Marko Jäntti

ICSEA Tutorial

From Software Engineering to IT Service Management

UNIVERSITY OF EASTERN FINLAND

Agenda

- Module 1: Introduction
- Module 2: Incident management
- Module 3: Problem Management
- Module 4: Change Management
- Conclusion

Module 1: Introduction

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Welcome to the world of IT services

3

Goals of the tutorial

• This tutorial shall

- provide an insight into IT service management

- describe the service lifecycle

- present the overview of the most popular IT service management processes and concepts.

- explain the relationship between software development and IT service management through the application management function.

- provide lessons learnt from ITSM process improvement case studies with IT service provider organizations

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About us

- UEF is one of the largest universities in Finland.
  - 15,000 students and 2,800 members of staff
- Three campuses are located in Joensuu, Kuopio and Savonlinna.
- Three areas of expertise:
  - Forests and the Environment,
  - Health and Well-being, and
  - New Technologies and Materials.
- School of Computing
  - Software engineering (IT Service Management)
  - Health care information systems
  - Computational intelligence

About us

- Keys to IT Service Management and Effective Transition of Services (KISMET) is a research project funded by TEKES ERDF and industrial partners.
- The goal of the KISMET is to
  1. Examine the transition of IT services and service management processes
  2. Enhance the knowledge sharing on IT service management procedures, methods and concepts both in IT service provider organizations and IT customer organizations
  3. Provide organizations a discussion forum to share experiences in IT service management
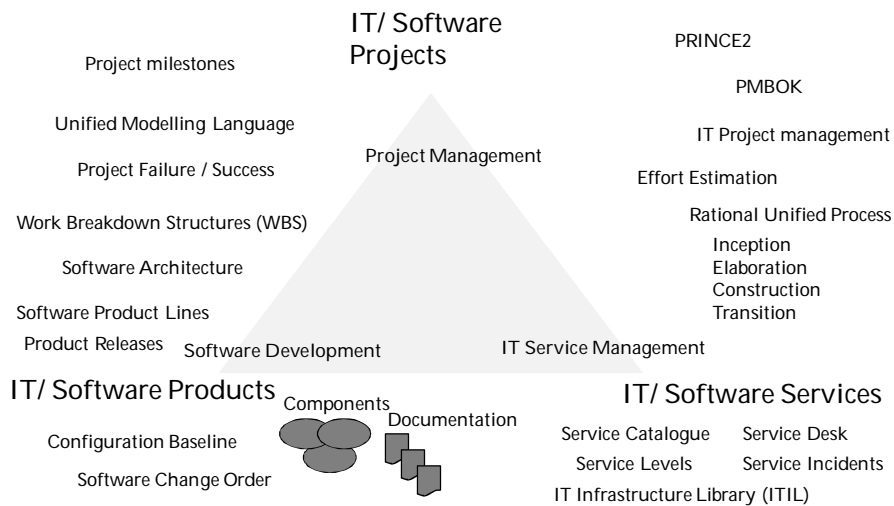
ITSM Research partners

Software Engineering vs. IT Service Management

- Software engineering: the systematic design and development of software products and the management of the software process
  - Mills H.D: The management of software engineering, Part I: Principles of software engineering, IBM Systems Journal
- IT Service Management: The implementation and management of Quality IT Services that meet the needs of the Business.
- IT Service Management is performed by IT Service Providers through an appropriate mix of People, Process and Information Technology.
  - ITIL V3 Glossary, 2007

Project-oriented business → Product-oriented business → Service-oriented business

Information Technology Triangle

IT/ Software
Projects

Project milestones

PRINCE2

PMBOK

Unified Modelling Language

IT Project management

Project Management

Project Failure / Success

Effort Estimation

Work Breakdown Structures (WBS)

