FAKULTÄT FÜR !NFORMATIK
Faculty of Informatics

Einhaltung der Qualitätskriterien von IT Services

DIPLOMARBEIT

zur Erlangung des akademischen Grades

Diplom-Ingenieur/in

im Rahmen des Studiums

Software Engineering / Internet Computing

eingereicht von

Wolfgang Hofmann
Matrikelnummer 9525671

an der
Fakultät für Informatik der Technischen Universität Wien

Betreuung
Betreuer/in: Privatdoz. Dipl.-Ing. Mag.rer.soc.oec. Dr.techn. Edgar Weippl

Wien, 21.11.2011

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Management and Monitoring of Quality Criteria of IT Services

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Erklärung zur Verfassung der Arbeit

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Hiermit erkläre ich, dass ich diese Arbeit selbständig verfasst habe, dass ich die verwendeten Quellen und Hilfsmittel vollständig angegeben habe und dass ich die Stellen der Arbeit – einschließlich Tabellen, Karten und Abbildungen –, die anderen Werken oder dem Internet im Wortlaut oder dem Sinn nach entnommen sind, auf jeden Fall unter Angabe der Quelle als Entlehnung kenntlich gemacht habe.

Wien, 21. November 2011

(Wolfgang Hofmann)

Kurzfassung

In den letzten Jahren hat die Bedeutung von IT Diensten (Services) deutlich zugenommen, weshalb der Wert dieser Services maßgeblich an die Bedürfnisse des Business und an die Unternehmensziele gekoppelt ist und in Folge direkten Einfluss auf den Geschäftserfolg hat.

IT Frameworks und Standards unterstützen IT Organisationen und Unternehmen diese Dienste einzuführen, kontinuierlich zu verbessern und den Betrieb sicherzustellen.

Prozesse, Prinzipien, Methoden und Grundsätze werden im Zusammenhang mit den Geschäftsbedürfnissen eingefordert, allerdings sollte eine Service Strategie der Einführung neuer IT Services zu Grunde liegen.

Die IT Infrastructure Library (ITIL®) hat sich mit Version 3 dem Thema der Service Strategie verstärkt gewidmet und einen eigenen Teil publiziert, in welchem die unterschiedlichen Aspekte , Prinzipien, Methoden und Prozesse behandelt und detailliert beschrieben werden.

Diese Arbeit setzt sich mit dem Thema der Service Strategie auseinander und beleuchtet anhand eines realen Beispiels wie eine Service Strategie aussehen kann und wie diese definiert wurde.

Ebenso werden die organisatorischen und technischen Erfolgsfaktoren beleuchtet, die sich im Rahmen der Definition der Service Strategie für das Unternehmen ergeben und welche Probleme sich herauskristallisierten.

Den Abschluss der Arbeit bildet die Beschreibung einer technischen Lösung, die zeigt, wie der Betrieb von IT Services sichergestellt werden kann und die in der Service Strategie definierten Erfolgsfaktoren validiert werden können.

Abstract

The importance of IT services has significantly increased over the last years; the value of these services is strongly aligned with the business value and success of a company. IT frameworks and standards help IT organizations and companies to improve the deployment, operation and maintenance of IT services.

Policies, processes and business alignment are often demanded but a service strategy needs to be defined at the beginning of each provided service.

The IT Infrastructure Library introduced a key publication in Version 3 that mainly covers service strategy. Principles and processes for defining, organizing and implementing such a service strategy are explained in a very detailed way.

This thesis will outline how such a strategy looks like by definition and will showcase the service strategy by using a case study of an existing company.

Organizational and technical critical success factors will be defined as well as common problems that occur during the implementation of a strategy.

Finally the thesis shows how IT as a technical solution can assist in managing and monitoring quality criteria of IT services.

Acknowledgements

"Festina Lente"

This study is dedicated to

Ulrike Müller (the love of my life)

For your understanding, patience and support all of which enabled me to complete this project.

Emmi and Peter Hofmann (my parents)

For their dedication and support and for the sacrifices that they made me what I am today.

Martin Dworschak, Andreas Schabus and Ralph Zeller (current and former managers)

For their personal and leadership skills that help me to continuously improve myself.

Contents

List of Abbreviations

AOW	Area of World
BS15000	British Standard 15000
CCTA	Central Computer and Telecommunications Agency
CEO	Chief Executive Officer
CIO	Chief Information Officer
COBIT®	Control Objectives for Information and Related Technology
CSF	Critical Success Factor
GITMM	Government Infrastructure Management Method
IDC	International Data Corporation
IEC	International Electrotechnical Commission
IO	Infrastructure Optimization
ISACA®	Information Systems Audit and Control Association
ISO	International Organization for Standardization
ISO/IEC 20000	Information Technology Service Management
IT	Information Technology
ITGI	IT Governance Institute
ITIL®	Information Technology Infrastructure Library
ITSM	IT Service Management
KPI	Key Performance Indicator
MOF	Microsoft® Operations Framework
OGC	Office of Government Commerce
PBA	Patterns of Business Activity
PDCA	Plan-Do-Check-Act
PRINCE2®	Projects in Controlled Environments
QOS	Quality of Service
ROI	Return on Investment
SLA	Service Level Agreement
SOX	Sarbanes-Oxley (US law)
TCO	Total Cost of Ownership
TOGAF	The Open Group Architecture Framework
UP	User Profiles

1. Introduction

IT (Management) Frameworks (COBIT®[1], ISO/IEC 20000[2], ITIL®[3], MOF[4], PRINCE2®[5] …) are good / best practices solutions and standards for IT services. A lot of organizations use these frameworks and standards for their IT services to introduce processes that ensure the documentation and guarantee of the lifecycle and its value.

In the thesis the topic of the service strategy is mainly covered and how certain IT services independent from the region and the involved suppliers can be offered in a global / international company with a defined set of quality criteria (critical success factors and key performance indicators) and how this can be automatically managed, monitored, measured and visualized with technical tools.

1.1. Research Questions

The thesis analyses how a service strategy is defined and implemented in a real-life example of "The Company", so that the following questions can be addressed and answered:

What are the gaps between an ITIL® Service Strategy and a defined Service Strategy of a global / international company?

What are the organizational and technical critical success factors for the implementation?

Which typical problems occur in the definition and implementation of an ITIL® Service Strategy?

Which technical requirements need to be fulfilled in order to implement and use best practices frameworks such as ITIL® and what is the impact?

Part of the thesis is to evaluate which ITIL® Service Strategy functions, principles and processes are already implemented and which are missing.

The author will explain and outline why certain ITIL® Service Strategy parts are not defined and how technical solutions can support the management, monitoring, measurement and visualization of quality criteria of IT services.

[1] Control Objectives for Information and Related Technology (COBIT®), IT Governance Institute (ITGI)
[2] ISO/IEC 20000-1:2011, Internet Organization for Standardization (ISO)
[3] IT Infrastructure Library (ITIL®), Office of Government Commerce (OGC)
[4] Microsoft® Operations Framework (MOF), Microsoft®
[5] Projects in Controlled Environments (PRINCE2®), Office of Government Commerce (OGC)

1.2. Target Audience

The thesis is primarily for persons that work in companies that are willing to use the ITIL® best practices framework to define and implement a service strategy for IT services.

In addition, the implementation of a technical solution is explained that helps senior management and technical experts of IT organizations to understand how IT services can be managed and monitored so that additional value can be generated.

1.3. Objectives of the thesis

The following objectives are covered in the thesis:

- Introduction to the ITIL® Service Strategy and Definition of Quality Criteria
  - Principles
  - Processes
  - Architecture, Governance and Implementation
  - Quality Criteria
    i. Critical Success Factors (CSF)
    ii. Key Performance Indicators (KPI)
    iii. Infrastructure Optimization (IO)
    iv. Total Cost of Ownership (TCO)
- Definition of "The Company's" Infrastructure Service Strategy
- Comparison ITIL® Service Strategy and "The Company's" Infrastructure Service Strategy
- Technical solution and implementation for the management and monitoring of IT services

1.4. Methodological Approach

The following methodological approach is used in the thesis:

- Literature analysis based on ITIL® publications which have been approved by the OGC
- Empirical and explorative case study of a global / international company in a large scale environment

The empirical and explorative case study was used as most of the publications and thesis mainly touched the topic of IT Governance, the implementation of ITIL® and the impact of the usage of frameworks and standards at that time while this thesis focuses on the implementation of an ITIL® Service Strategy in a global / international company.

The case study can be used to identify potential quality criteria (critical success factors and key performance indicators) for the implementation of a service strategy and how technical solutions support the validation of these.

1.5. Expected Assumptions

The assumption is that global / international companies, that have a defined service strategy for IT services, don't need a full implementation of functions, principles and processes of an ITIL® Service Strategy but technical solutions that help IT organizations to validate the quality criteria of the IT services.

1.6. Demarcation

In addition to ITIL® many frameworks and standards such as Balanced Scorecards[6], COBIT®[7], ISO/IEC 20000, MOF[8], PRINCE2®... are published but ITIL® was selected as one of the most used and adopted frameworks in IT.

Different global, regional and local IT organizations exist in "The Company" and the author believes that the findings from the "Infrastructure" area can be applied and matched to all other IT business units in "The Company".

[6] Balanced Scorecards (Kaplan & Norton, 2006)
[7] Mapping ITIL to CobiT (Eder, 2006)
[8] Referenzmodelle im Rahmen von IT Governance (Sewera, 2005)

2. What is ITIL®?

ITIL® (Information Technology Infrastructure Library) is a best practices framework to manage IT services in an effective and efficient way.

ITIL® was initiated in the second half of 1980's by the British government in order to design a set of operational IT guidance. The main goal was to increase efficiency in Government IT and the task was given to Central Computer and Telecommunications Agency (CCTA).

Authors consolidated best practices and guidelines from existing industry standards in a so called Government Infrastructure Management Method (GITMM). In 1989 it was renamed to Information Technology Infrastructure Library (ITIL®).

During the 90's it gained worldwide popularity as the most complete set of best practices in IT Governance.

The updated version 2 in the year 2000 gained even more followers in the IT industry, as it focused more on bringing IT and business to understand each other. It defined a standard for a common language in IT, especially around IT Service Management (ITSM[9]), which was covered by two central books: Service Support and Service Delivery.

ITIL® ITSM with its ten basic processes and service desk function covered basic needs of various IT service departments for best practice guidance in daily operations.

Service Support	Service Delivery
Service Desk	Service Level Management
Incident Management	Availability Management
Problem Management	Capacity Management
Change Management	IT Service Continuity Management
Release Management	Financial Management
Configuration Management	

Table 1: ITIL® ITSM

ITIL® V1 and V2 was obviously process oriented, since relatively young IT organizations in the 90's and 2000's mostly needed basic organizational knowledge and skills.

In the 2000's two very important ITIL® offspring were created:

- MOF: Microsoft® Operations Framework is a complete and mature framework based on ITIL® V2, completely free of charge and public
- ISO/IEC 20000: ISO standard evolved from British standard BS15000 and provides ITIL® V2 related auditable set of requirements for IT service management business organizations willing to ensure full alignment with basic processes. Figure 1 shows the in 2011 released ISO/IEC 20000-1:2011[10], which replaced ISO20000-1:2005.

[9] (ITIL & ITSM World, 2010)
[10] ISO/IEC 20000-1:2011 (http://www.iso.org)

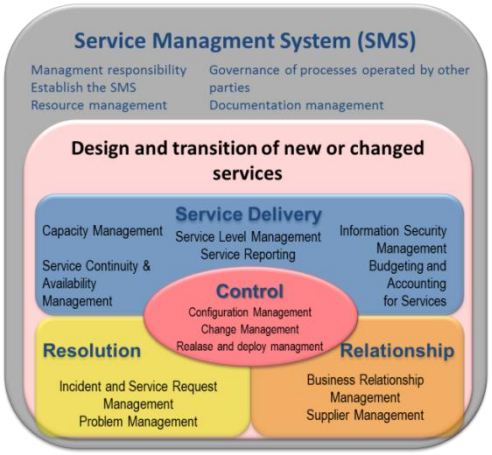


Figure 1: ISO/IEC 20000-1:2011

In 2001 CCTA became a part of the British Office of Government Commerce (OGC).

In May 2007 the third version of ITIL® was published. It introduced roughly 16 new processes and three functions. The main update was that processes were spread over five new lifecycle stages: Service Strategy, Service Design, Service Transition, Service Operation and Continual Service Improvement. This lifecycle approach was justified as IT organizations had gained maturity in the last years and that IT was not a mere support for business functions but it became an integral part of the business - a crucial and strategic asset. Hence it is important to follow the service through its lifecycle in order to support the business in an optimized way.

Figure 2 shows the five lifecycle stages that are covered in five respective ITIL® books:

Figure 2: ITIL® Service Lifecycle

These five core books represent the basic ITIL® knowledge. The intention was to later enhance these books by additional complementary publications and supporting web services.

In July 2011 the core books were updated and this edition is called ITIL® 2011. ITIL® 2011, the first update since 2007, addresses a broad range of issues raised by the ITIL® user community and resolved some errors and inconsistencies in text and diagrams across the core books suite.

Service Strategy	Service Design	Service Transition	Service Operation
• Strategy Management for IT services • Service Portfolio Management • Financial Management for IT Services; • Demand Management • Business Relationship management	• Service Catalogue • Availability Management • Capacity Management • Continuity Management • Service Level Management • Design Coordination	• Transition Planning and Support • Change Management • Service Asset & Configuration Management • Release and Deployment Management • Service Validation and Testing • Evaluation • Knowledge Management	• Event Management • Incident Management • Request Fulfilment • Problem Management • Access Management
Continual Service Improvement			
7-Step Improvement Process; Service Measurement; Service Reporting			

Table 2: ITIL® V3 2011

The basic and main focus of a service management discipline is to provide value to the customer, as "a service is a means of delivering value to customers by facilitating outcomes customers want to achieve without the ownership of specific costs and risks" (Cannon, Wheeldon, Lacy, & Hanna, 2011).

The service is incorporated and included in the five lifecycle stages:

Service Strategy: Service Strategy is the central position in the circular lifestyle scheme. Service management is regarded as a strategic asset in the service strategy stage. It deals with developing service markets, service provider types, development of a service portfolio, financial aspects of service management, business relationships and others. Strategy provides the tools and guidance to an organization to step back from daily operation and view existing services in terms of costs, risks involved and their performance. Strategy is about the pure cause of services, not about effects and how-to's.

Service Design: Service Design connects the strategy with transition and operation, providing tools to create and redesign services aligned with strategic objectives. It incorporates that service management is fully aligned with business needs and uses its capabilities in an efficient and resilient manner. Service design deals with service catalogue, availability, capacity, continuity and service level management.

Service Transition: Service transition deals with putting new and redesigned services into operation. The main goal of transition is to gather knowledge about the existing infrastructure, and then introduce new design elements in a controlled manner – in order to control risks of disrupting existing services. Transition stage covers disciplines of change, configuration, asset, release and deployment, validation, evaluation and knowledge management.

Service Operation: Service operation is the only lifecycle stage where service management creates new value. Operation is a critical stage as it makes results of previous stages visible to business. Operation is mostly about event, incident, problem, request and application management. Operation introduces four main ITIL® functions as well:

- Service Desk
- Application management
- IT operations management.
- Technical management

Continual Service Improvement (CSI) is not strictly a lifecycle stage, as it extends through all four other stages aiming to achieve a better design, transition and operation, aligned to strategic goals. CSI uses knowledge and skills of quality management and implements Deming's Plan-Do-Check-Act cycle[11] which Figure 3 shows:

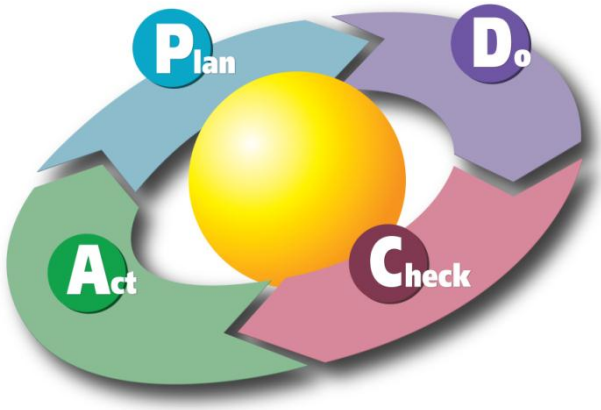


Figure 3: PDCA Cycle: Diagram by Karn G. Bulsuk

CSI implements a 7 step improvement process, reporting and takes care of service measurement.

[11] Plan-Do-Check-Act (PDCA), (Bulsak, 2009)

3. What is an ITIL® Service Strategy?

By a broader definition, strategy is a plan devised to achieve a long-term aim. Service strategy is therefore a systematic long-term plan designed by the IT service organization to achieve defined objectives.

The main goal of service strategy is to enable the service provider to think “what?” and “why?” before considering “how?”

In the ITIL® Service Strategy the “what and why” are about defining goals and objectives, while “how” is to be defined later in the ITIL® Service Design, Transition and Operation.

Service strategy provides guidance to a service organization to operate and grow successfully in the long term, to think and act in a strategic manner while transforming service management capabilities into a strategic asset.

It will help the service organization to understand and improve relationships between the IT services, processes and systems, having in mind business objectives and managing associated risks and costs.

Service strategy enables the service organization to align its service solutions to customer’s business needs and requirements.

Good service strategy will help a service provider to focus on customer “outcomes”, to raise the customer’s perception of the value delivered to him by the service.

Service provider must have a clear vision and understanding of the market place where the customer operates, in order to have a better picture of customer requirements. This is especially difficult when services for an unknown or potential customer are considered.

A successful service strategy of a service provider will enable the organization to differentiate positively from the potential competition.

3.1. Service management as a practice

Service management

In ITIL® the definition of service management is “a set of specialized organizational capabilities for providing value to customers in the form of services” (Cannon, Wheeldon, Lacy, & Hanna, 2011).

Service management is a discipline which deals with transforming resources into value for a customer, according to definition of a service. Main capabilities in service management are functions and processes for managing services through the service lifecycle.

Customers get the outcomes they want to achieve by purchasing or using a service. Perceived quality of these outcomes determines the value of the service to the customer.

A process is “a set of coordinated activities combining and implementing resources and capabilities in order to produce an outcome, which, directly or indirectly, creates value for an external customer or stakeholder” (Cannon, Wheeldon, Lacy, & Hanna, 2011).

Business wants IT to effectively and dynamically support its existing business processes. Business managers often lack the insight on complexity and problems of supporting the business process within the realm of IT resources. IT people, on the other hand do not understand exactly goals of business managers. Service management principles are used to reduce this gap. Among others these principles are specialization and coordination, agency principle, encapsulation etc.

It is one of the main objectives to align the governance (Gruber, 2007) (Rieder, 2006) and planning processes within the IT organization to achieve business value and cost effective solutions. Therefore “The Company’s” IT governance (“The Company’s” Infrastructure Service Strategy) is similar to the definition by the IT Governance Institute (ITGI)[12]:

“IT Governance is the responsibility of executives and the board of directors, and consists of the leadership, organizational structures and processes that ensure that the enterprise’s IT sustains and extends the organization’s strategies and objectives” (IT Governance Institute, 2007).

Main service management capabilities are functions and processes.

Functions

Functions are “units of organizations specialized to perform certain types of work and be responsible for specific outcomes” (Cannon, ITIL® Service Operation, 2007). Functions are self-contained units with their work methods, processes and body of knowledge. They can be viewed as organizational business units.

Service Desk is the oldest known ITIL® function. It provides a single point of contact for customers while dealing with restoration of normal operational service with minimal business impact on the customer. Other functions are Application, Technical and Operations management.

To improve cross-functional coordination and avoid pitfall of silo-mentality, service management needs well defined processes.

Processes

Process has actions, dependencies, sequence, inputs and outputs. Process is measurable; it has specific results and its own customers (owners). Process is usually event driven.

Incident Management is a process:

- The process starts with an incoming call or operations control tool notification (Event)
- Count of incidents, resolved in a first call or specific types (Measurable)
- Knowledge of the results of all closed incidents (Output result)
- Every incident has a contact person, (Customer) and Service Desk is the owner

[12] IT Governance Institute (http://www.itgi.org)

Operations management is not a process - it's a day-to-day activity which interacts with processes. Some organizations define some functions as processes if it suits their business and organizational requirements.

3.2. Service strategy principles

Fundamental aspects of strategy

A good service strategy should define a way to create and deliver a better value to the customer.

Main objective of service strategy is to recognize competitors and have them in mind when considering services which will in some way be better than theirs.