Rational Unified Process

Software Architecture

Inception
Elaboration
Construction
Transition

Software Product Lines

Product Releases   Software Development

IT Service Management

IT/ Software Products   Components
                        Documentation

IT/ Software Services

Configuration Baseline

Service Catalogue   Service Desk

Software Change Order

Service Levels   Service Incidents

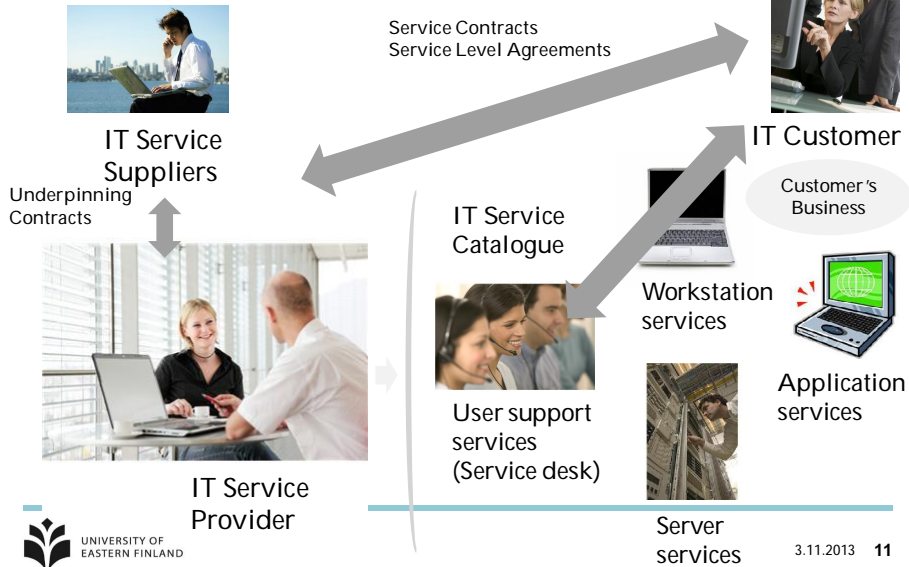IT Infrastructure Library (ITIL)

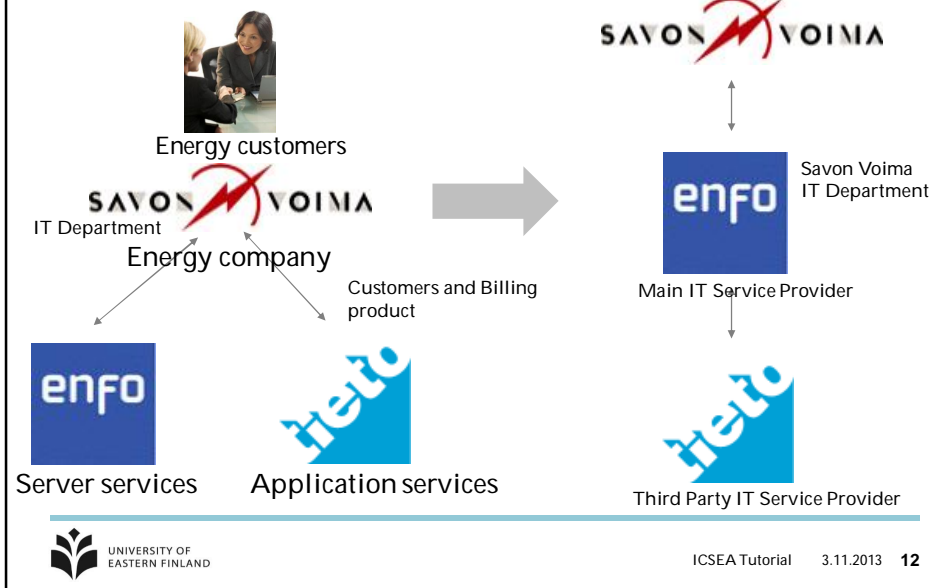---

Why to shift focus from SE to ITSM?

- IT service management is a world-wide trend:
  - Transition from software products to IT services (competition)
  - Outsourcing of service operations to lower-cost countries
- Global adoption of ITSM practices
  - 74% of federal, 37 % of state and 17 % of local government IT organizations in Australia are very knowledgeable about ITSM *
  - Nearly 60% of 100 U.S. CIOs polled (n= 370) confirmed that they are working with ITIL
- There is a strong demand for ITSM professionals

*Forrester Consulting 2012: Next-Generation IT Service Management in the Australian Government Sector
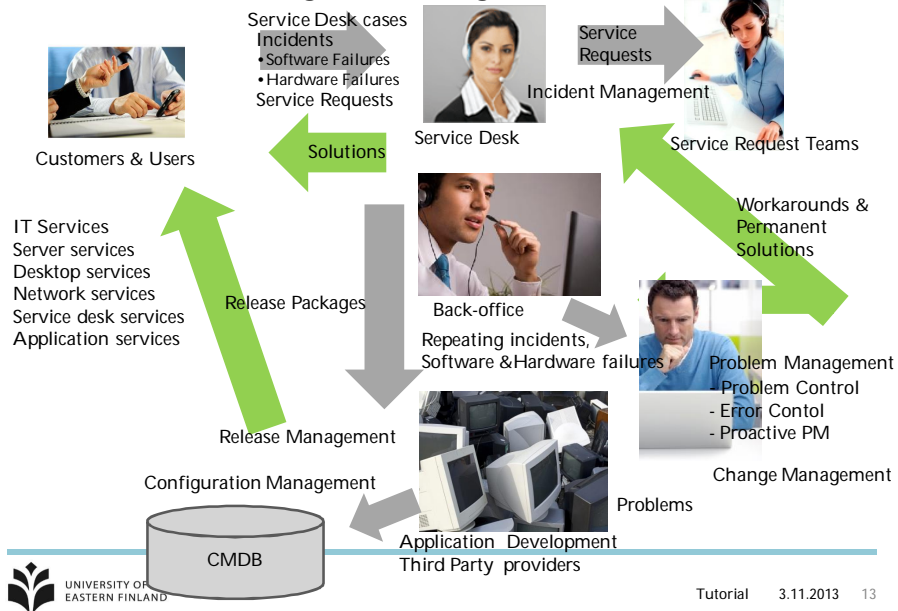
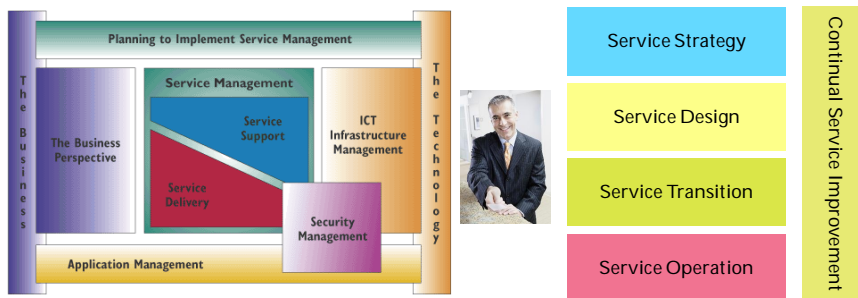The context of IT Service Management

IT Service Suppliers

Service Contracts
Service Level Agreements

IT Customer

Underpinning Contracts

IT Service Catalogue

Customer's Business

Workstation services

IT Service Provider

User support services (Service desk)

Application services

Server services

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Example of a service provider network

Energy customers

SAVON VOIMA

IT Department

Energy company

Customers and Billing product

SAVON VOIMA

enfo

Savon Voima IT Department

Main IT Service Provider

enfo

Server services

Application services

tieto

Third Party IT Service Provider

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IT Service Management Big Picture

Service Desk cases
Incidents
• Software Failures
• Hardware Failures
Service Requests

Service Requests

Incident Management

Service Desk

Solutions

Service Request Teams

Customers & Users

IT Services
Server services
Desktop services
Network services
Service desk services
Application services

Workarounds &
Permanent
Solutions

Release Packages

Back-office

Repeating incidents,
Software &Hardware failures

Problem Management
- Problem Control
- Error Contol
- Proactive PM

Release Management

Change Management

Configuration Management

Problems

CMDB

Application Development
Third Party providers

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IT Infrastructure Library (ITIL)

IT Infrastructure Library v2

IT Infrastructure Library v3

Planning to Implement Service Management

Service Management

The Business

Service Support

ICT Infrastructure Management

The Technology

The Business Perspective

Service Delivery

Security Management

Application Management

Service Strategy

Service Design

Service Transition

Service Operation

Continual Service Improvement

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How Software Development is visible in IT Service Management?