The four Ps of strategy

Strategy can be defined through so called four Ps model, which was introduced by Mintzberg in 1994: (Mintzberg, 1994)

- **Perspective** – what is the vision and mission of the company? Which beliefs and values are shared by the entire organization? There are various methods for setting the perspective. It can be propagated top-down by brute force and engraved in employees minds, or it can be derived bottom–up by various performance management methodologies by getting basic values from personal and business unit goals. Perspective sets the general course of company's strategy.
- **Position** – by definition it "describes the decision to adopt a well-defined stance" (Cannon, Wheeldon, Lacy, & Hanna, 2011). Position is a further definition of Perspective: Who will we serve, will we focus on utility or warranty…. Position can be based on variety, needs and access.
    - *Variety based positioning* – says that service provider operates with a narrow service catalogue covering a large customer base. Provider will grow mostly on new customers served by the existing catalogue. Example would be Document Management and Printing solutions for any firm that requires these services.
    - *Needs based positioning* - service provider operates with only a particular type of customers. Example: most or all IT services for law firms or restaurant franchises.
    - *Access-based positioning* - service provider chooses to operate with customers of specific location, scale, or structures. Reasons can vary
- **Plan** - Strategy as a plan describes transition from "as is" to "to be". Example: "we plan to outsource our email and collaboration platforms to a service provider Type III by the end of next year". Plans can vary by length depending on complexity and organization size, but they usually take a long time. Several plans can and frequently do coexist in order to support strategic position and perspective of the company.
- **Pattern** – is the way a company does business. Patterns are elementary strategy building blocks. They can be prescribed as policies, processes and procedures or they can be captured in a tacit knowledge recognized by the company as actions which deliver value to customers.

Different types of patterns are How-to patterns, which prescribe the style of doing things, or Boundary patterns, setting the focus on activities.

Creating Value

To be able to create value for the customer, a provider must know customer's needs. Value is not just a simple financially measurable category like a business outcome. Value depends on customer's perceptions. And perceptions are defined as the difference between perceived outcome and his/hers expectations.

Services have some real attributes and customers have preferences for them, influenced by perceptions. This is the real context of business outcomes.

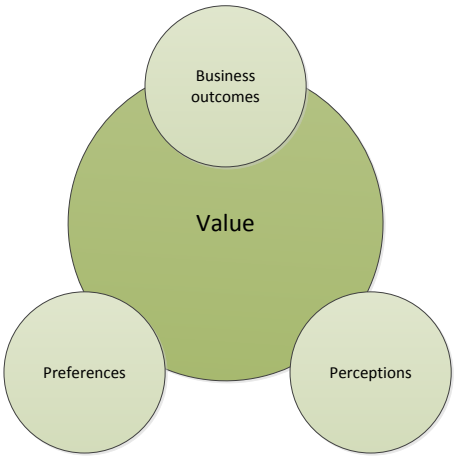


Figure 4: Components of value (Cannon, Wheeldon, Lacy, & Hanna, 2011)

As the value is defined mostly in the customer's mind, it is a job of a service provider to understand customer perceptions and preferences, and align them with future service attributes.

This will reduce the gap between what a customer perceives and what IT thinks it provides.

To create value for the customer, it is useful for a service provider to use marketing skills. Marketing mind-set is important in order to be able to see through the eyes of the customer:

- What are the business requirements and values?
- Who will use the service?
- How will they use it?
- Why do they need it?
- What demand will be fulfilled?

A marketing mind-set helps a service provider to move the focus from features and attributes towards customer needs and serving business outcomes.

Two basic characteristics of the service value are utility and warranty:

- **Utility**, or "fit for purpose" is seen by the customer through the service attributes that have a positive effect on desired business outcomes. Utility is the functionality of the service from the customer's perspective. Utility can be communicated in terms of supported outcomes, meaning that service adds to the business value by supporting the business process. Also, utility can be communicated by ownership costs and avoided risks: service has to support a business need in a way that it reduces risks of costs created by unwanted outcomes. This is contained in the very definition of a service.
- **Warranty**, or "fit for use", is the positive effect of the service being available when needed, in sufficient capacity or magnitude, and reliable in terms of continuity and security. Warranty is a kind of assurance that the service will be there when needed.
  Warranty is communicated by terms of availability, capacity, continuity and security.

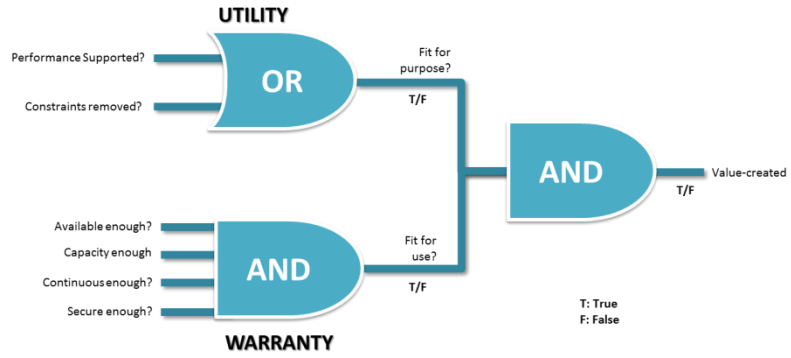


Figure 5: Utility and Warranty (Cannon, Wheeldon, Lacy, & Hanna, 2011)

Value of the service is perceived by the customer as a combination of utility and warranty.

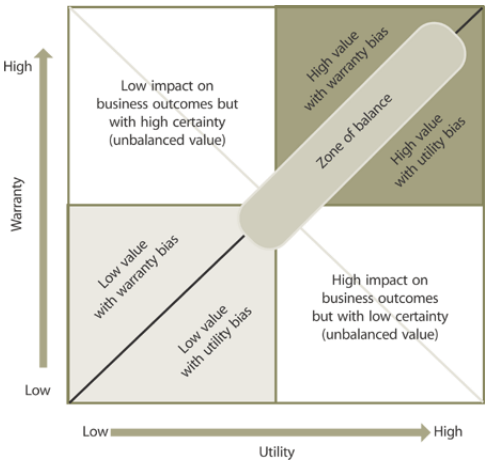


Figure 6: Effect of utility and warranty on customer assets (Cannon, Wheeldon, Lacy, & Hanna, 2011)

Customers will usually evaluate utility first, but warranty will have a high influence on a final customer's decision. So neither utility nor warranty is optional, they must exist both in order to provide value for the customer via an IT service.

Service Assets

Assets are defined via resources and capabilities:

- **Resources** are organization assets in a narrower sense – they are the direct input for production. Resources are capital, infrastructure, applications, information and people.
- **Capabilities** are intangible assets of the organization. They represent the ability of an organization to carry out an activity.

A service asset is any organization's asset (resource or capability) that contributes to the delivery of a service.

Organizations develop their capabilities over time. Two service organizations can have very similar resources, but differ significantly in their distinctive capabilities.

Service Providers

In IT service management there are three basic types of service provider: internal, shared and external service provider.

- **Type I:** *Internal service providers* are a part of business organizations that provide services. They are tightly connected to the business and they can considerably customize themselves and their services to their business (customers). Internal service providers usually serve smaller to mid-sized companies or even separate business units in a larger enterprise. Security of their services can be set up on a high level. Their capacity and availability have to be managed so that they are cost effective and highly skilled to support a usually narrow set of business functions in their internal market space.
- **Type II:** *Shared Services units* are service providers serving multiple business units, usually on a corporate/enterprise level. Information Technology, Finance and Human Resources usually form a Shared Services business unit managed on a corporate level. Their services are provided to a broader market space then Type I, but still fairly customized for their customers. On the other side, their services are more visible and often compared to available external service provider services.
- **Type III:** *External service providers* can have resources and capabilities which are unavailable to Type I and II providers. Customers often decide for Type III when they need expertise, resources and experience which they can't afford. Or they simply want to reduce their fixed costs, assets and operational risks. Security issues can act discouragingly here, especially if a Type III service provider is to be shared with the competition.

Based on their needs and basic service provider type characteristics, customer switch between types according to drivers as shown in the following table:

From/To	Type I	Type II	Type III
Type I	Functional reorganization	Disaggregation	Outsourcing
Type II	Aggregation	Corporate reorganization	Outsourcing
Type III	Insourcing	Insourcing	Value net reconfiguration

Table 3: Service Provider Characteristics

Service Structures

Service structures in IT service management are transforming from value chains to value networks.

- **Value chain** is an industrial age archetype, with sequential mind-set connected to production line: a series of sequential services influences the product adding to its value.
- **Value network** model describes complex nature of IT services as patterns of complex collaborative exchanges which occur in various places and times between two or more business organizations.

In the recent past, the only users of IT services were business people. Over the last few decades IT services became deeply incorporated in the business, most of the organizations could not survive several days without IT. IT is deeply embedded in everyday life with all kinds of digital services available to individual users. Collaborative services, video on demand, Wireless LAN, terminals and cloud services are creating service systems which are impossible to describe in a simple value chain.

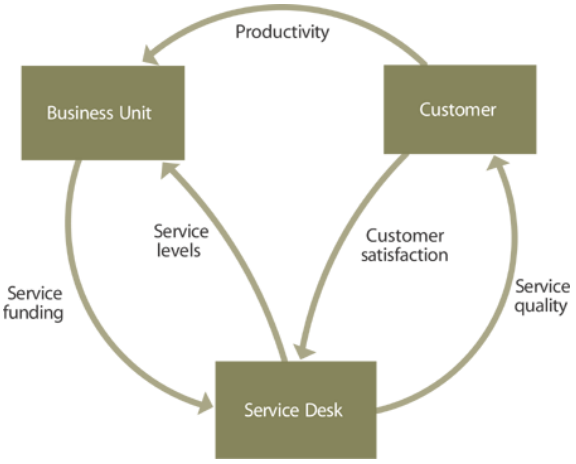


Figure 7: Example of a value network (Cannon, Wheeldon, Lacy, & Hanna, 2011)

Value net diagrams are used to describe value networks. Value net diagrams visually present actors or participants in a service, patterns of transaction exchange and deliverables in a simple and elegant way. They help the strategy to pinpoint and define best ways to generate value.

3.3. Service strategy processes

Service Portfolio Management

A service organization manages investments in services across the lifecycle by exercising Service Portfolio Management.

Service Portfolio Management enables customers to understand what services are available, why they should use them (and why from this provider) and what will be the costs.

It also enables a service organization to determine weaknesses and strengths of their portfolio, what the priorities and weaknesses of their investment are and how to allocate resources according to these priorities and risks.

"Service Portfolio is the complete set of Services that are managed through their lifecycle, from proposal though development, operation, and retirement. It includes three categories: Service Pipeline (proposed or in development), Service Catalogue (in operation) and retired Services." (Cannon, ITIL® Service Operation, 2007)

Activities

Key activities in Service Portfolio Management process:

- **Define** – collect all services in the pipeline and catalogue them with their business cases
- **Analyse** – determine services required for the organization to reach its service goals; alignment of Service Portfolio with these needs; defining resources required and prioritization to meet the demand
- **Approve** – define the future Service Portfolio, retention of necessary existing services is authorized, the transition of services that need change require investment
- **Charter** – approved decisions are communicated to Portfolio, new chartered services promoted to Design, refresh existing services in the Catalogue, and initiate Service Transition activities.

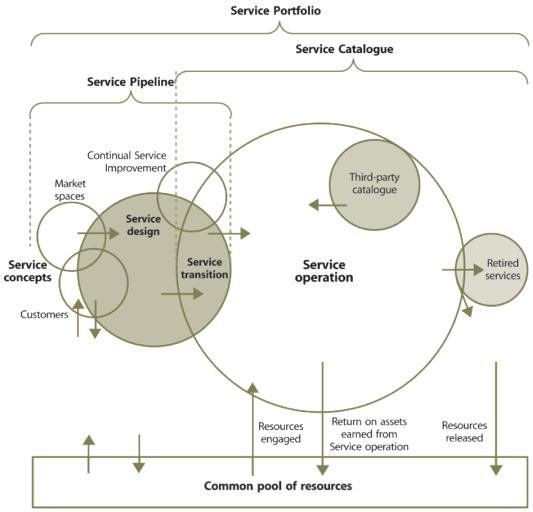


Figure 8: Service Portfolio Management (TSO Scotland, 2011)

The Product Manager owns each set of services in Portfolio Management:

- Management of a service through the lifecycle from an idea to retirement.
- Participation in Service Strategy development and execution through the Lifecycle

Financial management for IT services

Financial management enables the service organization to measure the value of IT services and underpinning assets. It manages cost-effectiveness of IT Service Management.

Financial management naturally resides in Accounting and Finance and service organizations use it to achieve:

- Better decision making
- Change speed
- Better Service Portfolio Management
- Financial and Operational control
- Sense of service value

Financial management data is very important input for Continual Service Improvement stage, providing data for keeping costs of the improvement and the additional value to the customer in balance (Chapter 3.7.1 Industry Quality Criteria, Total Cost of Ownership).

Service Valuation

- Provisioning value – what are the costs of the specific service provided to the customer
- Service value potential – the ratio of perceived values to cost of added services

Demand modelling

Demand modelling is focused on TCO of service provision to the customer.

Return of Investment

Return of Investment (ROI) is the main value of an investment.

Activities

Service ordered accounting is used to balance consumption and provisioning

Financial management in Accounting is a standard discipline of aligning corporate financial systems and IT Service Management.

Challenges

Monitoring tools providing utilization information have to be justified in terms of utilisation and costs (Chapter 6 Management and Monitoring of IT Services that are defined in the Infrastructure Service Strategy)

Planning information has to be communicated to the provider and the customer in a timely manner

Metrics

- Financial trends of services
- Utilization data

Roles

Organizations need to have dedicated IT Financial Managers, Chief Technical Managers, Support Managers, Senior IT Managers and Service Level Managers whose responsibilities include:

- Accounting
- Budgeting and Forecasting
- Supporting auditors

Demand management

It is impossible to produce services in advance. A service organization has to anticipate capacity and availability for a future demand. In order to be able to predict the demand, a provider has to clearly understand the Patterns of Business Activity (PBA) for every customer. Customer's assets like people, processes and applications define and generate PBAs.

User Profile (UP) determines a pattern of customer demand. A specific UP can include one or more PBAs.

Activities

Activity-based demand management is a method of collecting knowledge about customer's PBAs in order to predict future demand for service. The goal is to align customer's business plan to IT Service Management[13] plans.

Challenges

- Demand has to be managed, otherwise it is a serious risk source
- Lack of capacity influences quality of service (QoS)
- Too much and unused capacity generates unnecessary costs
- Capacity Plan has to be driven by a clear understanding of customer's PBA

Metrics

- What are real demand patterns which are used for activity/demand modelling?
- Which business activities support PBAs, UPs, monitoring and maintenance?

Roles

The Business Relationship Manager role is responsible for the key interface to understand and generate demand of a customer.

[13] IT Service Management: An Introduction (Bon, Pondman, & Kemmerling, 2002)

3.4. Service strategy, governance, architecture and ITSM implementation strategies

Governance

"Governance is the single overarching area that ties IT and business together, and services are one way of ensuring that the organization is able to execute that governance" (Cannon, Wheeldon, Lacy, & Hanna, 2011). When an organization looks at improving their business, values, processes,... to meet business requirements it is key that governance of organizations supports the change. Corporate governance refers to the rules, policies and processes by which businesses are operated, controlled and regulated.

ITIL® looks at governance as a set of strategies, policies and plans:

Figure 9: Strategy, Policy and Plan (Cannon, Wheeldon, Lacy, & Hanna, 2011)

Governance is therefore created and designed by first defining a strategy, then implementing the right policies to adhere to the strategy and in the end the action to make sure the strategy is achieved.

The strategy and policies are set and defined by the "governors". This can be any person or group that is responsible for governing the organization. In an organization that is usually a board of directors, senior government officials or an executive body.

Managers then define the plans that again need approval by the governors. Management is done by executives, led by the Chief Executive Officer (CEO) in an organization. They coordinate and control that the governance policies with their rules and processes are executed and the plans are working in an optimized way - all adhering to the top goal to achieve the strategy that is defined by the governors (Victor & Günther, 2005).

IT governance is part of corporate governance; there is no separate definition of the term. “This implies that IT complies with and fulfills the policies and rules of the organization and does not create a separate set for itself” (Cannon, Wheeldon, Lacy, & Hanna, 2011).

Nevertheless it is crucial that IT executives influence corporate governance that specifies how IT is governed. This is part of the responsibility of an IT committee. The final decision for IT governance and its strategy, policies and plans will be made by the governors in any case.

According to ITIL® the steering committee has various objectives:

- Discussion and influence of IT strategy, its contents and consequences
- Strategic requirements of other business units
- Decisions around funding
- Setting disputes about priorities
- Minimum Service Level for a service
- Negotiating changes to policies

As mentioned above governors are responsible to define the overarching strategy. When it comes to the management of the strategy and the fulfillment of it, the task lies with the responsible part of the organization. For example a CIO is responsible for strategy management for an internal IT service provider.

Establishing and maintaining a service management system

“Governance works to apply a consistently managed approach at all levels of the organization. Areas of specialization and processes within the organization are managed by management systems.

A Service Management System (SMS) includes all service management strategies, policies, objectives, plan, documentation, processes and resources required to deliver services to customers. It identifies the organizational structure, authorities, roles and responsibilities associated with the oversight of service management processes” (Brooks, Building Your IT Service Desk Dashboard: Three Steps to Finding Context, 2011).

An organization usually not only implements a SMS, but other management systems as well:

- A quality management system
- An information security management system
- A service management system
- An environmental management system

As there are overlaps between the various systems, organizations often manage them in an integrated way.

IT service strategy and the business[14]

IT service strategy and the business need to be aligned and closely connected in an organization to maximize the impact. In best practice examples strategies are deeply integrated in the business vision, mission and core values.

An overarching IT service strategy includes objectively considering a service's current state, its future state, competition, opportunity, risk and talking with the business.

In this context a service needs to support the business outcome as well as the strategy. To measure its effectiveness an organization needs to assess and evaluate its impact on the balance of the organization, by looking at e.g. costs, trends, values, etc. The goal is not to seek a perfect balance, but it should support the overall business vision and mission.

IT services strategy and enterprise architecture

"Enterprise architecture refers to the description of an organization's enterprise and associated components. It describes the organizational relationship with systems, sub-systems and external environments along with the interdependencies" (Cannon, Wheeldon, Lacy, & Hanna, 2011)

Enterprise architecture supports service strategy by clearly defining business processes and engineering design principles, therefore service strategy and enterprise architecture complement each other. The team for enterprise architecture creates models to design services, processes and function. These models can easily be extended, so that service management implementation model can be added. It is important that IT strategy supports the enterprise architecture principles and acts as a business partner.

Below you can find two examples of enterprise architecture frameworks:

- TOGAF: framework for the design, planning, implementation and governance of an enterprise (Lei, 2011)
- The Zachman Framework: two dimensional matrix that can be used to view and define an enterprise (Sessions, 2007)

IT service strategy and application development

Application development, IT strategy and service strategy are closely aligned and linked in many different areas. IT strategy combined with service strategy lifecycle provide primary input into governance and application development and help in the decision making process (e.g. classification of service assets and build vs. buy strategies).

[14] A comparison of the views of business and IT management (Burn & Szeto, 2000)

3.5. Organizing for service strategy

IT organizations, like any other organization, are subject to transaction costs. The more efficiently resources are used, the more efficient the organization's strategy and the higher its distinctiveness. Under certain circumstances, it is more efficient for an organization to cooperate instead of contracting or sourcing outside organizations, due to the risks involved in contracting.

Organizational development

Organizations can be organized in a centralized or decentralized way. Centralized IT organizations are characterized by economies of scale and control, neglecting responsiveness and business unit ownership; whereas decentralized organizations stand for rapid response and increased business unit ownership, neglecting synergy and control. It has been observed that well-running organizations tend to take up a more decentralized model, whereas in times of crisis a shift to a more centralized model is common. A constant shift from one type of model to the other is seen as the main source of long-term organizational problems. Resolving these problems involves major organizational change, which depends on three main factors: the management's ability to recognize the need for change, the influence of outside forces and the age and size of the organization.

Stages of organizational development

Every organization has a dominant management style that serves the needs of the organization for a limited period or stage (network, directive, delegating, coordinated or collaborative). As service requirements evolve, management requirements change and problems arise. Before these are resolved, the organization cannot continue to grow. Problems however cannot be resolved by retiring to a previous management style or stage.

Stage 1 organizations have a network structure, are often entrepreneurial and focused on innovation and a fast delivery of services. They are characterized by informal, flexible, bureaucratic and non-hierarchical structures, and actions are coordinated via agreements. As the organization grows and service demands increase, this type of structure will prove unsuitable and conflicts will arise as a result. To overcome this challenge, a change in the organizational structure and leadership is required in order to create a competent management team.

Stage 2 organizations are characterized by hierarchical (directive) structures that separate functional activities. The outcome of the stage 1 crisis is a strong management team and so decision-making and innovation is limited. The consequence is a staff crisis, which can be resolved by greater delegation. Process owners should be given autonomy for low-level decision-making and service accountability.

In stage 3 organizations, a decentralized, a delegating organizational structure is adopted, and more responsibility is transferred from functional owners to process owners, as a result of a stage 2 crisis. Problems arise when functional and process objectives collide. The solution to this crisis lies in developing the organization's coordination techniques, via formal systems and programs. Neither a purely functional nor a pure process model will solve the situation; there must be a balance between both types.

Stage 4 organizations are characterized by planned, coordinated service management structures. Technical functions are centralized, service management ones are decentralized. The challenge lies in the organization's capacity to respond to business needs in an intelligent and fast manner and to avoid excessive bureaucracy, which limits innovation.