Functional requirements
Non-functional requirements
Data requirements

Use case model

Application Review

Service Management

SLA Levels

Application Development

Testing

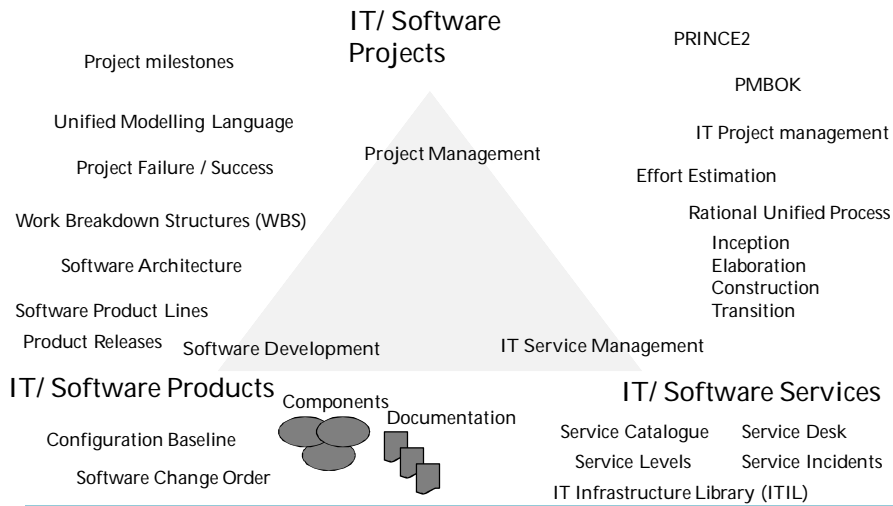Application Management Lifecycle
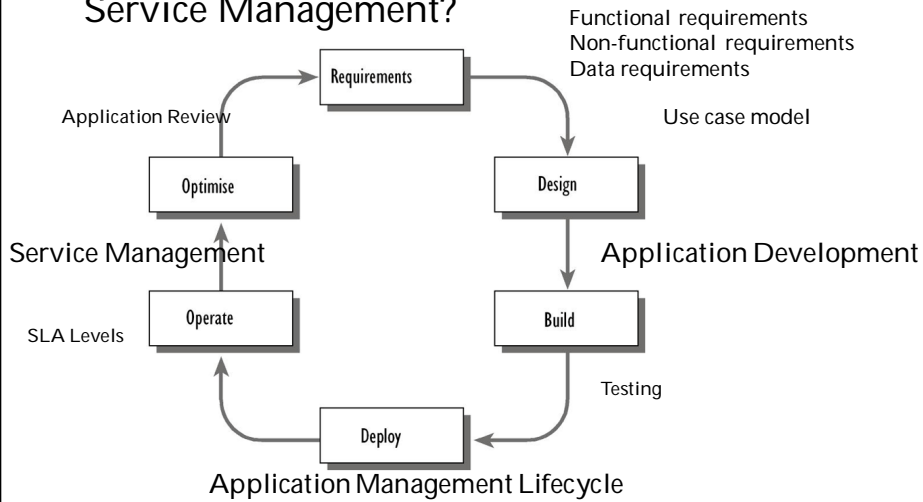
UML Sequence Diagram
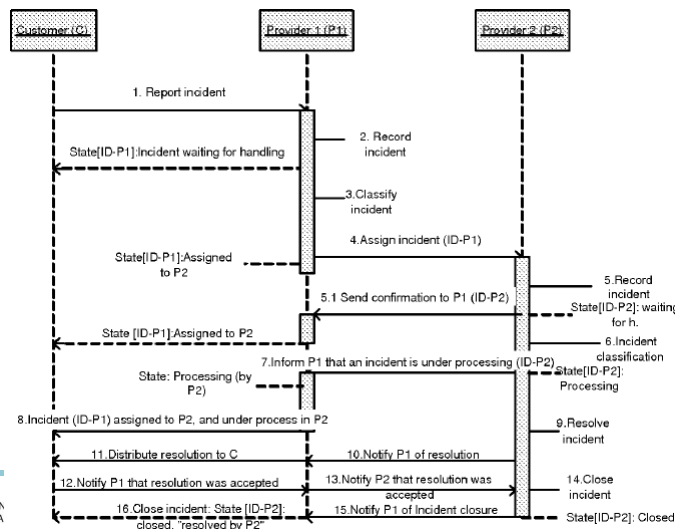
Tutorial exercise

- Discuss the following questions in small groups:
1. Why IT companies are interested in providing IT services instead of creating software products?
2. What elements would you like to add to the IT triangle?
3. How does the application development cycle differ from a service lifecycle?

Task 1: Why IT companies are interested in providing IT services?

- Increasing need to outsource service operations
- Product-based business model faces a lot of competition
- Customers aim at focusing on core business processes instead of managing IT

Task 2: Information Technology Triangle

IT/ Software
Projects

Project milestones

PRINCE2

Unified Modelling Language

PMBOK

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Components
Documentation

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Software Change Order

Service Levels   Service Incidents

IT Infrastructure Library (ITIL)

How does the application development cycle differ from a service lifecycle?

Application Management
Lifecycle

Service Lifecycle

Availability Management
Capacity Management
Service Level Management

Continual Service Improvement

Service Strategy

Service Design

Change Management
Configuration Mgmt
Release Management

Service Transition

Service Operation

Incident Management
Problem Management
Service Request Management

Requirements

Optimise

Design

Operate

Build

Deploy

Module 2: Incident management

Fire fighting

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Incident management

- The primary goal of Incident Management process is to

  – restore normal service operation as quickly as possible and

  – minimize the adverse impact on business operations,

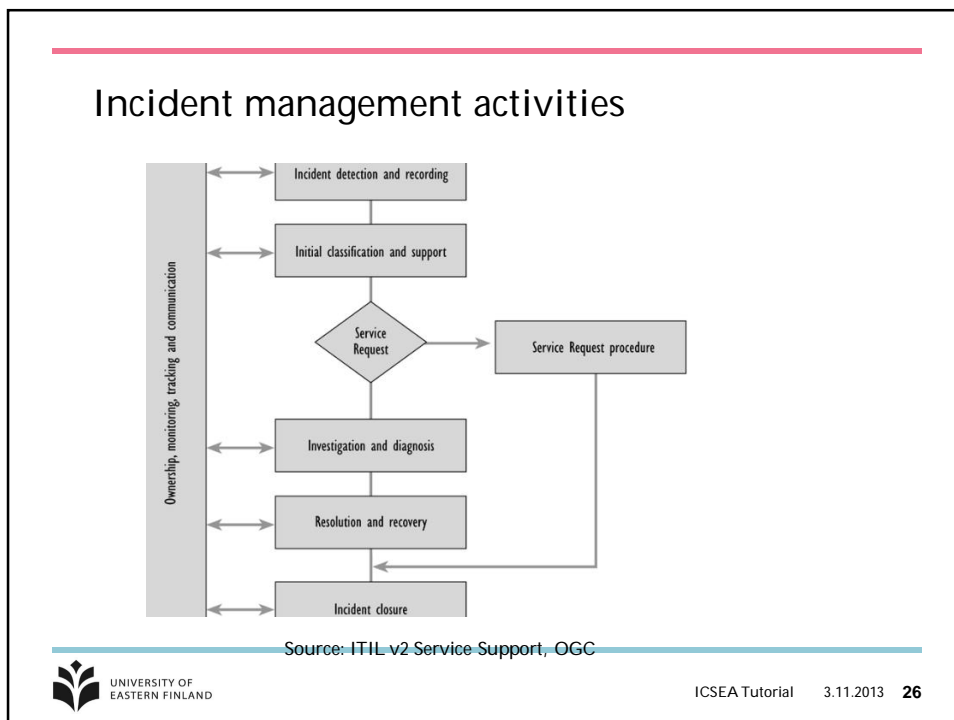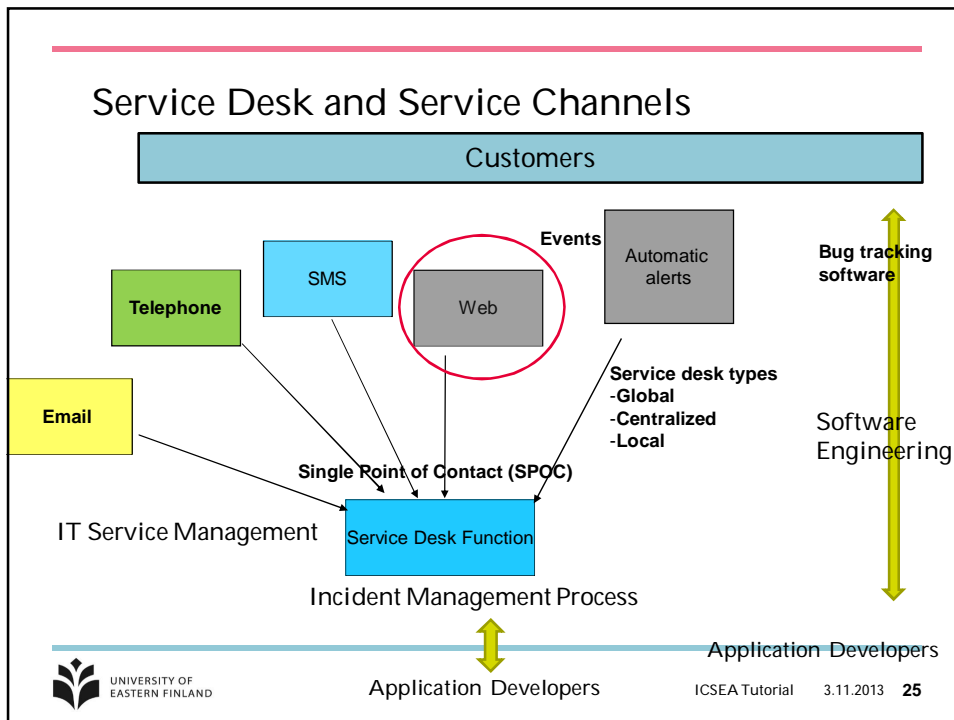 – ensure that the best possible levels of service quality and availability are maintained.