A common structure adopted by stage 5 organizations is the matrix structure, which allows the formation of teams across functions to respond to changes in business and strategy. The focus lies on greater cooperation with the business, and an organization of this type will adopt whatever functions necessary to achieve its objectives, relying on minimum vertical and maximum horizontal control from the use of incorporated teams. This collaborative structure allows an organization to respond in a more agile way to changing product or customer needs and reduces functional barriers.

Organizational change

The process of organizational change consists of three steps. The first step is diagnosis: recognizing and acknowledging the need for change. The second step is determining the desired state, starting with the organizational strategy and structure. The third step is implementing the change: identifying possible obstacles to change, deciding on who will be in charge of and responsible for the change process (internal or external agents), and choosing the strategy that will best unfreeze, change and refreeze the organization (either bottom-up or top-down).

Organizational departmentalization

When functions, i.e. functional groups, grow to departmental size, they can be reoriented toward function, product, market space or customer, geography, process, or a combination of these, according to the aims of the service strategy.

Organizational design

The key to organizational design is strategy, which directs and guides the design process. Thus departmentalization decisions should be taken before designing key processes. Processes depend on the strategy and may be modified accordingly to meet the demands thereof.

Organizational culture

Organizational culture is the set of shared values and norms that control an organization's interactions. There are two types of organizational values, terminal values (desired outcomes or end-states) and instrumental values (desired modes of behavior), which determine an organization's behavior.

Functions

A function is a person or group of people and the resources they use to implement one or more processes or tasks. For a service strategy to succeed, the roles and responsibilities of each function need to be clearly defined and managed accordingly.

Roles

In order for service strategy to succeed, a series of roles need to be carried out. Roles shall not be confused with job titles; they are a set of responsibilities, tasks and authorities granted to an individual or team. Roles are defined in processes and functions. An individual can carry out more than a single role, and the same role may be carried out by more than one individual. Each organization shall define appropriate job titles and descriptions for each role.

There are two types of roles, generic roles (process manager, process owner) and specific roles (involved within a particular process).

Generic service owner role

The service owner is accountable for the delivery of a specific IT service and for the management thereof with a business focus. The service owner's responsibilities include defining, understanding, reviewing, supporting, monitoring and improving the service, ensuring the efficient performance of the service, change management, accountability to and communication with the customer, representation of the service across the organization, serving as the point of notification in case of an incident and being the primary stakeholder in all IT processes related to their service.

Generic process owner role

The process owner is accountable for the performance of a specific process according to the agreed standard and process definition. The process owner is accountable for designing, changing, improving the process and its strategy; design, documentation, process policies and standards and the compliance thereof, process communication, process technicians, and collaboration with the CSI manager, among others. Strategy management for process owners consists of collaborating with other process owners to ensure correct representation of the organization's strategy in the processes; financial management includes collaborating with other process owners.

Specific process owner roles include service portfolio management process owners, business relationship management process owner and demand management process owner, who collaborate with other process owners to ensure maximum efficiency in the implementation of their management.

Generic process manager role

The process manager is accountable for operational management of a specific process. Their responsibilities include cooperating with the process owner, service owners and other process managers, resource management, role assignment, process performance and improvement. Strategy

management for process managers encompasses a further set of responsibilities, as does financial management.

Specific process manager roles include service portfolio process managers (responsible for the service portfolio, its marketing and adjustment to customer needs); business relationship management process manager (responsible for supervising the customer environment and for meeting the customers' requirements, adjusting services accordingly); demand management process manager.

Other roles involved in the strategy management for IT services process

Process practitioners (generic role) carry out one or more process activities, for which they are accountable. Business strategy managers are responsible for the formulation, documentation, performance, adjustment and successful implementation of the strategy. IT directors or service management directors are responsible for the overall implementation and performance of all ITSM processes. The IT steering group, as has already been mentioned, steers the overall direction of the service strategy.

Further roles include business relationship managers (BRMs), customers and users, budget holders (responsible for the administration, documentation and planning of the budget), and sourcing roles. Any sourcing strategy should be carried out via supplier management and it is important the role of sourcing officer is defined. Their function is to promote, coordinate and evaluate the sourcing strategy, with the aim of creating a shared identity between internal and external sources.

Responsibility model – RACI

To ensure effective service management, it is essential that accountability and responsibility are clearly defined. This can be achieved with the RACI model (Klemencic, 2006) or "authority matrix", often used in organizations to define the roles and responsibilities associated with specific processes. The acronym stands for the four main competencies of being:

- Responsible
- Accountable
- Consulted
- Informed

Only one person can be accountable for an activity, and is accountable for it from beginning to end, whereas more than one can be responsible for it. The RACI model allows keeping track of who does what in a process.

Competence and training

Service quality mostly depends on the service staff's educational background, training, competencies and experiences. Nonetheless, there are a series of requirements that all members of an IT service provider should fulfill. They include awareness of their own role, business priorities, the role IT plays in business success and management and communication skills, among others. Common frameworks

of reference, such as the Skills Framework for the Information Age (SFIA) have been developed to define the skills and competencies required to carry out certain IT services and to facilitate service and human resources management. Furthermore, training programs in service management such as the ITIL qualification scheme allows organizations to expand and standardize competencies.

3.6. Implementing service strategy

Implementation through the service lifecycle

Service providers adopt strategic positions based on the need to serve specific customers and market spaces, influenced by strategic perspectives. These positions and perspectives are transformed into plans with specific objectives and patterns of execution through the service lifecycle. Plans translate the strategic objectives into concrete projects and programmes via service design, transition, operation and continual improvement. Each stage of the service lifecycle is influenced by service strategy.

Service strategy describes the portfolio of offered services and the customers they are targeted at. This in turn determines the customer agreement portfolio that needs to be supported with design, transition and operation capabilities (i.e. systems, processes, knowledge, skills and experience). Design and operation capabilities determine the transition capabilities required. These, in turn, determine the duration of the transition, provide visibility and control over service management, and interact with service design and operations to provide new service models and increase operational effectiveness. The outcome is the level of service provided to customers.

Service strategy requires ongoing service revision and improvement via feedback. New positions are introduced based on emerging patterns from service execution. This bottom-up approach is combined with the top-down approach to create a closed-loop planning and control system. Feedback is essential to change and innovation.

Service strategy implementation activities following a lifecycle approach

Service strategy defines the service lifecycle and how services are designed, transitioned, operated and improved. It is therefore essential that the implementation and improvement of service strategy processes follow the service lifecycle stages of design, transition, operation and continual improvement. Furthermore, by defining the direction, policies and standards of execution for each stage of the lifecycle, service strategy has a major impact on the lifecycle stages.

Setting the implementation strategy

Before creating service strategy processes it is essential the service strategy is formally defined. This definition shall include current state assessment, target state definition, gap analysis, project identification, project estimation, project consolidation and a chronological plan of action. A crucial aspect during this stage is assessing the impact the strategy and the new processes will have on the organization’s current direction.

Both the service strategy and their processes are owned by senior executives and are their main responsibility. This way, service strategy becomes the core of the service provider business.

Designing service strategy

During the design stage, the processes, tools and structures of service strategy are designed based on the assessment of requirements for each area to be implemented. This stage includes design of strategy management, service portfolio management, financial management, demand management and business relationship management and the corresponding definition of roles and the interfaces between service strategy processes and all other processes, among others.

It is important to note that when it comes to service portfolio management, the design of the processes and tools is conducted prior to defining the actual services to be implemented to avoid poorly defined service models.

Service strategy defines the direction, the objectives and the desired outcomes of services, based on customer requirements. This means that it simultaneously both enables and restricts design, setting the limits and constraints within which the design must be carried out. Constraints may include funding, policies and standards, resource constraints, values and ethics, etc.

Service models play an important role during the design stage. They provide input about the market space and necessary assets to effectively implement the service and therefore provide a starting point for developing strategic services. Additionally, the assessment of patterns of business activity (PBA) provides information regarding the utilization, capacity, availability and performance of services. Business impact analysis (BIA) ensures incorporation of adequate levels of availability, service continuity and performance. Business relationship management, on the other hand, provides information regarding the customer environment and requirements. This way, any changes in the design or service requirements that affect the service model or overall strategy are validated against the service strategy.

Transitioning service strategy

The transition stage of service strategy consists of constructing or purchasing the previously designed processes and tools, reviewing and testing them for performance and deploying them. This stage includes staff and user training on the implementation of the tools. In this stage the necessary changes in organization, organizational culture and service take place. The influence of service strategy during this stage can be summed up as follows:

1. Service strategy determines the way services are transitioned.
2. It defines what needs to change, when and how, according to the overall strategy.
3. It provides the basis on which services are reviewed.

Operating service strategy

During the operating stage of service strategy, the previously designed and transitioned processes and tools are executed and monitored for their performance and the overall success of the strategy. Service strategy is realized in this stage. Therefore, it is essential that the strategy takes operational

capabilities and constraints into consideration and that those operational activities are designed and evaluated based on the strategic objectives and outcomes.

Continual improvement of service strategy

Continual service improvement consists of revising and evaluating the success of services based on service strategy and desired outcomes. Continual and ongoing revision of services influences service strategy by determining necessary changes and evaluating the efficiency and effectiveness of services.

3.7. Quality Criteria (Critical Success Factors, Key Performance Indicators)

Organizations use best practices frameworks such as COBIT®, ITIL®, and MOF to create value to its customers and stakeholders in any form. This can vary from one organization or service provider to the other one and very often depends on the organization's requirements and expectations.

In each of the five ITIL® publications, typical critical success factors and key performance indicators are defined which help organizations to build their own quality criteria, critical success factors[15] and key performance indicators.

Therefore it is reasonable that a service strategy can include quality criteria, critical success factors and key performance indicators from all different areas related to the provided services.

This chapter will explain how quality criteria, critical success factors and key performance indicators are defined, how examples look like and how industry quality criteria can be included in the service strategy.

Quality Criteria

Quality criteria are defined by a set of critical success factors that include key performance indicators. These quality criteria are then evaluated regularly to ensure the success and value of the services.

"Quality Criteria is ability of a product, service or process to provide the intended value. For example, a hardware component can be considered of high quality if it performs as expected and delivers the required reliability. Process quality also requires the ability to monitor effectiveness and efficiency, and to improve them if necessary" (Cannon, Wheeldon, Lacy, & Hanna, 2011).

[15] Critical Success Factors in the alignment of IS plans with business plans (Teo & Ang, 1998)

Examples for quality criteria:

- Service Strategy Management
- Service Portfolio Management
- Service Project Management
- Service Level Management
- Change Management
- Optimization of IT Infrastructure
- Standardization
- Total Cost of Ownership

Critical Success Factor (CSF)

Critical success factors are conditions that have to be met or activities that need to be done to measure if they are successful or not.

“Something that must happen if an IT service, process, plan, project or other activity is to succeed. Key performance indicators are used to measure the achievement of each critical success factor. For example, a critical success factor of protect IT services when making changes could be measured by key performance indicators such as percentage reduction of unsuccessful changes, percentage reduction in changes causing incidents” (Cannon, Wheeldon, Lacy, & Hanna, 2011).

“The identification, measurement and periodic review of CSFs to determine the service assets required to successfully implement the desired service strategy” (Cartlidge, Hanna, Rudd, Macfarlane, Windebank, & Rance, 2007).

Examples of CSF:

- Understanding about the strategy
- Regular review of the strategy
- Offering of services
- Formal process to provide services
- Reduction in SLA breaches
- Increase in customer satisfaction
- Services covered in end-to-end

Key Performance Indicator (KPI)

KPIs are metrics associated to CSFs and help to evaluate and measure these factors.

Hillebrandt defines KPIs “as atomic measures that provide low level measurements of how well the ITIL® services are running. For every KPI there should be a target value, to which the current value is compared to - without a target, there would simply be no way of telling if a goal is reached or not. There is a number of KPIs suggested in the ITIL® framework for every state of the service lifecycle” (Hillebrandt, 2009).

“A Key Performance Indicator is a specific metric that can be used to help manage and report on IT services, processes, plans, projects or other activities. KPIs help to measure the achievement of critical success factors. Many metrics may be measured, but only the most important ones are defined as key performance indicators and used to actively manage and report on the process, IT service or activity” (Cannon, Wheeldon, Lacy, & Hanna, 2011).

KPIs should be carefully selected to ensure efficiency (doing things right), effectiveness (doing the right things) and cost effectiveness (optimal return for minimal investment) are managed.

KPIs need to be mapped from the” strategically aspect to a more operational” one so that technical tools can “measure” these KPIs. (Kaplan & Norton, 2006)

Examples of KPIs:

- Definition of vision and mission statements
- Awareness of roles and responsibilities within organization
- Definition of service portfolio
- Definition of services in service portfolio about outcome, metrics, value
- Existence of service portfolio management
- Review of service portfolio management
- Percentage of successfully implemented changes
- Reduction in the number of unauthorized changes
- Number of incidents linked to changes before and after change implementation
- Average time to implement (similar) changes
- Reduction in service interruptions

3.7.1. Industry Quality Criteria

IT service provider and their customers require and demand beside the ITIL® quality criteria also “industry quality criteria” and as an example three areas (infrastructure optimization, the total cost of ownership and the total cost of continuously available IT services) will be explained.

The definitions of processes, policies and standards as well as the implementations of frameworks and methodologies are covering one side for the success of providing services. The other one is having a set of technical tools to be able to measure quality criteria, critical success factors and key performance indicators.

To support frameworks such as ITIL® and Microsoft® Operations Framework (MOF) it is necessary that IT service providers are changing not only from an organizational perspective. The way how service provider are introducing, deploying, managing, maintaining and improving IT services has a significant impact on the quality and the created value.

Infrastructure Optimization

There are different maturity models for IT, but the thesis focuses on the Microsoft Infrastructure Optimization as most of the "The Company's" services run on the Microsoft Platform.

The optimization of the infrastructure lowers IT costs, improves service levels and increases quality and agility.

Microsoft developed the Infrastructure Optimization Model[16] to allow organizations to assess the maturity level of the infrastructure and platform with a systematic methodology. The foundation of that model comes from an IT infrastructure maturity model that was developed by Gartner Research in 2004 (Gartner Research, Gartner Introduces the Infrastructure Maturity Model, 2004) and was updated in 2007 (Gartner Research, Introducing the Gartner IT Infrastructure and Operations Maturity Model, 2007).

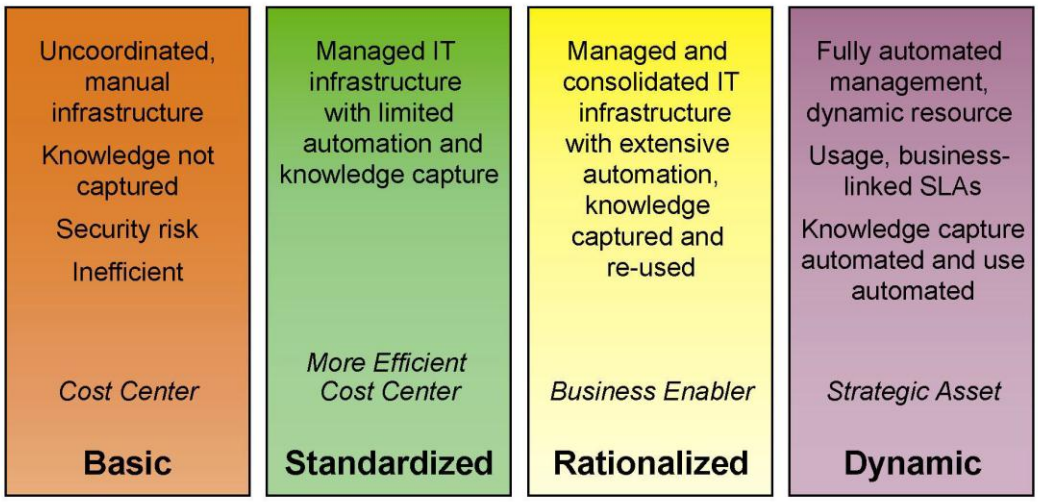


Figure 10: Microsoft's Infrastructure and Optimization Model (Gillen, Perry, Dowling, & Grieser, 2007)

Compared to the Microsoft Infrastructure Optimization Model, Gartner Research defines six levels of infrastructure maturity:

1. Survival
2. Awareness
3. Committed
4. Proactive
5. Service-Aligned
6. Business Partnership

[16] Microsoft® Infrastructure Optimization (Microsoft® Corporation, 2011)

The figure below compares and maps the levels of the Gartner and Microsoft models:

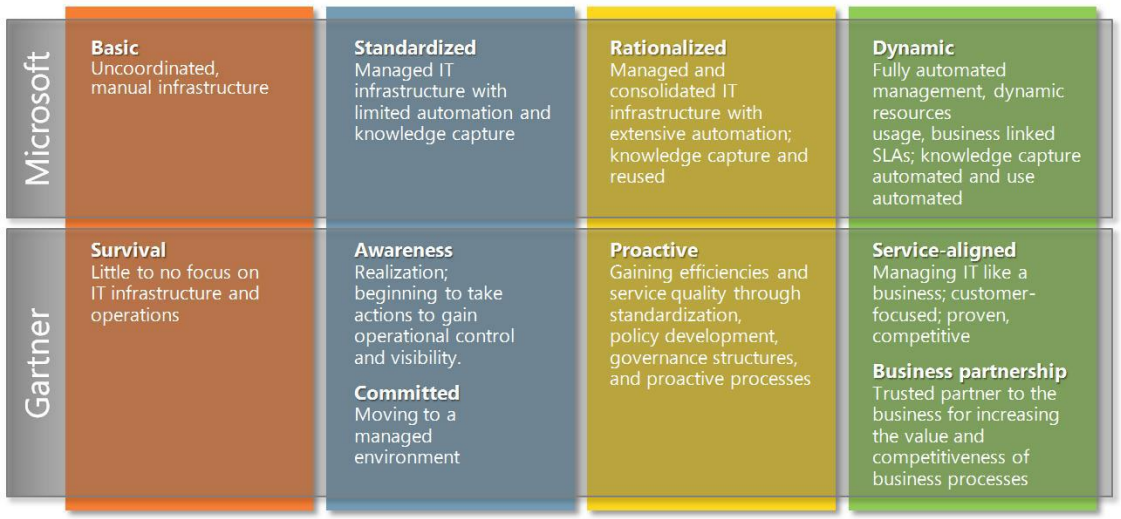


Figure 11: Gartner IT infrastructure maturity and Microsoft Infrastructure Optimization Model[17]

International Data Corporation (IDC)[18] initiated a research project in 2005 and 2006 among 141 for-profit enterprises in the US with 1.000 to 20.000 systems to determine how successful organizations achieved high IT values. These 141 enterprises were then classified in one of the four Microsoft "groups".

The project showed that no enterprise company could qualify for the "dynamic" stage. The results of the study proved furthermore the difficult and many improvements a company needs to consider and achieve to move from the basic stage to just the rationalized one.

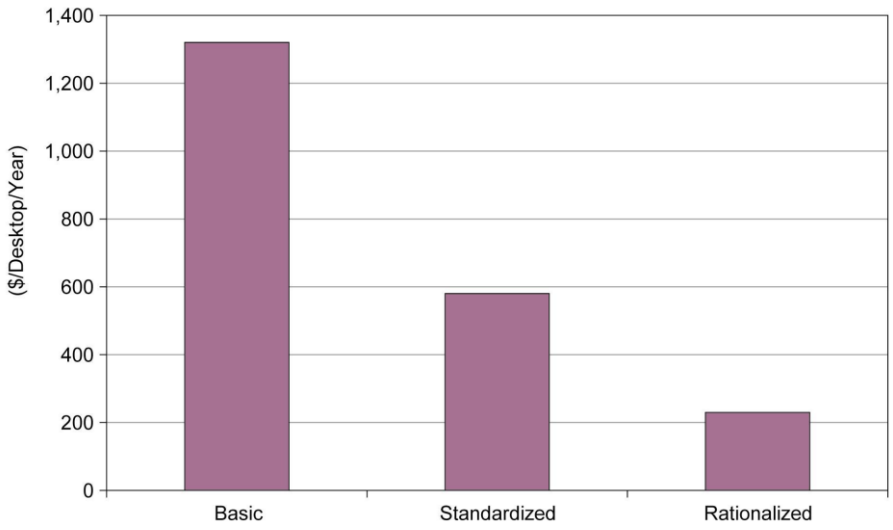


Figure 12: IT Labor Cost Comparison by IT Optimization Level[19]

IDC research shows that when an organization changes from basic to rationalized, IT costs dramatically decrease, while the service quality and agility increase.

[17] (Microsoft , Microsoft Optimization Models: Foundation, Evolution, and Validation, 2008)
[18] International Data Corporation (http://www.idc.com)
[19] (Microsoft , Microsoft Optimization Models: Foundation, Evolution, and Validation, 2008)

When the IDC study was released in 2006 many organizations started to implement policies, processes and technical systems management tools to achieve a higher level of standards, automation and quality in IT.