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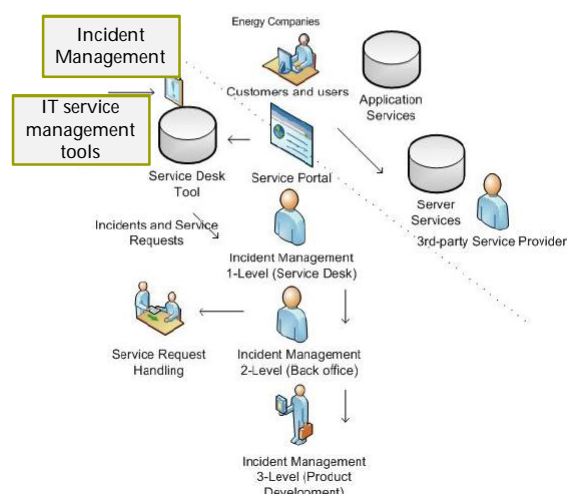
Incident management concepts

- Basic concepts
  - Incident = "an unplanned interruption to an IT service or reduction in the quality of an IT service"
  - Escalation = assigning the case to other teams or management
  - Major Incident = an incident with a major impact
  - Service Request = request from a User for information or advice, or for a Standard Change or for Access to an IT Service (f.ex. reset a password, or to provide standard IT Services for a new User)

Incidents

Hardware failures   Software failures

Service Requests

Examples

Request type	Example
Incident	Hardware failures Connection failures (network, internet) Security breaches Email failures Application failures
Service request	User rights changes Hardware orders Installation requests Requests for version updates

Service Desk and Service Channels

Customers

Events

Bug tracking software

Telephone

SMS

Web

Automatic alerts

Service desk types
-Global
-Centralized
-Local

Software Engineering

Email

Single Point of Contact (SPOC)

IT Service Management

Service Desk Function

Incident Management Process

Application Developers

Application Developers

Incident management activities

Ownership, monitoring, tracking and communication

- Incident detection and recording
- Initial classification and support
- Service Request → Service Request procedure
- Investigation and diagnosis
- Resolution and recovery
- Incident closure

Source: ITIL v2 Service Support, OGC

Incident management roles

- Incident Manager
  - Drive the efficiency and effectiveness of the Incident Management process
  - produce management information
  - manage the work of Incident support staff (first-and second-line)
  - monitor the effectiveness of Incident Management
- 1st level specialist
  - Recording incidents
  - Incident solving based on workarounds available
- 2nd level specialist
  - Detailed investigation of incidents
  - Identification of workarounds

Measuring incident management performance

Metrics in ITIL v3
- Total numbers of Incidents (as a control measure)
- Breakdown of incidents at each stage
- Number and percentage of major incidents
- Mean elapsed time to achieve incident resolution or circumvention, broken down by impact code
- Percentage of incidents handled within agreed response time
- Average cost per incident

Key Metrics for IT Service and Support (Gartner, 2008)
- Average speed to answer
- First-contact resolution
- Number of contacts per month per employee
- Channel delivery mix
- Abandonment rate
- Number of incidents caused by improper changes
- Which services and configuration items drive the most incidents

Case: Finnish Tax Administration

VERO SKATT

- Case type: Government agency
- Number of employees: 5700
- Improvement target:
  - Incident management
  - Problem management
- Core business:
  - We will ensure the tax revenue by providing proactive guidance and good service as well as by conducting credible tax control.
  - Our customers can contribute to their tax issues with as little cost and inconvenience as possible.