Total Cost of Ownership

The Gartner TCO study (Troni, Margevicius, & Silver, 2010) analyzes the various components of a TCO analysis[20] of an organization with a deployment of 2.500 users with a centralized IT organization.

The study doesn't take different Operating System versions into account; the management tool costs were added in the managed scenario.

Four scenarios with different levels of manageability are analyzed:

- Unmanaged (no management tool)
- Somewhat managed (processes and policies not fully developed)
- Moderately managed (managements tools, processes and policies in place – users can install software and change some settings)
- Locked and well managed (managements tools, processes and policies in place – users cannot install software or change critical settings

The table below shows TCO figure per user, per year. Direct costs are the sum of hardware, software and facility costs, IT operation costs and administration costs.

[20] Strategisches IT Management: Wert steigern, Leistung steuern, Kosten senken (Buchta, Eul, & Schulte-Croonenberg, 2009)

	Desktop TCO 2011			
	Unmanaged	**Somewhat Managed**	**Moderately Managed**	**Locked and Well-Managed**
Hardware	$243	$243	$241	$239
Hardware Maintenance	35	36	37	38
Software and Software Maintenance	750	725	699	648
IT Software	70	75	79	88
Data Center Allocation	-	1	1	1
Electricity / Heating / Cooling	67	55	48	24
Hardware, Software and Facilities	**$ 1.165**	**$ 1.135**	**$ 1.105**	**$ 1.038**
Tier 1	$ 112	$ 106	$ 101	$ 90
Tier 2	219	186	153	87
Tier 3	95	96	89	75
Security	93	86	78	61
Desktop Management	145	202	191	170
IT Operations	**$ 664**	**$ 676**	**$ 612**	**$ 483**
Administration	$ 71	$ 69	$ 66	$ 60
Management	65	65	65	65
User Training	28	30	31	34
IT Training	14	15	15	15
Disposal	30	29	29	29
Administration	**$ 208**	**$ 208**	**$ 206**	**$ 203**
Training	$ 460	$ 450	$ 441	$ 422
Fixing	3.101	2.608	2.115	1.129
Downtime	197	157	116	35
End-User Costs	**$ 3.758**	**$ 3.215**	**2.672**	**$ 1.586**
Hardware and Software	$ 1.165	$ 1.135	$ 1.106	$ 1.038
IT Operations Labor	663	677	612	483
Administration Labor	209	208	206	203
Direct Costs	**$ 2.037**	**$ 2.019**	**$ 1.923**	**$ 1.724**
End-User Costs	**$ 3.758**	**$ 3.215**	**$ 2.672**	**$ 1.586**
TCO	**$ 5.795**	**$ 5.234**	**$ 4.595**	**$ 3.310**

Figure 13: Desktop TCO for 2011 (Troni, Margevicius, & Silver, 2010)

When comparing Gartner's 2008 TCO study to the 2011 one, a gradual decline of 0,7% to 3% can be noticed depending on the scenario.

	Change from 2008			
	Unmanaged	Somewhat Managed	Moderately Managed	Locked and Well-Managed
Hardware and Software	-11,2%	-12,2%	-13,0%	-15,4%
IT Operations Labor	-3,9%	5,9%	7,0%	10,3%
Administration Labor	-3,2%	-3,4%	-3,6%	-3,2%
Direct Costs	-8,1%	-5,9%	-6,4%	-8,0%
End-User Costs	3,0%	3,0%	3,0%	3,1%
TCO	-1,2%	-0,7%	-1,1%	-3,0%

Figure 14: Overall TCO Change, From 2008 (Troni, Margevicius, & Silver, 2010)

Hardware, software and facility costs continue to decline, operating costs increase due to growing IT labor salaries – but still direct costs and overall TCO decline. Gartner's TCO analysis proves "the need to focus on manageability as a means to reduce the labor costs related with IT" (Troni, Margevicius, & Silver, 2010).

Another interesting aspect proven in the TCO study is that the "Somewhat Managed" scenario only shows a modest direct cost decline. To gain value from the management tool and reduce direct costs, organizations must move past the definition of a "somewhat managed" environment and achieve at least a "moderately managed" environment.

Total Cost of Continuously Available IT Services

"Continuous" High Availability of Services is a frequently requested requirement and as Gartner stated in one of their recent studies, "fewer than one in 100 IT services will be made continuously available across multiple sites due to cost and complexity in 2014" (Malik & Scott, 2010).

High Availability

An IT service is considered as "highly available" when a service is provided with an uptime of at least 99,3%. Downtime can occur because of hardware or software failures, bugs, faulty configurations, etc. By looking at a 24/7 scheduled operation this results in approximately 61 hours of downtime.

High availability of a service can be increased or maintained by duplicating necessary software and hardware. If a service is about to fail or has failed the workload can therefore be transferred from the active element to its backup element. The goal of the failover process is to be non-disruptive and smooth.

At 99,95% availability an IT service is considered best-in-class, thus resulting in less than 5 hours downtime per year per IT service.

Continuous Operations

If an IT service does not need to be stopped and restarted for maintenance, the IT service is considered to be continuously operable. This measurement can be achieved by release toleration (coexistence of current and prior release), hot-pluggable components (no need for a restart of a

system), command-driven IT service and no hard-coded limits or counters that make a restart necessary.

Continuous Availability

If the IT service has both high availability as well as continuous operations, the IT service is continuously available. The measurement of a continuously available IT service is 99,81% uptime, or approximately 17 hours of downtime in a 24/7 scheduled operation.

All three of the mentioned states – high availability, continuous operations and continuous availability – are **focused on single-site availability**; they do not include mitigation from disaster incidents.

Measurement

To measure and as a result increase availability an organization should focus on metrics adequate to the experienced outages and their reasons. The availability of a frequently failing system needs to be tracked by aggregating availability across a meaningful reporting period. If the outage is a result of process failure, more in-depth training may be necessary.

Analysis & Reporting

Organizations often don't just look at the analysis of the initial incident that caused the outage but dig deeper to find the root cause. For example the initial report describes the incident, a second report then documents the process or behavior that contributed to the incident. There may even be additional layers to further look at the analysis of the root cause.

To give an example for the analysis: The incident of an outage was lack of storage; the solution is to add additional storage. A second incident report describes why the issue was not previously detected by monitoring software that would alert the right people to stop the issue from even occurring. A third incident report would then describe that the monitoring software alerted the staff, but handling of the issue or alert was unclear.

Such deep dive reports that focus on the process as well as the root cause – and how to avoid similar incidents in the future are best practices and should be adopted by organizations striving for continuously available IT systems.

Multisite, Continuous Availability

A system that requires high availability and continuous operability (=continuous availability) across geographically dispersed locations, is called "multisite, continuous available". When multiple sites run IT services (in active/active or active/passive mode) it increases the flexibility of planned downtime.

Costs of Multisite Continuous Availability

The IT system requires these equivalent hardware configurations:

- N = current production level
- N+1 = next release level
- N-1 = prior production level
- DR (disaster recovery) -

If an incident or outage occurs while a new IT service is released or deployed, a rollback can be quickly managed. An organization may have to roll back to N-1, and will be preparing to deploy N+1, while running N for users.

DR environment is necessary to support a continuously available IT service in a multisite architecture. All four environments need to be equally configured for production capacity.

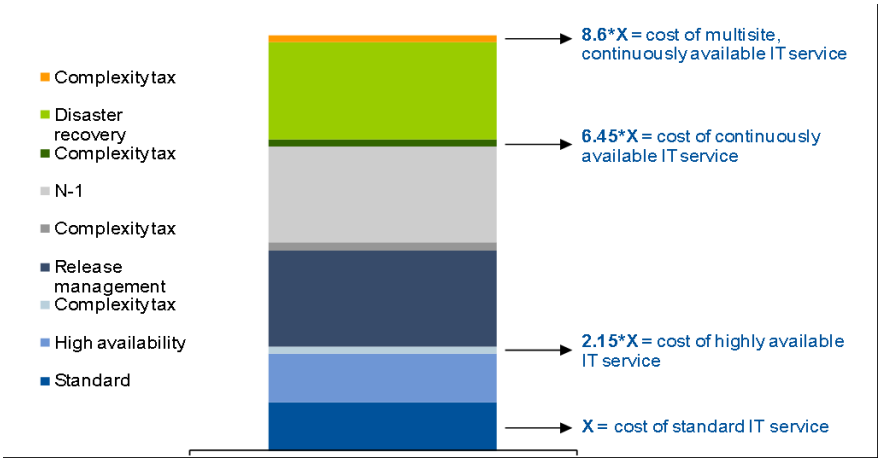


Figure 15: Relative Environment Costs of Continuously Available Business Systems (Malik & Scott, 2010)

Figure 15: Relative Environment Costs of Continuously Available Business Systems shows that multisite, continuous availability has the potential for more than eight times the costs compared to a standard, non-continuously available IT service. The calculation is not taking into account e.g. costs of multiple copies of point-in-time snapshots, development/test, labor, requirement & cost of highly skilled IT staff, etc. - real costs are certainly higher than shown. Therefore and because of the complexity level “less than one out of 100 IT services will be made available across multiple sites through 2014” (Malik & Scott, 2010).

Reducing costs of multisite continuous availability

Costs can be reduced in a multisite continuous available environment by e.g. usage of lower-cost components, sharing capacity between environments (e.g. N+1 and DR share the environment and server virtualization is used) or combining two of three (N-1, N, N+1) environments.

Nevertheless an organization must be aware that there is a strong alignment between reduction of costs of multisite continuous availability and the increase of additional risk. Before looking at reducing costs of multisite availability an organization should first ensure that it is even required, e.g. service levels can be reviewed and if necessary downgraded.

Conclusion

"Infrastructure cost of multisite, continuously available business systems can be more than eight times the cost of a standard, non-highly or continuously available IT service – and this is just for the hardware and software infrastructures, not taking into account the increase in people and process costs. The cost of continuous availability needs to be balanced through sharing the infrastructure or reducing performance in some environments against the risk and cost of an interruption in service. Tracking the availability trends for systems that are mission critical and analysis of incidents is best practice" (Malik & Scott, 2010).

3.7.2. Quality Criteria Summary

Although the ITIL® Service Strategy focuses on quality criteria, critical success factors and key performance indicators, a service provider needs additional measurement capabilities.

Industry quality criteria are not included in the ITIL® Service Strategy and are roughly explained in other ITIL® publications.

Service Design, Operation and Continual Service Improvement include and describe additional applicable factors for an IT Infrastructure organization that often has to deal with the deployment, management and monitoring of services.

Service Level Agreements or other metrics are not covered in the ITIL® Service Strategy but appear in conjunction with service definitions.

Continual Service Improvement and the 7-step improvement process demand that:

1. Define what should be measured
2. Define what can be measured
3. Collect data (Who, How, When)
4. Process collected data
5. Analyze collected data
6. Define actions
7. Apply actions

In order to achieve that the above, a set of technical tools has to be implemented, otherwise the management and monitoring of quality criteria of IT services cannot be performed.

These solutions help to enable the

- Service Deployment and Management
- Service Monitoring of
    - Availability
    - Capacity
    - Performance
    - Trends
- Visualization in form of Dashboards, Reports

4. “The Company’s” Infrastructure Service Strategy

The scope of the thesis is to investigate how “the Company’s” Infrastructure Service Strategy differs to an ITIL® Service Strategy and to describe which elements are covered and which are not. Therefore the following chapters will describe “the Company’s” IT Organizations, the IT Infrastructure Service Strategy that consists of the strategy, portfolio and project management and the IT Infrastructure Quality Criteria.

4.1. About “The Company”

“The Company” is one of the global leading retailing companies and operates more than 32.000 local branch offices in over 110 countries offering services to more than 60 million people every day.

More than 75% of all branch offices are owned and operated by independent business people. Around 1.5 million employees work worldwide for the company, which was founded in the United States of America.

The headquarters in the United States of America lead the many verticals, subdivisions and groups; corporate groups and departments are focused on various business areas, from finance, marketing and supply chain to human resources and information technology.

Excerpt of headquarters’ objectives:

- Provide strategic guidelines and supporting services to the many geographically dispersed branch offices
- Enable global partnerships with vendors, suppliers and branch offices
- Provide analysis of data and revenue results to shareholders and investors

The organizational structure of company employees, suppliers and owner/operators is one of the key criteria of success and at the same time a huge challenge as each unit has the same importance and equality. Therefore it is fundamental to have a common vision, values and processes in each area of the business.

4.2. "The Company's" IT Organization

As it is very important to understand how the whole IT organization is structured, the various organizational layers are outlined below - what responsibilities they have, how they work together and how decisions are made. The members of the organizations are treated as anonymous persons.

"The Company" enables and supports IT by adding 3 IT-centric layers or organizations:

- Global IT Organization
- Regional IT Organization (e.g. IT Europe as described below)
- Local IT Organization (e.g. IT Austria, IT United Kingdom as described below)

The global, regional and ´local layers are not linked via formal reporting lines but in a dotted line. This means that e.g. the IT Manager of a country does not report to an IT Manager of the region. All three units are dealing with partners and suppliers who assist in development, deployment and operations of the IT services. The employees of the three layered IT organizations and the IT professionals from the partner and supplier companies are working together as one IT organization to serve the demands of IT services coming from the branch offices - even if they do not have any formal reporting lines in place. As employees of all three layers as well as business partners are geographically dispersed across multiple countries and time zones, there is a high demand for communication and knowledge management to effectively work together.

4.2.1. "The Company's" Global IT Organization

The Global IT organization focuses mainly on high level development activities, such as

- Business Drivers
  - Business Strategy
  - IT Solutions Strategy
  - Technology Investment Board
- Infrastructure Operating Model
  - Budget Constraints
  - Corporate Realities
  - Vendor Limitations
- Infrastructure Technology Service Strategy
  - Enterprise Architecture and Standardization
  - Industry Technology Trends
  - Strategic Directions
  - Technology Orientation

All strategic decision (e.g. architecture, governance, supplier decisions …) are made on global level. Therefore guidelines and standards (e.g. Data and Information Design and Management Standards and Guidelines) are defined and setup to be applicable for all areas of the world.

These guidelines and standards are further adopted by all areas of the world (AOW) and as a last consequence by all countries within the region.

More than 65% of all IT employees are part of the Global IT organization which is based in “the Company’s” headquarters in the United States of America. As in almost every global organization some team members are based in other countries spread over the whole world, working and fulfilling their global role from local country offices.

In “The Company’s” Global IT Organization all other verticals / sub divisions are embedded and directly report to the Global Chief Information Officer:

- IT “Branch Offices”
- IT Enterprise
- IT Finance
- IT Foundation / Chief Technology Officer (Global IT Infrastructure)
- IT Human Resources
- Shared Services
- AOW IT Leads from APMEA, EUROPE, US (dotted line, no direct reports)

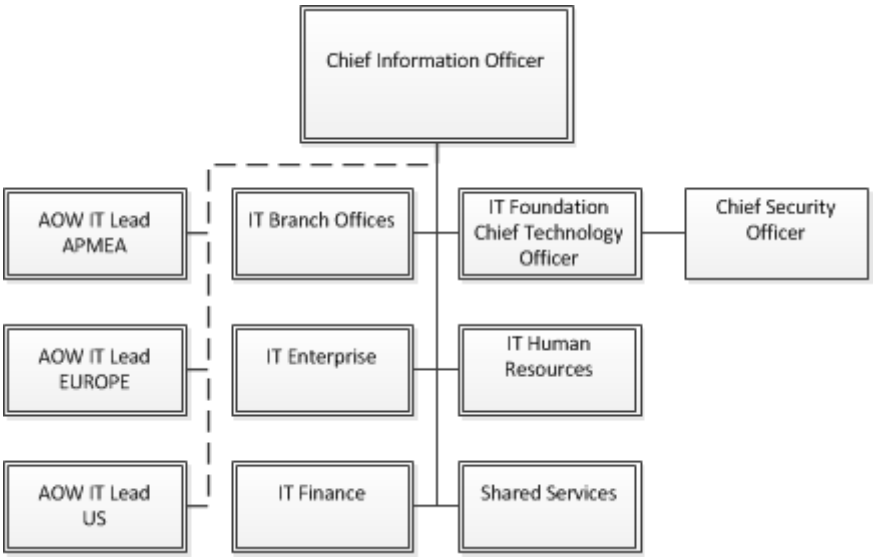


Figure 16: Organization Chart: Global IT Organization (simplified)

As the thesis mainly focuses on the IT Infrastructure area, other Global IT organizations are not explained in more detail.

Global IT Infrastructure (IT Foundation)

The Global Chief Technology Officer is leading “The Company’s” Global IT Infrastructure that is defining, building and in some cases also responsible for the operation of fundamental infrastructure services:

- provides recognized, measurable customer value
- demonstrates shared accountability between all IT organizations
- shares a global infrastructure technology services strategy

Global IT Infrastructure members are:

- Chief Security Officer, IT Security
- End User Computing
- Enterprise Technology
- Global Infrastructure
- Governance
- AOW IT Leads from APMEA, EUROPE, US (dotted line, no direct reports)

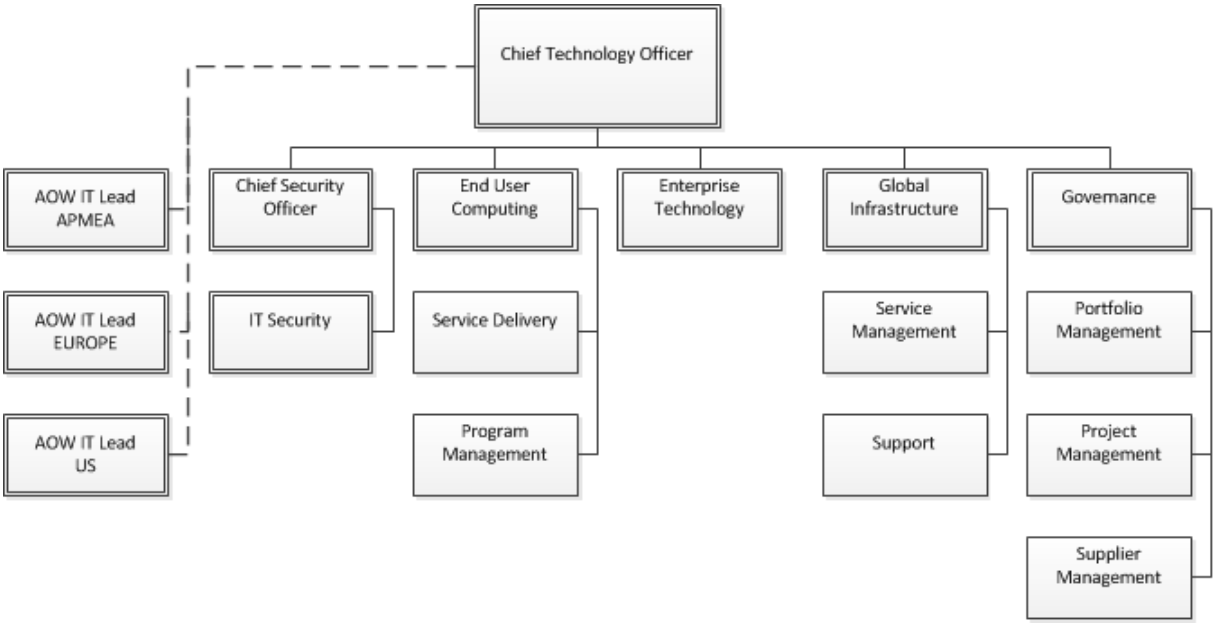


Figure 17: Organization Chart: Global IT Infrastructure Organization (simplified)

Global Infrastructure Management Team (Steering Team)

The Global Infrastructure Management Team is responsible to create, communicate and execute a strategic vision and direction for implementing a consistent enterprise wide IT infrastructure, including a roadmap to deliver and enforce standards in a collaborative manner, and accelerate value to the worldwide business.

Common objectives:

- The team is comprised of key IT infrastructure leads that will communicate and collaborate on the definition and communication of global IT infrastructure.
- The team focuses on key issues related to global communications, networking and architecture. They will function in a leadership role for establishing the global IT architecture, associated standards and guidelines, and for ensuring conformance to the defined architecture and standards.
- The team works on the Data Center, Sourcing and Consolidation strategy.
- The team develops the strategy to leverage global vendor partners to ensure that "The Company" receives the best value, service and quality.
- The team works to establish the future vision and plans necessary midterm projects to support the legacy environment as well as the future web and Intranet enabled technologies.

- The team is a messenger for the information services strategic vision and a visible leader of all IT decisions related to infrastructure

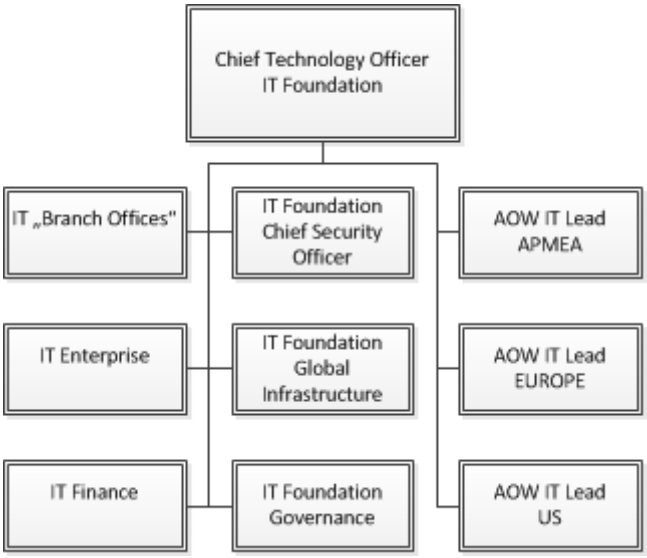


Figure 18: Organization Chart: Global Infrastructure Management Team

4.2.2. "The Company's" European IT Organization

The European IT organization is spread across the region. The team's main responsibility is to enable, ensure and drive the adoption of the standards and guidelines of the global strategy and services.

The organization adopts and breaks down the global standards and guidelines. The subset of the necessary standards and guidelines are then applied and aligned in the various regions – fitted to the market's specific needs.

The European IT organization is responsible for a region consisting of 40 countries with 40 independent IT organizations.

The European IT organization collects, consolidates and reports back experiences, demands and issues reported from the countries into the Global IT organization to help the global teams re-design and improve their services to fit the demands of the local markets. The common goal of the regional IT organization is to help redesign local (market) solutions and ensure their scalability, re-use and leverage in other markets.

The European Chief Technology Officer leads the European IT organization and all its departments are reporting to the European CTO:

- Branch Office
- Business Solutions
- Infrastructure
- Quality Assurance
- Sourcing

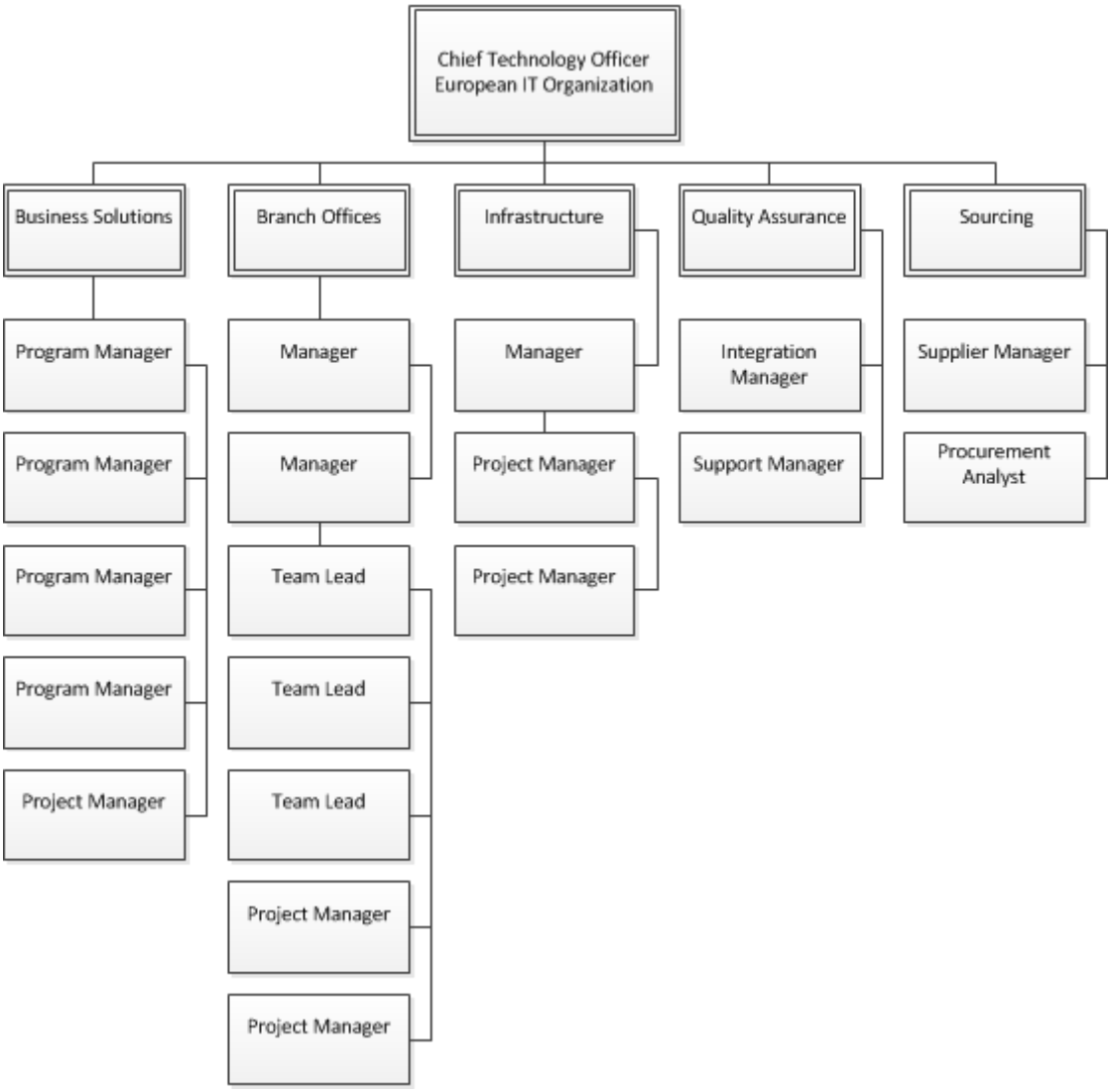


Figure 19: Organization Chart: European IT Organization (simplified)

European IT Infrastructure Leadership Team (Steering Team)

The European IT Infrastructure Leadership Team is responsible for creating, communicating and executing a strategic vision and direction to implement a consistent enterprise wide IT infrastructure for Europe, including a roadmap to deliver and enforce standards in a collaborative manner, and accelerate value to the worldwide business.

It consists of the European Chief Technology Officer and all department heads of the European IT organization.

Figure 20: Organization Chart: European IT Infrastructure Leadership Team

European IT Board (Steering Team)

Similar to the Global Infrastructure Management Team, the European IT Board is the highest steering committee in the region. It has representatives of the largest three countries, four divisions that represent smaller countries and the IT Europe Leadership Team. The steering committee agrees on various strategies – these strategies are then mandatory and need to be implemented locally by the countries.

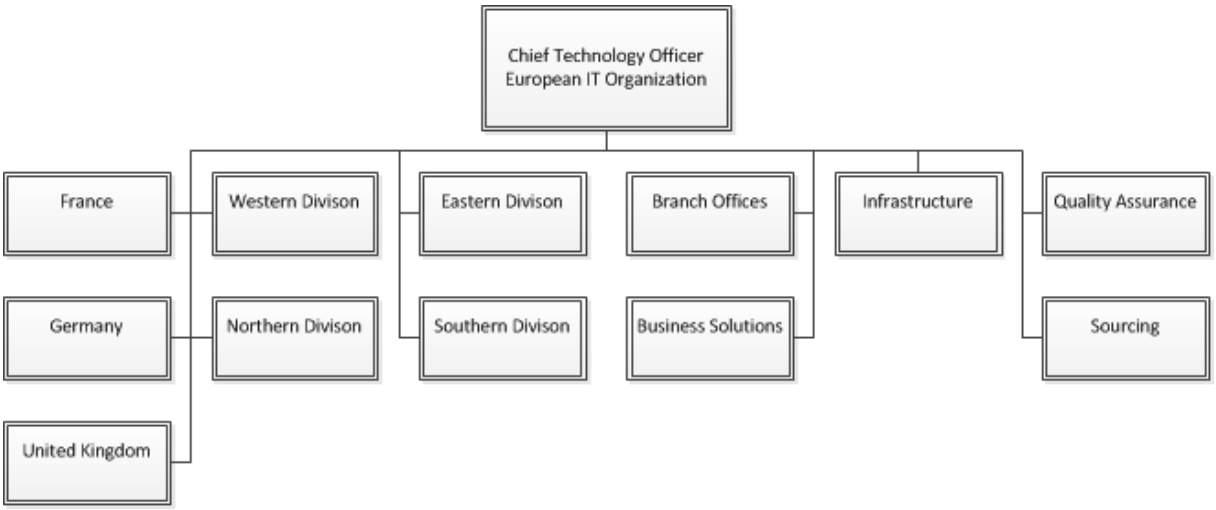


Figure 21: Organization Chart: European IT Board

4.2.3. “The Company’s” European Country IT Organization

The country’s IT organization’s is responsible for the deployment and operation of IT services in the branch and head offices. In almost every country external IT suppliers and partners are engaged for operational tasks, such as installation and support. A country IT organization is available in each country that has branch offices.

Although standards and guidelines are defined on a global and regional level, some of the solutions don’t fulfill the requirements of the countries. In this case some services are still developed on a country level - but the main focus stays on operation and deployment of IT services.

It is important to understand that the activities within the individual IT organizations are all very similar although the size of an IT organization in a country may significantly vary.

Markets can work on similar projects; the main differences are timelines and the need / importance of implementing those projects.

Austrian IT Organization

The Austrian IT Organization is a typical organization compared to size and structure of 50% of all European Country IT organizations. Especially smaller countries need to prioritize the importance of certain services and to engage the local suppliers and partners to operate and deploy the services.

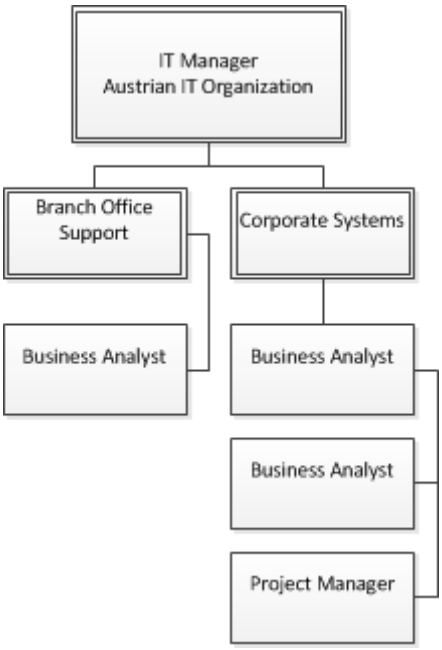


Figure 22: Organization Chart: Austrian IT Organization

UK IT Organization

The UK IT Organization is a representative of the organizational structure and size of the three largest European countries – the others are France and Germany. These countries have the flexibility to not only implement services but also think about innovation and to build proof of concepts.

Similar to smaller countries operations and deployment of the services are done by local suppliers and partners.

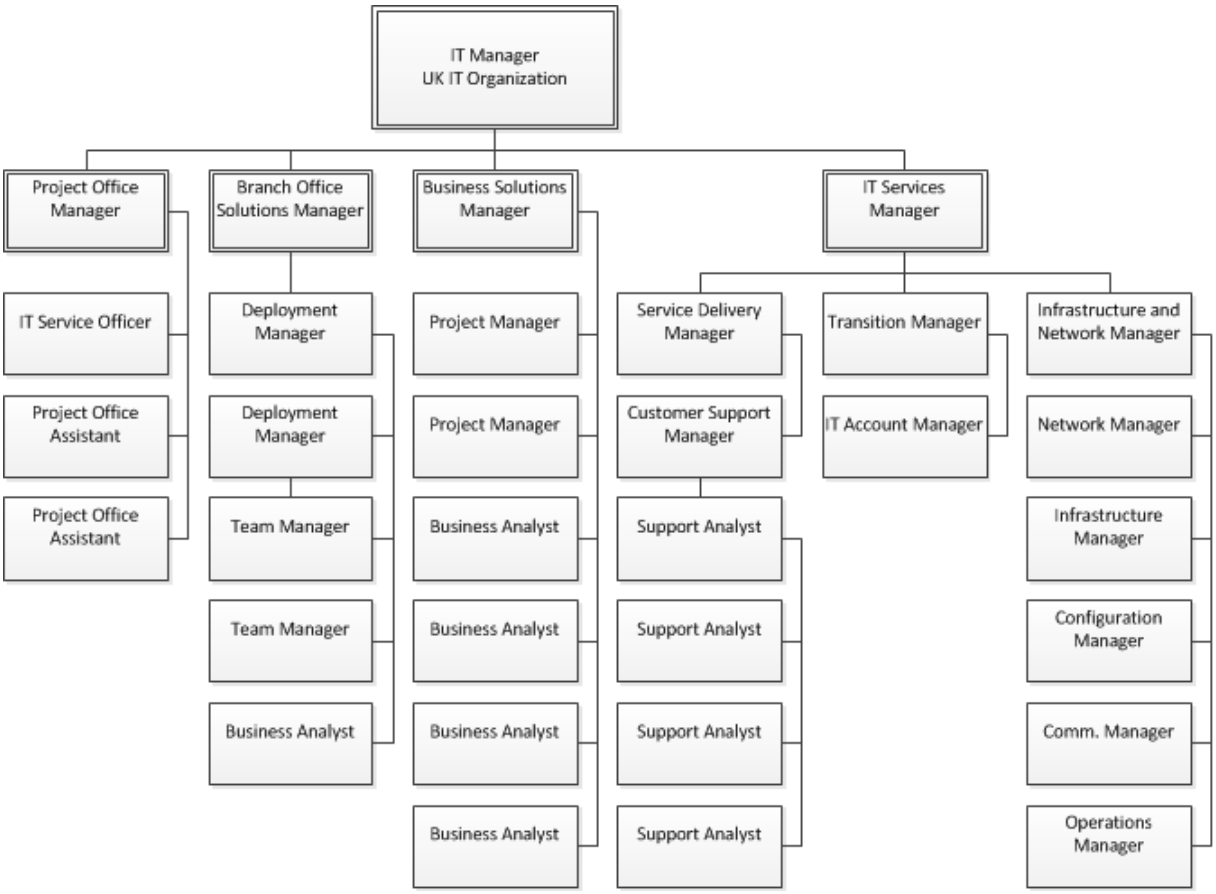


Figure 23: Organization Chart: UK IT Organization

4.2.4. IT Organization Summary

"The Company's" IT Infrastructure organizations act as non-profit centers and shared services units (Service Provider Type II). The structures of the organizations strongly vary from one layer to the next one.

Therefore a common model should be established that can be adapted to all layers- taking under consideration that IT organizations in larger countries will have more headcount than smaller ones. Roles and responsibilities have to be aligned and compared in all areas of the world so that defined processes within IT service management can be established.

4.3. “The Company’s” IT Infrastructure Service Strategy

The Global IT Infrastructure organization’s mission is to empower business results by providing information and business process improvements through the efficient use of technology. This is accomplished by a global platform / service strategy, which enables countries to more quickly and economically localize and scale technology solutions. Technology platform solutions leverage corporate investments and set standards to create a foundation to more efficiently and quickly deploy future technologies.

Aligning with this strategy, the objective is to deploy 80% of the solutions in all countries, allowing the final 20% to be customized to meet local market’s needs.

Architecture, Infrastructure and Security are the foundation that enables countries’ differentiating capabilities in the business now and in the future. These technologies include technology platforms, infrastructure and security services and network capabilities.

It is a goal to make work an enjoyable place with technologies and tools that are easy to access and use for the employees. To support the growth and needs of employees, emerging technologies need to be introduced to connect and collaborate, and maximize the use of data to support better, faster decision-making.

4.3.1. “The Company’s” IT Infrastructure Strategy Management

“The Company” has a defined and aligned IT Infrastructure Strategy which is governed by the different global and regional working teams.

The Business Drivers, Infrastructure Operating Model and Infrastructure Technology Strategy are focused on answering the following questions:

- What will be delivered
- How will it be delivered
- When will it be delivered
- By Whom will it be delivered

The strategy is aligned with “the Company’s” business model, which has to fit 30.000 local branch offices that are self-owned or franchised. “The penny margin” business relies on a federated decision making process which even makes it more important to reduce the TCO of the product / service in its lifecycle.

Every product / service that is part of the strategy has to be supportable, deployable and capable of being monitored. Quality Criteria (Key Performance Indicators and Critical Success Factors) need to be determined and then automatically monitored by technical solutions.

Short cycle solution development with a phased approach and general availability of a product / service is defined. General availability is granted when a country can implement a solution with appropriate assistance from the Global Product Development resources. General availability includes a packaged product / service, support model, documented technical specifications and implementation guidelines, and service level agreements.

For each service that is listed in “the Company’s” Infrastructure Strategy a

- Strategic Direction,
- Roadmap and
- 3 Year Strategy (Deliverables and Milestones)

is available.

The table below shows which classifications have been identified in the Infrastructure Strategy:

“The Company’s” Infrastructure Strategy
Application Technologies
Branch Office Technologies
Data Services
Data Warehouse Technologies
Hosting
Network
Security
Workspace Technologies

Table 4: Categorization of the "The Company's" Infrastructure Strategy

4.3.2. “The Company’s” IT Infrastructure Portfolio Management

The ITIL® Service Strategy chapter explained that service portfolio management is one of the critical and important parts as business value, service pipelines and services catalogues are defined and reviewed regularly.

”The Company’s” Service Catalogue

“The Company’s” Global and Regional IT Infrastructure organizations have defined service catalogues which are annually created and reviewed. These service catalogues are signed off by the global and regional steering committees and are “utilized” by the local layers.

The service catalogues provide information about all offered services that are available at a single location and consistently documented and published, so that a key documented communication interface between the IT organizations and their partners is enabled.

The infrastructure services are categorized into logical groupings which are called platforms. Each platform contains multiple related services and their detailed service descriptions to help partners understand what offerings are available to them and the corresponding costs, benefits, etc.

The “Global IT Infrastructure Service Catalogue” is “consumed” and used by the regional IT Infrastructure organizations while the local IT Infrastructure organizations have access to the “Regional IT Infrastructure Service Catalogue”. A local IT Infrastructure organization cannot directly access and use a “Global” offered services.

Table 5: IT Infrastructure Portfolio Access

Global IT Infrastructure Service Catalogue	
Access	Active Directory Anytime, Anywhere Access Application Authentication Service …
Application	End to End Monitoring End to End System Certification …
Data	Data Management Data Movement …
End User Productivity	Desktop Services Messaging Mobility Online Services (Cloud Services) Virtual Desktop …
Infrastructure	On-Demand Hosting Remote Access Service Desk …
Security	Data Encryption Data Recovery Vulnerability Scanning …
Supplier’s Project Work	Supplier Project and Service Catalogue

Table 6: Global IT Infrastructure Service Catalogue

Regional IT Infrastructure Service Catalogue	
Collaboration	Voice Video …
Data Movement	Data Transport Data Transformation …
Directory Services	Active Directory Anytime, Anywhere Access Application Authentication Service DNS …
Hosting	On-Demand Hosting Managed Server …
Messaging	Online Services (Cloud Services) …
Network	Remote Access Wireless LAN …
Policies	Policies
Security Services	Intrusion Detection PCI Consulting Vulnerability Scanning …
Supplier's Project Work	Supplier Project and Service Catalogue

Table 7: Regional IT Infrastructure Service Catalogue

"The Company's" Service Description (Product Sheet)

A detailed service description (product sheet) is available for each service that is listed in one of the platforms of "the Company's" Service Catalogue.

The format of these service descriptions is the same on global and regional level. It contains the following fields:

- Service Owner and Contact Information
- Platform Name
- Service Name
- Service Overview
- Benefits of the Service
- Pre-Requisites for Deployment
- Pricing Structure
- Service Target
- Support Model for the Service
- Service Metrics and Reports

The service descriptions / product sheets are annually updated and signed off but if an important and / urgent change is necessary within a year, the steering committee can facilitate the necessary modification.

“The Company’s” Service Requirements

Whenever new services are defined built and offered on a global or regional level in “The Company”, necessary requirements must be collected. These requirements include standard sections, such as

- Problem Statement
- Business Case and Value
- General Requirements
- General Supplier Requirements
- Architecture
- Release and Change Management Process
- Service Level Agreements
- Support
- Deployment and (End to End) Monitoring

The requirement collection is part of the project management process which will be explained in the following chapter 4.3.3. “The Company’s IT Infrastructure Project Management”.

4.3.3. “The Company’s” IT Infrastructure Project Management

“The Company” is using a project management method to standardize project management and delivery processes throughout “The Company” to create a culture which enables better planning and communication of project results, more effective risk management and better quality results at a lower cost.

The project management method which is similar to PRINCE2® is standardized for all projects in the organization. All projects get planned, communicated, governed and delivered throughout “The Company” - representing a single language that helps the entire organization, its vendors and strategic partners to communicate clear, concise and consistent project results.

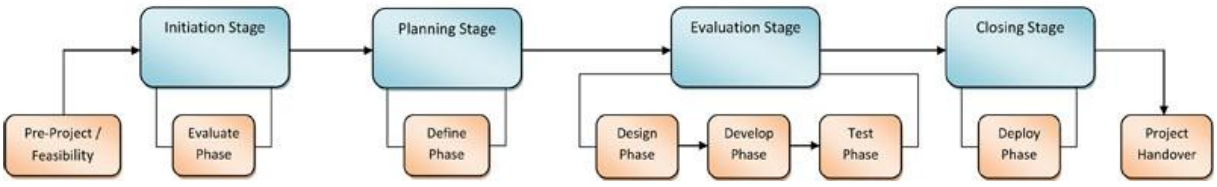


Figure 24: "The Company's" Project Management Processes

A project consists of four stages:

- Initiate
- Plan
- Execute (and Control)
- Close

The fundamental purpose of the Initiate Stage is to receive, qualify and evaluate new ideas. The Plan Stage is considered the most important phase in project management while the Execute Stage is characterized by the heaviest use of resources in the project life cycle. The Close Stage involves deploying the solution and transition of support.

Monitoring and controlling are done throughout the project lifecycle to ensure the expected progress is made.

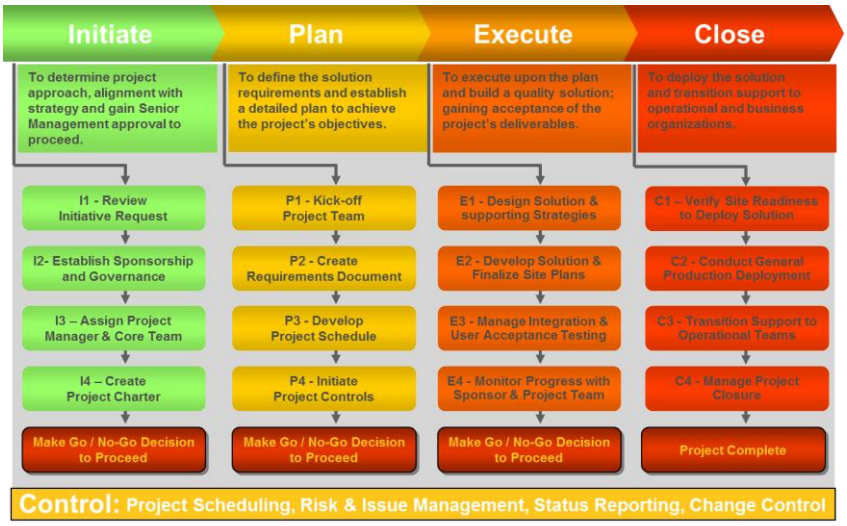


Figure 25: "The Company's" Project Management Framework Overview

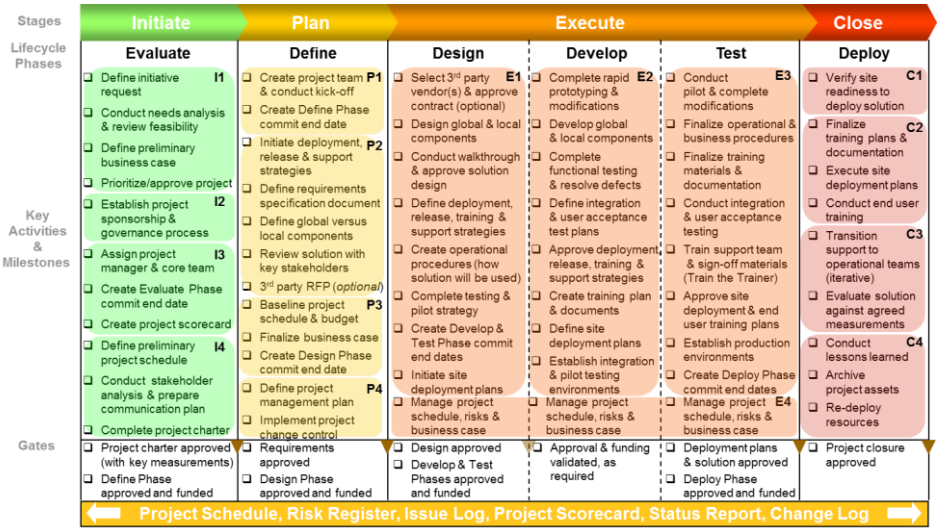
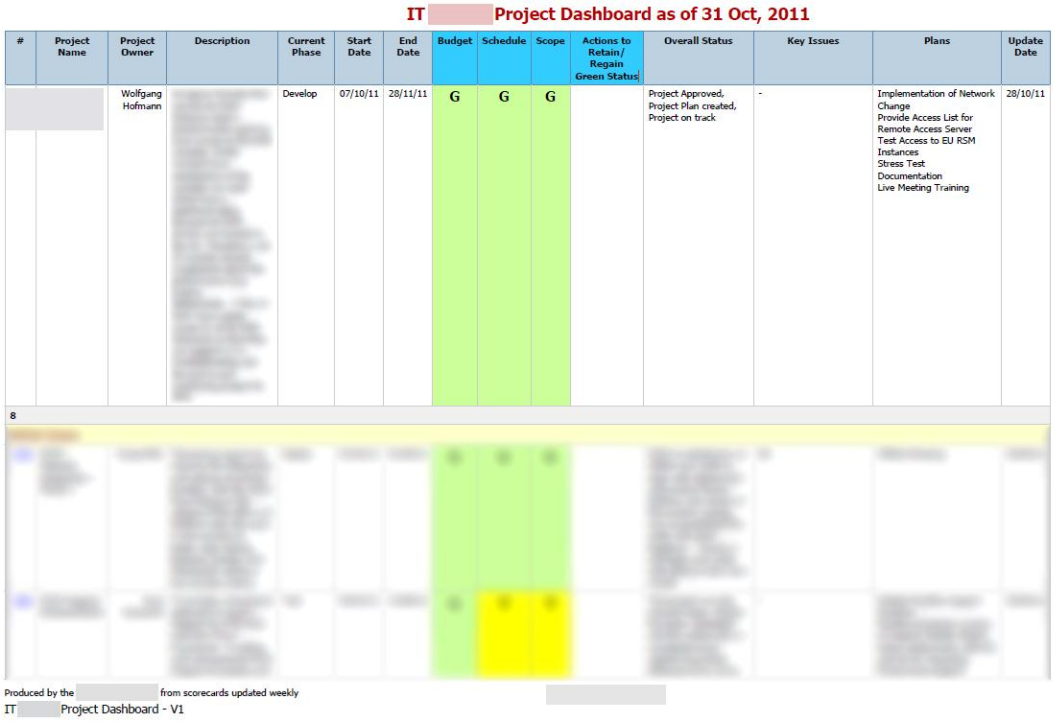


Figure 26: "The Company's" Project Management Framework Checklist

Each project is listed on a company-wide project portfolio web site that shows all projects per region and organization. In addition a weekly region-wide project dashboard is sent out by email to all leadership levels.



IT Project Dashboard as of 31 Oct, 2011

#	Project Name	Project Owner	Description	Current Phase	Start Date	End Date	Budget	Schedule	Scope	Actions to Retain/ Regain Green Status	Overall Status	Key Issues	Plans	Update Date
		Wolfgang Hofmann		Develop	07/10/11	28/11/11	G	G	G		Project Approved, Project Plan created, Project on track	-	Implementation of Network Change Provide Access List for Remote Access Server Test Access to EU RSM Instances Stress Test Documentation Live Meeting Training	28/10/11
8														

Produced by the from scorecards updated weekly

IT Project Dashboard - V1

Page 7 of 17

Figure 27: Regional IT Project Dashboard

4.4. "The Company's" IT Infrastructure Quality Criteria

It is important for all IT organizations within "the Company" to have a strong business alignment in order to be recognized as a value adding service provider that has defined processes for strategic alignment, value and service delivery.

"The Company" has adopted many standards, policies, and processes when it comes to finance management. These processes are annually audited against the Sarbanes-Oxley Act of 2002. Documentation and standardization for services that are out of scope with regards to SOX[21] compliance varies on the global, regional and local layers.

For that reason there is a joint long-term effort to implement ITIL® within all IT organizations and for all services.

"The Company" has currently identified the following quality criteria:

- Infrastructure Strategy Management
  - Governance
- Infrastructure Portfolio Management
  - Service Catalogue
  - Service Description
  - Service Requirements
- Infrastructure Project Management
- Service Management
  - Infrastructure Optimization
  - Total Cost of Ownership
- Service Delivery
  - High Availability
  - Service Level Agreements
  - Deployment, Management and Monitoring

Implementation of a set of technical tools is especially required for service delivery and management. "The Company" uses a systems management solution that mainly addresses the following quality criteria, critical success factors and key performance indicators (for further reference see chapter 6. "Management and Monitoring of IT Services that are defined in the Infrastructure Service Strategy"):

- Service Standardization
- Service Deployment and Management
- Service Monitoring
- Service Quality
- Service Reporting

[21] Sarbanes-Oxley and IT Governance (Damianides, 2005)

5. Comparison ITIL® Service Strategy and “The Company’s” Infrastructure Service Strategy

One of the fundamental research questions of the thesis has been:

What are the gaps between an ITIL® Service Strategy and a defined Service Strategy of a global / international company?

Therefore a checklist has been created which helps to compare the functions, processes and policies of an ITIL® Service Strategy with “the Company’s” Infrastructure Service Strategy.

In case some of the points haven’t been addressed and released in “the Company’s” published service strategy additional information was requested by the global and regional infrastructure organizations.

When no information could be provided, the specific item was considered and classified as “Not defined”.

5.1. Gap analysis

At the moment “The Company” hasn’t implemented ITIL® in its whole functionality and the adoption rate slightly differs in the global, regional and local IT organizations.

From an educational perspective no mandatory requirement to have a certification or qualification in ITIL® currently exists for an employee of an IT organization. Nevertheless the number of employees who have qualified ITIL® expertise and knowledge is growing due to the fact that ITIL® itself becomes more important for IT professionals.

The gap analysis and its results reflect information from the global and regional IT organizations as they are providing the standard and fundamental IT services that are driving and supporting “The Company’s” business.

The table below shows which parts of the ITIL® Service Strategy are defined within “The Company”:

Service management as a practice

	Definition	Further Information
Definition of services	Yes	General understanding No internal applicable definition available
Definition of (IT) service management	Yes	General understanding No internal applicable definition available
Definition of service provider	Yes	Classification not as in ITIL® Type II - shared service unit
Definition of stakeholders	Yes	Customer, Users and Suppliers
Definition of utility and warranty	No	
Assets, resources and capabilities	Yes	General understanding
Processes	Yes	Standard project management guidelines on global and regional level (PRINCE2®)
Organizing for service management	Yes	General understanding, although functions and roles are not "standardized" within "The Company"
The service portfolio	Yes	Defined service pipeline and catalogue, retired services
Knowledge management and the SKMS	No	
Governance	Yes	Common directions, policies and rules are defined
Management systems	No	No management system (e.g. ISO/IEC 20000) is implemented. Nevertheless it is defined as a requirement for global / regional suppliers
Specialization and coordination across the lifecycle	Yes	Although roles and responsibilities are not defined in a standardized way, a specialization and coordination across the lifecycle is given
Processes through the lifecycle	Yes	There are processes for the different ITIL® lifecycles but they are not referring to the ITIL® ones As previously mentioned there is no broad ITIL® implementation in "The Company"

Service strategy principles

	Definition	Further Information
Fundamental aspects of strategy	Yes	The aspects which are covered are "delivering value" and "deciding a strategy"
The four Ps of strategy	Yes	Perspective, Positions, Plans and Patterns are defined in a not very detailed way
Customers	Yes	All services are offered to internal customers such as business units or other IT organizations
Services	No	No internal applicable definition available which matches and covers ITIL® aspects
Value	No	The only value that is measured is the "price of the service"
Utility and warranty	No	
Customer, service and strategic assets	Yes	Rudimentary not ITIL® compliant definition; Varies between global and regional layers
Define the market and identify customer	Yes	Defined Customer is either the region or the country
Understand the customer	Yes	Defined Understanding of the business strategy
Quantify the outcomes	Yes	Outcome is defined through global and regional steering teams
Classify and visualize the service	No	
Understand the opportunities	Yes	Defined Understanding of the business strategy
Define services based on the outcomes	No	
Service models	No	Not standardized on global and regional level
Define service units and packages	No	Not defined for all global and regional services
Strategies for customer satisfaction	No	
Return on investment (ROI)	Yes	Business case available to ensure the ROI.
Deciding what to source	**Yes**	**"The Company" has a clear understanding of what is sourced**
Sourcing structures	Yes	Defined

Multi-vendor sourcing	Yes	Defined
Service provider interfaces	Yes	Defined
Sourcing governance	No	Not standardized on global and regional level
Critical success factors	Yes	Defined
From value chains to value networks	No	
Using value networks	No	
Service strategy inputs and outputs	Yes	Defined but not according to ITIL® lifecycles

Service strategy processes

	Definition	Further Information
Purpose and objectives	Yes	Defined Service direction, roadmap, deliverables
Scope	Yes	Defined Service direction, roadmap, deliverables
Value to business	Yes	Defined Understanding of the business strategy
Policies, principles and basic concepts	Yes	Defined
Process activities, methods and techniques	No	Not standardized on global and regional level
Triggers, inputs, outputs and interfaces	Yes	Defined
Information management	No	
Critical Success Factors and Key Performance Indicators	Yes	Defined
Challenges and Risks	Yes	Defined

Service strategy, governance, architecture and ITSM implementation strategies

	Definition	Further Information
Governance	Yes	Defined Differences on global and regional level
Establishing and maintaining a service management system	No	
IT service strategy and the business	Yes	Defined Understanding of the business strategy
IT service strategy and enterprise architecture	No	Not standardized on global and regional level
IT service strategy and application development	No	Not standardized on global and regional level
Creating a strategy for implementing service management processes	No	

Organizing for a service strategy

	Definition	Further Information
Organizational development	Yes	Defined Differences on global and regional level
Organizational change	No	
Organizational departmentalization	No	
Organizational design	No	
Organizational culture	No	Not standardized on global and regional level
Functions	No	
A logical organization structure for an IT service provider	No	
Roles	Yes	Defined Differences on global and regional level
Responsibility model - RACI	No	
Competence and training	No	

Implementing service strategy

	Definition	Further Information
Implementation through the lifecycle	Yes	Defined
Service strategy implementation activities following a lifecycle approach	No	
The impact of service strategy on other lifecycle stages	No	

5.2. Interpretation of the gap analysis / results

In general there is a difference between the adoption, implementation and usage of "The Company's" Project Management Framework and the management of IT services and implementation of ITIL®.

The checklist that mainly touched the areas of the ITIL® Service Strategy can be taken as a baseline to understand which improvements "The Company" has to apply to successfully implement global, regional and local baselines from a short term perspective and which can be addressed in mid or long term.

Service management as a practice

At the moment there is no internal curriculum available in "The Company" to understand the functions, principles and processes of ITIL®. Although the general ITIL® know-how of new and existing employees is increasing due to available courses a first step would be to offer "standard" internal training materials or "mandatory" curriculums to ensure that every employee of an IT organization has a certain skillset about ITIL® and IT employees share a common understanding.

In addition an internal website can be created – similar to the project management framework – where the most common definitions in ITIL® are explained and internal examples, policies, processes and templates are shown.

Therefore the executive and senior management on global and regional layers have to agree on and align the most important areas for ITIL® so that a roadmap for the implementation and "rollout" of ITIL® can be created. This has to be implemented on a global level first and then needs to be executed by all other layers in addition.

The strategic plan has to reflect available IT resources aligned with the business strategy and priorities.

ITIL® as a best practice framework doesn't need to be 100% implemented to create value; each object that is controlled, defined, standardized and validated improves the quality of provided or consumed IT services.

Service strategy principles

"The Company" is following the four Ps of strategy and the author recommends formalizing the complete process so that every IT organization in "The Company" can adopt and use these standards.

It is crucial to define and perform a service provider's classification for at least the global and regional level to gain transparency and a clear understanding about all company-wide service providers and their roles.

In addition stakeholders can be defined to identify customers, users and suppliers.

At the moment service descriptions and requirements exist for globally and regionally offered and provided services.

When comparing the content of these documents and the demands of ITIL®, the mismatch of the following items needs to be defined in more detail, as well as tracked and validated on a regular basis:

- Utility and warranty,
- Value and Outcome,
- Service models,
- Service units and packages
- Customer satisfaction

Although "The Company" has a defined sourcing strategy on the global, regional and local layers, additional topics need to be specified in more detail. Input from the suppliers is necessary:

- Demonstration of Competencies (industry certifications and experience)
    - Adoption and Implementation of standards such as ISO/IEC 20000[22]
- Quality of Solutions
- Capabilities
- Interfaces

Service strategy processes

"The Company" implemented a rich set of policies and processes that are mentioned in ITIL®. One of the most important areas is the service portfolio management which has been implemented by the global and regional IT organizations. Chapter 4.3 "The Company's" IT Infrastructure Service Strategy" covers the definition of:

- Service portfolio
- Service pipeline
- Service catalogue
- Retired services

The implementation of new IT services is governed and controlled by the mandatory usage of "The Company's" Project Management Framework.

The service strategy processes can be improved by introducing a central application that supports the management of the complete portfolio management process.

Service strategy governance, architecture and ITSM implementation

[22] Praxisbuch ITIL/Erfolgreiche Zertifizierung nach ISO 20000 (Bock, Macek, Oberndorfer, & Prumsenberger, 2008)

The gap analysis proved that there is no service management system available in "The Company" that could be used as a repository for documentation, policies, processes and resources for the strategy.

The IT service strategy for the global and regional IT Infrastructure organizations is well defined but it is lacking an alignment of the application and enterprise architecture strategy with the Infrastructure strategy.

A service provider must align his or her overall strategies so that a value network can improve the quality of all provided services as a result.

Organizing for service strategy

"The Company" and their global and regional IT organizations don't have defined functions and roles, due the fact that sizes of the organizations vary between global and regional levels and even more in the region itself.

Although ITIL® can be tailored to different sizes of organizations the author believes that defined functions and roles need to be in place in a global / international company so that IT services can be provided in a standardized way in all areas of the world.

If IT organizations on the regional and local levels don't have enough resources compared to the global level, some of the roles can be combined and associated with one person.

It is important that a "standard" logical organization structure needs to be defined within "The Company". ITIL® Service Strategy explains in many details how this can be accomplished and provides examples.

As an organizational change implemented worldwide can only be driven, supported and decided by the highest executive management of a company, the author believes that this can only be realized as a long term strategic goal.

Implementing service strategy

The implementation of a service strategy is linked to all other ITIL® lifecycles and shows the importance of taking a lifecycle approach. Therefore the dependency on Service Design, Operation, Transition and Continual Service Improvement is high and needs to be considered in the Service Strategy.

Quality Criteria

From an ITIL® perspective "The Company" has defined some organizational quality criteria, critical success factors and key performance indicators which are outlined in Chapter 4.4.

“The Company’s” IT Infrastructure Quality Criteria.

The gaps that have been identified when “The Company’s” Infrastructure Service Strategy was compared with the ITIL® Service Strategy can be addressed and solved with the implementation of technical solutions that improve the deployment, management, operations and continuous improvement of provided IT services.

The author believes that “The Company” needs to shift towards the rationalized and dynamic state based on the Infrastructure Optimization and that this can only be achieved by leveraging and implementing technical solutions.

Management and Monitoring of IT services are not part of the ITIL® Service Strategy but these components ensure that customer satisfaction and value can be increased while decreasing costs.

Therefore the following technical quality criteria and critical success factors cannot be implemented, tracked and validated without implementing a technical solution:

- Service Deployment and Management
- Service Delivery
    - High Availability
    - Service Level Agreements
    - Deployment, Management and Monitoring
- Service Monitoring of
    - Availability
    - Capacity
    - Performance
    - Trends
- Visualization in form of Dashboards, Reports

6. Management and Monitoring of IT Services that are defined in the Infrastructure Service Strategy

It is necessary to implement a worldwide solution to manage, maintain, measure and monitor IT services that are defined in the Infrastructure Service Strategy (Chapter 4.3. “The Company’s” IT Infrastructure Service Strategy),.

The Systems Management solution enables an easy and effective management of all IT services and infrastructure related aspects and components. The solution combines end to end management of mission critical application and services, as complexity in day to day management and operating costs increased in the last years.

Systems Management tools add costs for designing, planning, purchasing, implementing, managing and using the tools but the savings far outweigh the costs as they are on-going and consistent. (Troni, Margevicius, & Silver, 2010).

The ROI is usually not achieved until the second year but implementation time and grade of adoption can speed up the process. Costs savings of IT operations are primarily connected with the usage of systems management tools. On the other side productivity loss due to less stable or unavailable systems has to be considered as well. Unavailability of services can also result in negative perception but it is difficult to measure the financial impact.

The Global IT Infrastructure Services organization has defined high level requirements; those have been signed off by the different regions of the world:

- establish a “standard” Systems Management Solution for each area of the world that provides a system-wide approach and capability to manage, maintain, monitor and measure critical IT Services in real-time
- based on industry leading standard solutions
- support of frameworks such as ITIL® and ISO/IEC 20000
- integration of internal applications, systems and platforms
- build on a scalable and extensible model that consistently allows to define, deploy, monitor and manage increasing IT services
- capture and aggregate knowledge about infrastructure, policies and process
- automate operational and management tasks by leveraging and integrating existing tools and processes
- ensure SLA delivery

6.1. Technical Solution / Systems Management Solution

90% of all systems, applications and services that are used within the company are based on the Microsoft[23] platform. During the evaluation of different systems management solutions it became

[23] Microsoft, http://www.microsoft.com/about/en/us/default.aspx (November, 2011)

very clear that there was not one solution available that was capable of handling all the requirements.

Therefore a systems management platform has been built that combined and integrated a configuration management and monitoring solution.

Gartner Research confirmed in two independent studies that both preferred solutions (Microsoft System Center Configuration Manager, Microsoft System Center Operations Manager) were listed in the magic quadrant for “leaders” (Cosgrove, 2011) (Williams & Curtis, 2010).

Microsoft System Center Configuration Manager 2007 R3 (SCCM)

Microsoft states that “System Center Configuration Manager 2007 is used by more enterprises than any other client management solution. It comprehensively assesses, deploys, and updates your servers, client computers, and devices across physical, virtual, and mobile environments. Optimized for Windows, it is the best choice for gaining enhanced insight into and control over your IT systems. With maintenance costs accounting for 70 per cent of system ownership, Configuration Manager gives organizations a powerful tool to reduce costs by providing effective management for a client infrastructure”. (Microsoft, Microsoft System Center Configuration Manager 2007 R3, 2011)

Gartner lists Microsoft System Center Configurations Manager 2007 R3 in the magic quadrant for “leaders”.

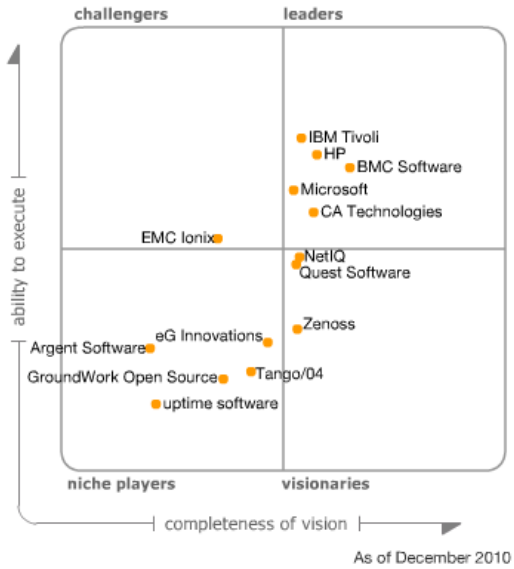


Figure 28: Magic Quadrant for PC Configuration Life Cycle Management Tools (Cosgrove, 2011)

The purpose of Microsoft System Center Configuration Manager (SCCM) is to automate tasks and maintain a standard, stable environment which has a big impact on the TCO. As it is very challenging and difficult to quantify the monetary value, the Gartner TCO model (Chapter “The Company’s Critical Success Factors, Key Performance Indicators, Quality Criteria’s”) was chosen to define the critical success factors and key performance indicators.

There is a substantial cost difference between the “unmanaged” and “locked and well managed” state (Chapter 3.7.1. Industry Quality Criteria). The well managed state can be achieved by using SCCM. When a service is well managed, better control is available to understand the usage of applications and services. In this case money can be saved by reducing costs for unnecessary applications and services.

It is important to note that Gartner believes total cost of ownership requires looking at both the “direct” IT cost of providing and supporting services as well as “indirect” costs - the cost end users cause by using services (e.g. productivity loss when services are not working properly).

The SCCM product enables the following maintenance and deployment capabilities:

- Agent Installation
- Asset Intelligence
- Data Retention
- Desired Configuration Management
- Collections
- Software Distribution
- Software Updates
- (Mobile) Device Management
- (Operating System) Deployment
- Reporting

Microsoft System Center Operations Manager 2007 R2 (SCOM)

Microsoft states that “System Center Operations Manager 2007 R2, Microsoft’s end-to-end service-management product, is the best choice for Windows environments. It works seamlessly with Microsoft infrastructure servers, such as Windows Server, and application servers, such as Microsoft Exchange, helping to increase efficiency while enabling greater control of the IT environment. As a significant step towards fulfilling Microsoft’s common management vision, Operations Manager 2007 R2 also helps organizations monitor Windows Azure applications, allowing to extend familiar on-premises monitoring solution to public cloud scenarios”. (Microsoft, Microsoft System Center Operations Manager 2007 R2, 2011)

Gartner lists Microsoft System Center Operations Manager 2007 R2 in the magic quadrant for “leaders”.

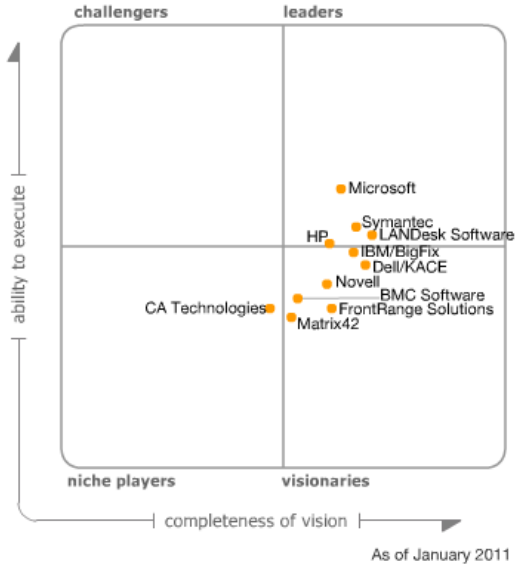


Figure 29: Magic Quadrant for IT Event Correlation and Analysis (Williams & Curtis, 2010)

As explained in “Chapter 3.7.1. Industry Quality Criteria”, most of the cost savings in the SCCM area can be achieved by reducing IT operations costs. SCOM enables proactive monitoring, that again helps to reduce costs at all levels of support and to avoid unavailability of applications and services.

SCOM provides a centralized monitoring solution for Microsoft and cross platform environments such as Linux, UNIX whether the applications and services run in physical or virtual infrastructure.

The SCOM product itself is a monitoring solution that enables the implementation of monitoring managed applications. For that purpose management packs can be created or can be purchased by third party vendors. There are almost one thousands management packs available.

Once a management pack is deployed and imported, it can be used to monitor services, applications, and hardware and software components.

The SCOM product itself enables the following monitoring and remediation capabilities:

- Agent Installation
- Alerts and Notifications
- Data Retention
- Dashboards
- Management Pack
- Reporting

Management Pack

"Management packs typically contain monitoring settings for applications and services. After a management pack is imported SCOM begins monitoring objects based on default configurations and thresholds that are set by the management pack". (Microsoft, Microsoft TechNet, 2009)

Microsoft® defines a Management Pack as:

- "Monitors, which direct an agent to track the state of various parts of a managed component
- Rules, which direct an agent to collect performance and discovery data, send alerts and events, and more
- Tasks, which define activities that can be executed by either the agent or the console.
- Knowledge, which provides textual advice to help operators diagnose and fix problems.
- Views, which offer customized user interfaces for monitoring and managing this component.
- Reports, which define specialized ways to report on information about this managed component.
- Object discoveries, which identify objects to be monitored.
- Run As profiles, which allow you to run different rules, tasks, monitors, or discoveries under different accounts on different computers" (Microsoft, Microsoft TechNet, 2009)

The below Microsoft sample shows what SCOM is capable of. The "Figure 30: Microsoft Contoso POS, High Level Architecture " describes architecture of two environments to the Contoso automated sales environment.

- POS environment which includes POS devices and the local resources on the Store Server. Every store has the same setup and there are more than 50 store environments
- Contoso environment is the web based commerce application and includes the whole server back end and integration to business partners. Also store servers are integrated to update product and pricing information.

The Service Model and the dependencies are roughly provided in "Figure 31: Microsoft Contoso POS, Service Model " below. For all classes detailed information is available.

Based on the application overview and the service model monitoring options, alerts and health status as well as remediation actions can be setup. This capability ensures to measure and monitor key performance indicators of IT services.

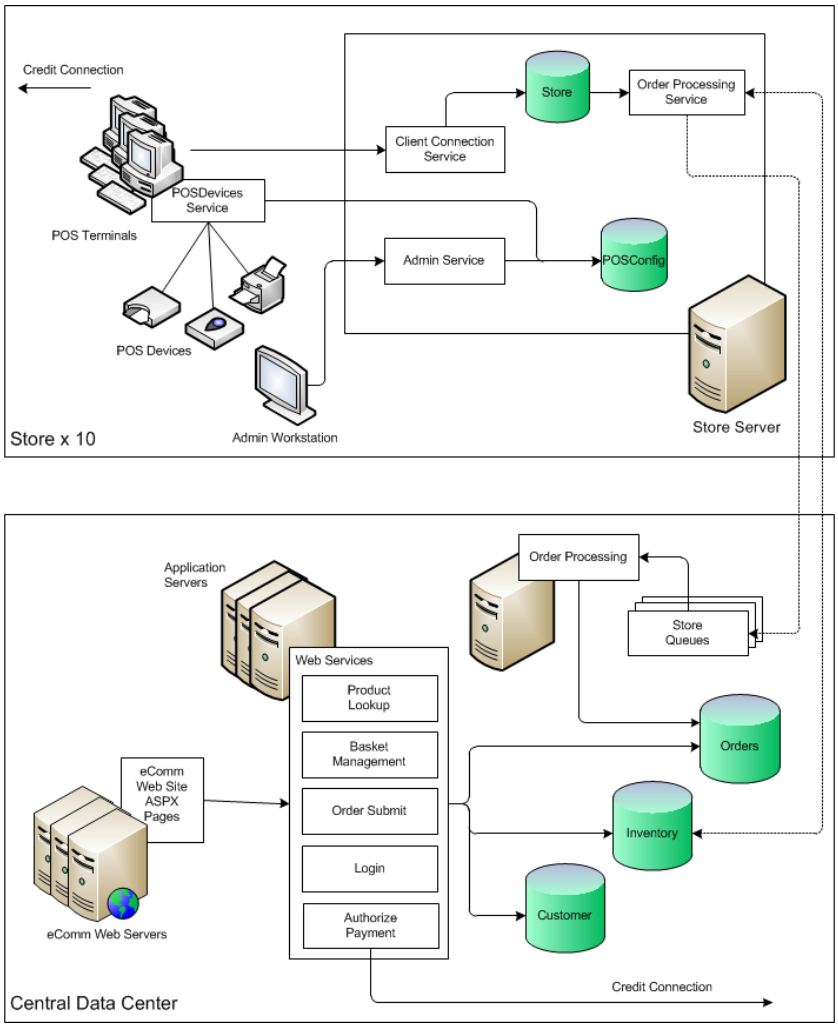


Figure 30: Microsoft Contoso POS, High Level Architecture (Wren, 2011)

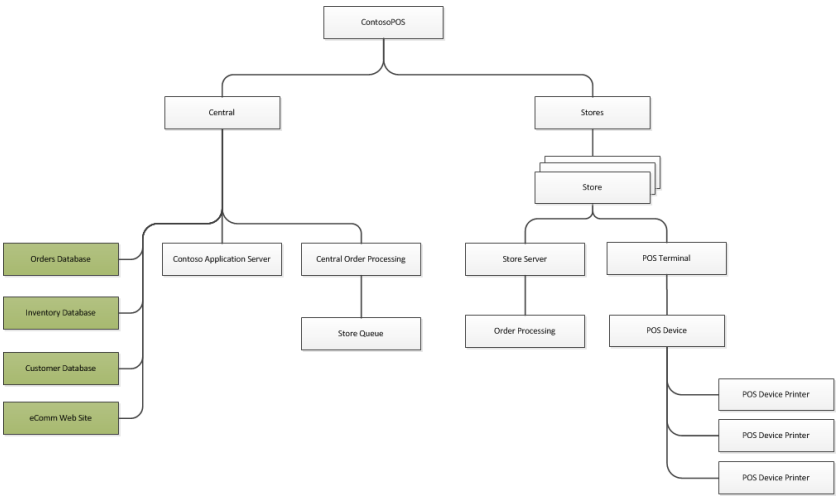


Figure 31: Microsoft Contoso POS, Service Model (Wren, 2011)

6.2. Systems Management Architecture and Implementation

6.2.1. Microsoft System Center Configuration Manager 2007 R3 (SCCM)

Microsoft System Center Configuration Manager 2007 R3 Infrastructure is used as part of the worldwide Systems Management solution in “The Company”.

The following part describes how the solution was deployed and setup in the European region.

The Central Primary Site contains all settings that are replicated to either the underlying primary or secondary sites. Five primary sites and four secondary sites have been installed in the current environment. When the full adoption and deployment phase is finished there will be three primary sites for the three largest countries (France, Germany and United Kingdom) and a fourth shared primary site with 37 secondary sites for all other European countries.

As the whole solution is based on a Server / Client architecture, it is necessary to install an agent (client component) on all managed devices to gain and use the whole functionality of SCCM. There is also the ability to manage devices and systems in an agentless way but this limits the features to the reporting capability.

Overview

The following table shows an overview of all sites that are available within European SCCM environment:

EU SCCM Environment			
Site Code	**Site Description**	**Parent Site**	**Used by (country)**
CEN	European Central Site	-	None
EU1	Shared European Primary Site	CEN	Multiple Countries
BE1	Secondary Site	EU1	Belgium
CH1	Primary Site	CEN	Switzerland
DE1	Primary Site	CEN	Germany
IE1	Secondary Site	UK1	Ireland
PL1	Secondary Site	EU1	Poland
RU1	Secondary Site	EU1	Russia
UK1	Primary Site	CEN	UK and Ireland

Table 8: European SCCM Environment

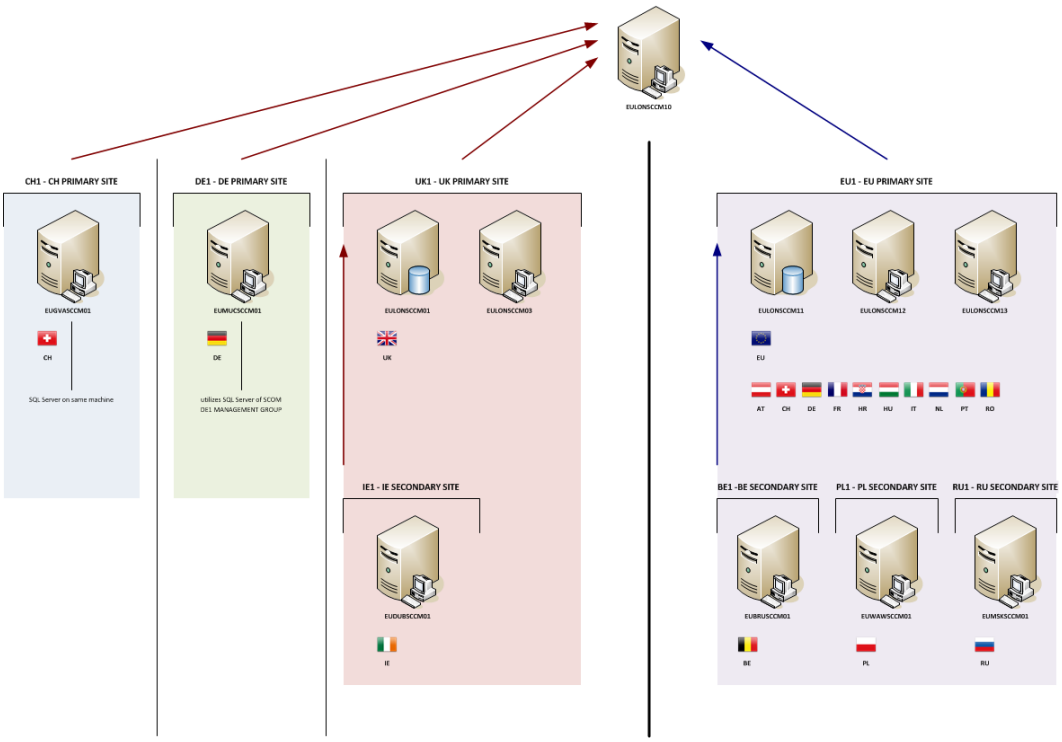


Figure 32: European SCCM Environment: SCCM Architecture (as October 2011)

Detailed SCCM Configuration

Client Installation Methods

There are a number of different methods for the installation and distribution of the System Center Configuration Manager 2007 client software. The automatic client installation methods were disabled in the environment to be able to control the installation of the client.

Client Agents

Client Agents belonging to the SCCM site are enabled with the following settings:

- Advertised Programs Client Agent
- Computer Client Agent
- Desired Configuration Management Client Agent
- Hardware Inventory Client Agent Properties
- Mobile Device Client Agent
- Network Access Protection Client Agent
- Remote Tools Client Agent
- Software Inventory Client Agent Properties
- Software Metering Client Agent
- Software Updates Client Agent

Ports

Service	Port	Description
Client Requests-HTTP (TCP)	80	(default) Client Requests-HTTP (TCP)
Client Requests-HTTPS (TCP)	443	(default) Client Requests-HTTPS (TCP)
Wake On LAN (UDP)	9	

Table 9: European SCCM Environment: Network Ports

Name	Type	Priority	Site Server Name	Schedule
BE1 - BE Secondary SCCM Site	Standard Sender Address	1	eubrusccm01	Unlimited when sending to this address
CEN - EU SCCM 2007 CENTRAL SITE	Standard Sender Address	1	eulonsccm10	Unlimited when sending to this address
CH1 - CH Primary SCCM Site	Standard Sender Address	1	eugvasccm01	Monday – Friday between 8 and 16 allow medium and high priority. Other times – open for all priorities.
DE1 - DE Primary SCCM Site	Standard Sender Address	1	eumucsccm01	Monday – Friday between 8 and 16 allow medium and high priority. Other times – open for all priorities.
EU1 - EU Primary SCCM Site	Standard Sender Address	1	eulonsccm11.	All times - open for all priorities.
IE1 - IE Secondary Site	Standard Sender Address	1	eudubsccm01	Unlimited when sending to this address
PL1 - PL Secondary SCCM Site	Standard Sender Address	1	euwawsccm01	Unlimited when sending to this address
RU1 - RU Secondary SCCM Site	Standard Sender Address	1	eumsksccm01	Unlimited when sending to this address
UK1 - UK SCCM 2007	Standard Sender Address	1	eulonsccm01	All times - open for all priorities.

Table 10: SCCM Environment: Server Addresses

Status Reporting & System Health Validation

The server and client component status reporting is turned on for all internal milestones and log files. This functionality ensures that the overall SCCM health functionality can be guaranteed and tracked.

The query interval is set to 120 minutes and its validity period to 26 hours.

Maintenance Settings

Setting	Enabled	Time
Rebuild Indexes	Yes	every Sunday from 12:00 AM to 5:00 AM
Monitor Keys	Yes	every Sunday from 12:00 AM to 5:00 AM
Delete Aged Inventory History	Yes	delete data older than 90 days, every Saturday from 12:00 AM to 5:00 AM
Delete Aged Status Messages	Yes	every day from 12:00 AM to 5:00 AM
Delete Aged Discovery Data	Yes	delete data older than 90 days, every Saturday from 12:00 AM to 5:00 AM
Delete Aged Collected Files	Yes	delete data older than 90 days, every Saturday from 12:00 AM to 5:00 AM
Delete Aged Software Metering Data	Yes	delete data older than 5 days, every day from 12:00 AM to 5:00 AM
Delete Aged Software Metering Summary Data	Yes	delete data older than 270 days, every Sunday from 12:00 AM to 5:00 AM
Summarize Software Metering File Usage Data	Yes	daily from 12:00 AM to 5:00 AM
Summarize Software Metering Monthly Usage	Yes	Enabled, daily from 12:00 AM to 5:00 AM
Clear Install Flag – Not enabled	No	
Delete Inactive client Discovery data –	No	
Delete Obsolete Client Discovery Data –	No	
Delete Aged Configuration Management Data		delete data older than 30 days, every Tuesday and Saturday from 12:00 AM to 5:00 AM
Delete Aged Client Access License Data	No	
Summarize Client Access License Weekly Usage	No	
Delete Aged Computer Association Data	Yes	delete data older than 30 days, every Saturday from 12:00 AM to 5:00 AM

Table 11: European SCCM Environment: Maintenance Settings

6.2.2. Microsoft System Center Operations Manager 2007 R2 (SCOM)

Microsoft System Center Operations Manager 2007 R2 infrastructure is used as part of the worldwide Systems Management solution.

Compared to SCCM it is not possible to configure all settings in a top down approach and then replicate the settings to all SCOM server systems.

Four SCOM environments are implemented for France, Germany, United Kingdom and the rest of Europe. Their configuration and set up is completely identical. The amount of required servers increases with the size of managed devices. Like SCCM, SCOM is based on a Server / Client architecture and it is recommended to install an agent (client component) on all managed devices to access all functionalities of the solution.

Overview

The following table shows an overview of the sites (management groups) that are available within the European SCOM environment:

EU SCOM Environment (Management Groups)	
Management group	**Description**
DE1	Management group dedicated for the Germany
EU1	Management group for the rest of European countries
FR1	Management group dedicated for the France
UK1	Management group dedicated for United Kingdom

Table 12: European SCOM Environment

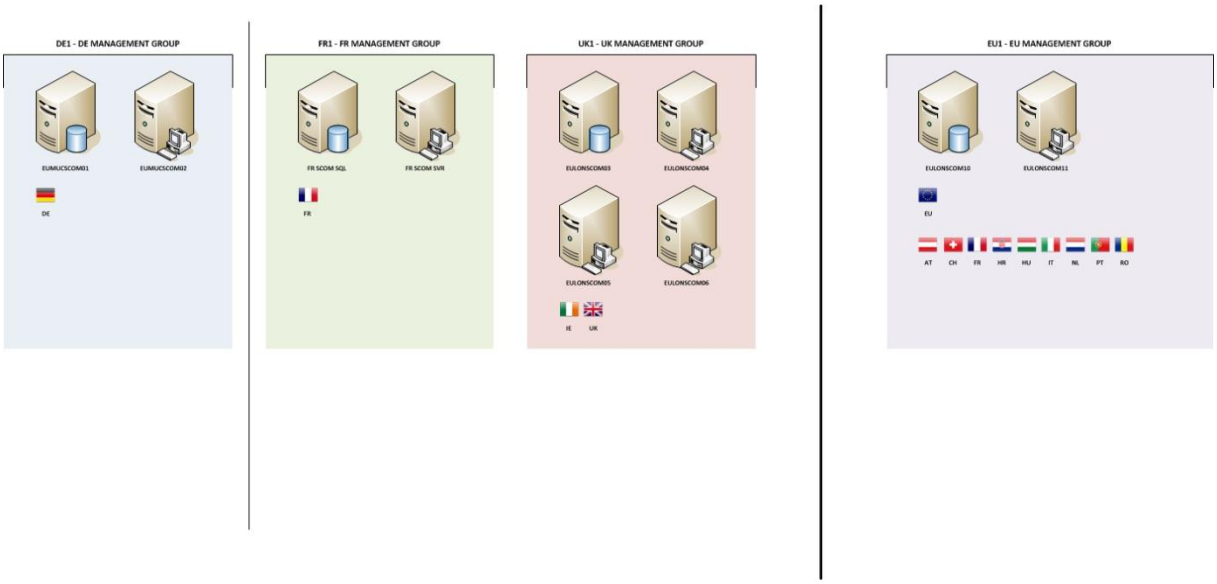


Figure 33: European SCOM Environment: SCOM Architecture (as October 2011)

Detailed SCOM Configuration

Client Installation Method

There are a number of different methods for the installation and distribution of the System Center Operations Manager 2007 client software.

SCCM is used to deploy the agent in a standardized way to all managed devices.

Client Agents

Agents are generating heartbeat requests every 60 seconds to ensure that their components are working properly. When a heartbeat request isn't received, the SCOM servers try to verify the connection to the client by using the "ping" command. After three attempts an alert and notification is sent to the appropriate service support organization so that they can immediately start working on the issue.

The integration of the monitoring system to a service desk application or ticketing system is planned for the future.

General Settings and Database Grooming

SCOM is keeping records of new and closed alert resolution states which are then visible on a service level dashboard. At the moment these records are kept for seven days. In the future all records should be made available for a whole year to be able to generate dashboards and reports that demonstrate trends.

Records to delete	Older than - days
Availability history	7
Event Data	7
Maintenance mode history	7
Monitoring job data	7
Performance Data	7
Performance signature	2
Resolved Alerts	7
State change events data	7
Task History	7

Table 13: European SCOM Environment: Database Grooming Settings

Notifications and Reports

When an alert is identified, notifications and alerts are sent to the service support organizations of the IT service. These settings are customized based on the application, service and country but the main setting is standardized.

Based on the raised alerts and notifications, reports are generated and sent by e-mail to a defined set of people. In addition the reports can be accessed through reporting servers by using Internet Browsers such as Mozilla Firefox, Microsoft Internet Explorer, etc. by a defined set of people.

Notification Settings		
Default Notification	SMTP Server	EULONSMTP
	Port #	25
	Authentication	Windows Integrated
	Return address	scom_eu1
	Retry interval (min)	5
	Format	Default
Application A Supplier Support Notification Alert Name & Device Name & Time of the alert in the subject line	SMTP Server	EULONSMTP.
	Port #	25
	Authentication	Windows Integrated
	Return address	scom_eu1
	Retry interval (min)	5
	Format (Subject)	Alert: $Data/Context/DataItem/AlertName$ Path: $Data/Context/DataItem/ManagedEntityPath$ Last modified time: $Data/Context/DataItem/LastModifiedLocal$
	Format (E-mail message)	Alert: $Data/Context/DataItem/AlertName$ Source: $Data/Context/DataItem/ManagedEntityDisplayName$ Path: $Data/Context/DataItem/ManagedEntityPath$ Last modified by: $Data/Context/DataItem/LastModifiedBy$ Last modified time: $Data/Context/DataItem/LastModifiedLocal$ Alert description: $Data/Context/DataItem/AlertDescription$
Application B Supplier Support Notification Customized e-mail notification to send emails to application support	SMTP Server	EULONSMTP
	Port #	25
	Authentication	Windows Integrated
	Return address	scom_eu1
	Retry interval (min)	5
	Format (Subject)	Alert: $Data/Context/DataItem/AlertName$ Resolution: $Data/Context/DataItem/ResolutionStateName$
	Format (E-mail message)	Alert: $Data/Context/DataItem/AlertName$ Source: $Data/Context/DataItem/ManagedEntityDisplayName$ Path: $Data/Context/DataItem/ManagedEntityPath$ Last modified by: $Data/Context/DataItem/LastModifiedBy$ Last modified time: $Data/Context/DataItem/LastModifiedLocal$ Alert description: $Data/Context/DataItem/AlertDescription$

Table 14: European SCOM Environment: Notification Settings

Management Packs

A standard set of management packs is deployed to the SCOM servers so that the same alerts, metrics and data are collected. A governance team controls the development and deployment of the management packs for the IT services and applications to ensure that all necessary criteria and quality expectations are met.

Data Warehouse Database Retention Policy

SCOM collects a huge variety of performance counters and alert records. Therefore a retention policy for 365 days was created to generate reports for the last 12 months unless data is overwritten.

Dataset name	Aggregation name	Default data retention period (days)	New data retention period (days)	DWDATARP.exe command used
Alert data set	Raw data	400	365	`dwdatarp.exe -s . -d operationsmanagerdw -ds "Alert data set" -a "Raw data" -m 60`
Event data set	Raw data	100	365	`dwdatarp.exe -s . -d operationsmanagerdw -ds "Event data set" -a "Raw data" -m 30`
Performance data set	Hourly aggregations	400	365	`dwdatarp.exe -s . -d operationsmanagerdw -ds "Performance data set" -a "Hourly aggregations" -m 60`
Performance data set	Daily aggregations	400	365	`dwdatarp.exe -s . -d operationsmanagerdw -ds "Performance data set" -a "Daily aggregations" -m 90`
State data set	Raw data	180	365	`dwdatarp.exe -s . -d operationsmanagerdw -ds "State data set" -a "Raw data" -m 30`
State data set	Hourly aggregations	400	365	`dwdatarp.exe -s . -d operationsmanagerdw -ds "State data set" -a "Hourly aggregations" -m 60`
State data set	Daily aggregations	400	365	`dwdatarp.exe -s . -d operationsmanagerdw -ds "State data set" -a "Daily aggregations" -m 90`

Table 15: European SCOM Environment: Data Retention Policy

Alerts / Notifications and Resolution

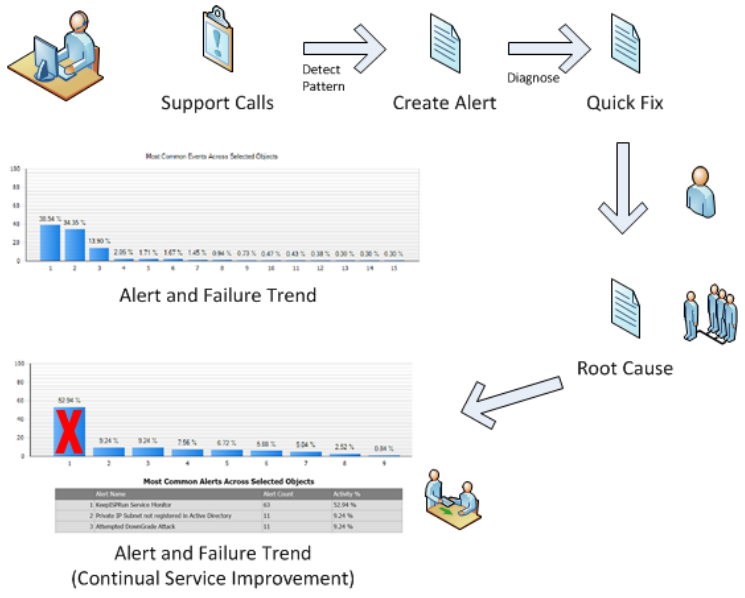


Figure 34: Alerts, Notification and Resolution

6.3. Technical Solution / Dashboard

When a company wants to get a deeper understanding of IT services processes and activities, visual dashboards are the perfect means. IT services dashboards can showcase business-critical metrics and help improve the business value.

It is crucial to focus not only on the relevant data that the dashboard will contain but keep the expectations of IT service desk and senior management in mind as well. The dashboard must provide the right and necessary metrics to support its audience in their decision making and management process.

Different audiences have different needs; a company usually uses multiple dashboards with various metrics to cater to the various levels in an organization. A dashboard shows relevant data at a certain point in time, and puts the information into context. It provides insights in ongoing activities of the IT Service organization.

To determine the right metrics for a dashboard is a difficult task, it completely depends on what the common goals are and what business questions should be answered. Gartner (Brooks, Building Your IT Service Desk Dashboard: Metrics and Information With Meaning, 2011) however helps to qualify the right metric by applying the diagram below:

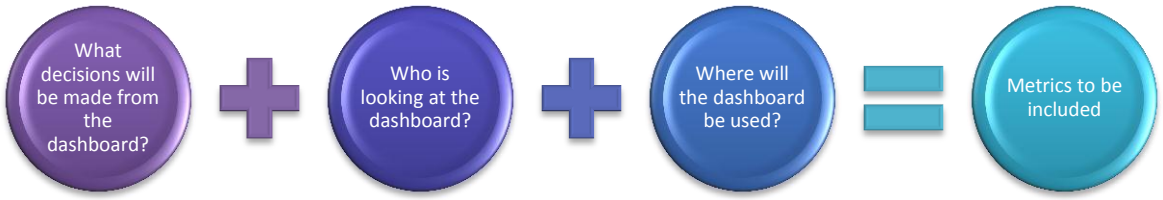


Figure 35: Dashboard Workflow Diagram: (Brooks, Building Your IT Service Desk Dashboard: Metrics and Information With Meaning, 2011)

What decisions will be made from the dashboard?

An IT service dashboard helps an organization in the decision making process, Gartner qualifies the following descriptors:

- Informational: dashboard shows information, no support in decision making process
- Operational: dashboard shows operational metrics and trends
- Tactical: dashboard helps with tactical considerations by looking at one to two year trends
- Strategic: dashboard helps with strategic considerations by looking at three to five year trends

Who is looking at the dashboard?

Different members of an organization have different requirements – the seek answers to different business related questions. Gartner (Brooks, Building Your IT Service Desk Dashboard: Three Steps to Finding Context, 2011) assumes that "specific levels within the organization structure will have similar requirements". It may be that not everybody in an organization should have the same insights (privacy concerns or sensitive data), different audiences might need a different view of the presented information.

Where will the Dashboard be used?

Gartner (Brooks, Building Your IT Service Desk Dashboard: Three Steps to Finding Context, 2011) identifies three different areas where a dashboard can be used in an organization:

- Display in the IT Service desk area
- Desktop/Laptop being used in someone's work area
- Mobile devices

The above criteria impacts the reason why a dashboard is used as well as who uses it, and should therefore be taken into consideration.

6.4. Dashboard Architecture and Implementation

Within "The Company" data is collected by Microsoft System Center Configuration Manager and Operations Manager. A Dundas Dashboard Solution[24] is built on top which is used to visualize the collected data from a data warehouse. The chosen software allows extracting data from any data warehouse which provides the flexibility to include more it services, critical success factors and key performance indicators to "The Company".

As a start four different types of dashboards have been created which can be leveraged easily for all European countries as the data is centrally kept in a data warehouse.

[24] Dundas Dashboard Solution: http://dundas.com/dashboard/ (October, 2011)

Figure 36: Dashboard: SLA

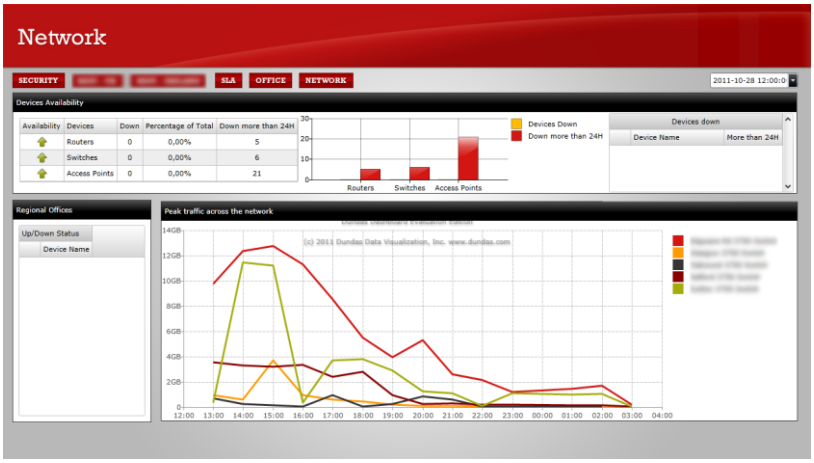


Figure 37: Dashboard: Network

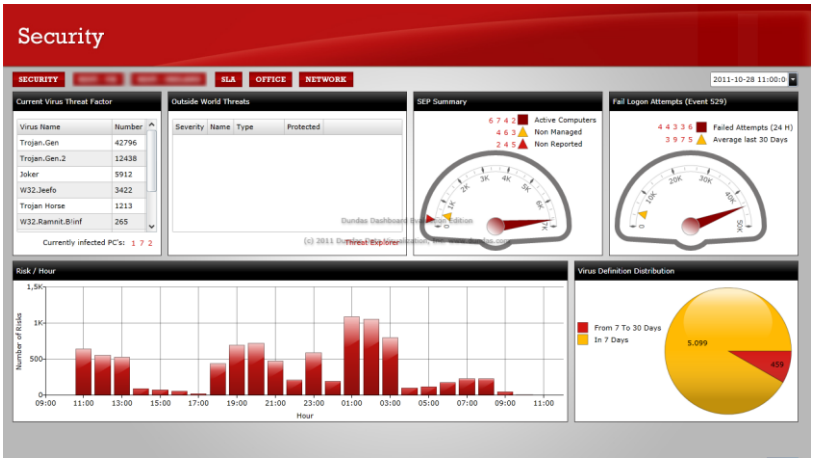


Figure 38: Dashboard: Security

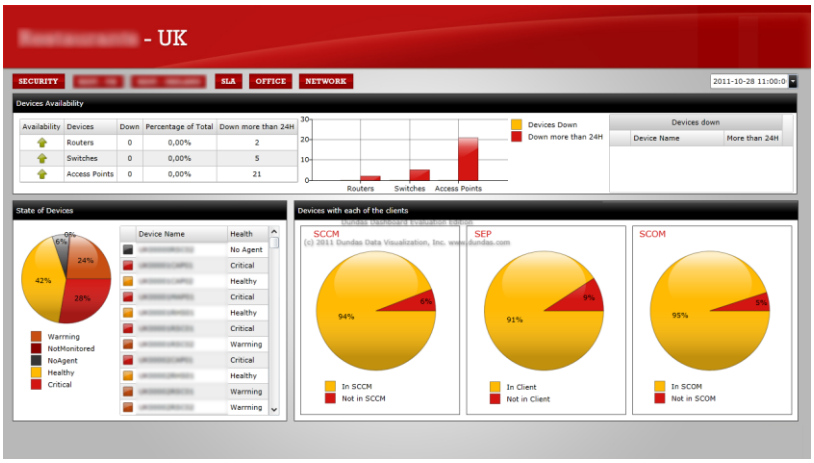


Figure 39: Dashboard: Branch Office UK

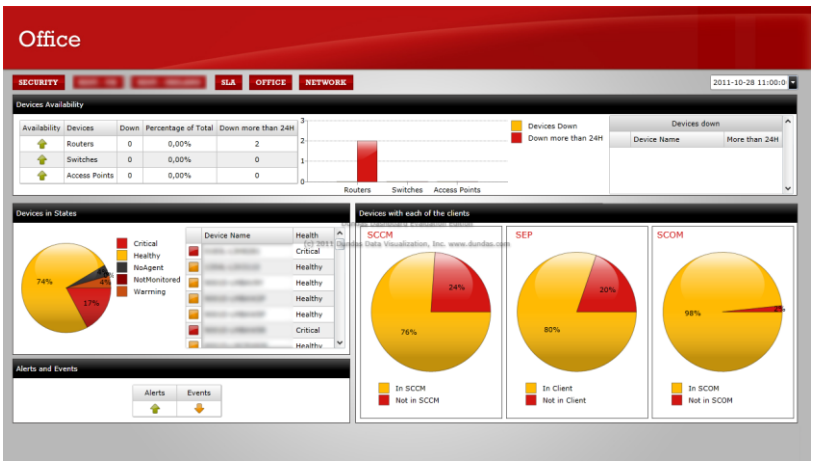


Figure 40: Dashboard: Head Office UK

7. Conclusion / Summary

The thesis evaluates the differences between an ITIL® Service Strategy and a real-life example of a global / international company ("The Company") in a large scale environment.

The evaluation is primarily based on chapters 3 and 4 and answers the following question:

What are the gaps between an ITIL® Service Strategy and a defined Service Strategy of a global / international company?

This has been analyzed and answered by using a literature analysis based on publications that have been approved by the OGC.

Due to the empirical and explorative case study of "The Company" a gap analysis has been performed; in Chapter 5 the assumption was confirmed that global / international companies, that have a defined service strategy for IT services, don't need a full implementation of functions, principles and processes of an ITIL® Service Strategy but technical solutions that help IT organizations to validate the quality criteria of the IT services.

In addition the following research question was answered:

What are the organizational and technical critical success factors for the implementation?

"The Company" has defined the following organizational and technical quality criteria and critical success factors:

<u>Organizational Critical Success Factors:</u>

- Infrastructure Strategy Management
  - Governance
- Infrastructure Portfolio Management
  - Service Catalogue
  - Service Description
  - Service Requirements
- Infrastructure Project Management
- Service Management
  - Infrastructure Optimization
  - Total Cost of Ownership
- Service Delivery
  - High Availability
  - Service Level Agreements
  - Deployment, Management and Monitoring

Technical Critical Success Factors:

- Service Standardization
- Service Deployment and Management
- Service Monitoring
- Service Quality
- Service Reporting
- Visualization in form of Dashboards, Reports

The results of the gap analysis outlined common problems that can occur during the implementation of ITIL®.

Which typical problems occur in the definition and implementation of an ITIL® Service Strategy?

ITIL® is a best practices framework which can be tailored to fulfill the needs of each organization to be a successful service provider. It is a company's decision to prioritize sections of ITIL® that the company wants to focus on and which phased approach is selected for the introduction and implementation of ITIL®.

ITIL® Service Strategy helps to formulize and standardize policies and processes but other areas of ITIL® such as Service Design, Operation, Transition and Continuous Service Improvement need to be implemented in addition to create value and provide better IT services.

Frameworks such as ITIL® provide guidance for companies to:

- develop their service portfolio
- define critical success factor and key performance indicators,
- establish incident management and service desks

The implementation of technical solutions is required for:

- Incident management: a ticketing system and a service desk need to be implemented
- Event management: a monitoring solution needs to be implemented
- Continuous Service Improvement: monitoring, dashboards and reports are required
- Standardization (Service Deployment and Management): a systems management solution is required

Chapter 6 described how Management and Monitoring of IT Services is done by using a systems management solution.

Which technical requirements need to be fulfilled in order to implement and use best practices frameworks such as ITIL® and what is the impact?

The final research question was answered by focusing on service portfolio management, defined quality criteria for IT services and "The Company's" requirements:

- establish a "standard" Systems Management Solution for each area of the world that provides a system-wide approach and capability to manage, maintain, monitor and measure critical IT Services in real-time
- based on industry leading standard solutions
- support of frameworks such as ITIL® and ISO/IEC 20000
- integration of internal applications, systems and platforms
- build on a scalable and extensible model that consistently allows to define, deploy, monitor and manage increasing IT services
- capture and aggregate knowledge about infrastructure, policies and process
- automate operational and management tasks by leveraging and integrating existing tools and processes
- ensure SLA delivery

As a final conclusion the author believes that global / international companies need to have a defined set of organizational and technical quality criteria. Organizational quality criteria can be defined by using ITIL® as a guideline while the technical ones may vary from one company to the other one.

The implementation of ITIL® or technical solutions should be done in a phased approach so that both aspects are continuously improved and additional aspects are covered.

List of Figures

List of Tables

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List of manually processed websites

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