Challenges in incident management

- Classification of support requests is difficult for customers
- Customer support is too reactive
- Identification of repeating incidents from the service desk system.
- Lack of Configuration Management Database (CMDB).

Slide 1

Incident record

Service Area Tree

- Incident (failure or error),
- Request (feedback),
- Request (improvement idea),
- Request (order),
- Request (other service request),
- Request (advise),
- Request (information/notification)

Customer   Service   Contact channel   Reason for contact

Asiakas *   **Palvelu ***   **Yhteydenottotapa ***   **Yhteydenoton syy ***

Jokela, Kristo   Tukipyyntö.Puhelin.Mu   Palveluliittymä   Neuvonta (Palvelupyyntö)

Tiedot

Tila Status

Reported by   **Raportoija**

Jäntti, Marko

10 – Uusi
10 – Uusi
20 – Käsittelyssä
30 – Odottaa asiakkaan toimenpiteitä
35 – Odottaa toimittajan toimenpiteitä
38 – Odottaa sisäistä toimenpidettä
40 – Kommentti vastaanotettu
50 – Osatehtäviä työn alla
70 – Tiedoksi
80 – Ratkaistu
90 – Suljettu

Ryhmä Group

KTUKI Palvelupiste

Tukipiiri

Kuopio (Kuopion tukipiiri)

Aktiivinen?

KYLLÄ

Call back time   **Takaisinsoittoaika**

<tyhjä>

Sulkukoodi Closure code

Vastattu asiakkaalle

Katkoksen alkamisaika

Failure start time

Katkoksen päättymisaika Failure end time

Tiivistelmätieto

Tiivistelmä Summary

Miten softa-puhelimesta saa näkyviin vastattujen puheluiden numerot jälkikäteen?

Description **Kuvaus *** Hae tietämystä

Hei. Miten softa-puhelimesta saa näkyviin vastattujen puheluiden numerot jälkikateen? Soittajaluettelo on tyhjä, vaikka vastattuja puheluita on.

How can I get answered calls visible in software phone? The list is empty although I have answered many phone calls.

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Slide 2

Improving service areas

Service Area Tree

- Three different elements identified in classification
  - Service area: Application services
  - Configuration item: Application – Tax applications - Tax card in web
  - Support request type: Incident
- A service area tree was created together with the case organization

Desktop Support Service

Application, database and system support services

Desktop

Service a

Desktop information of tax applications

Service b

File recovery

Service ...n

Automatic alerts

Printer ink alert

Virus alert

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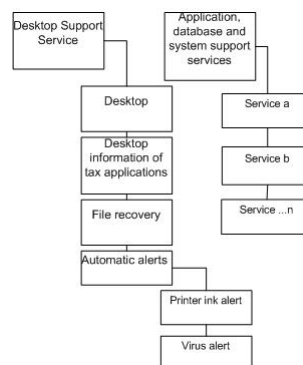
Tutorial exercise

• Discuss the following questions in small groups:

1. What kind of service desk experiences have you had? Identify a good service desk service and a bad service desk service.

2. What type of challenges do IT service providers have regarding the service desk & incident management?

Module 3: Problem Management

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What is a root cause?

Main objectives

- Problem Management is the process responsible for managing the lifecycle of all problems.
- The primary objectives of Problem Management are to
  - prevent problems and resulting incidents from happening,
  - eliminate recurring incidents and
  - minimize the impact of incidents that cannot be prevented.
- In software engineering, this process is often called defect prevention

Key concepts

- *Problem* is "the unknown underlying cause of one or more incidents"
- A *known error* is "an incident or problem for which a root cause is known and for which a temporary work-around or a permanent alternative has been identified"

Differences between software engineering and IT service management (Defects vs. problems)

- In Software Engineering,
  - a software defect is "any flaw or imperfection in a software work product or software process"
  - developers could directly contact the customers and vice versa
- In IT service management, incidents (hardware / software failures) should be first reported to the service desk.
- If the 1st level and 2nd level incident management cannot solve the case, a separate problem record should be opened.
- Customers's cannot directly contact the development team and interrupt their work

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Problem Management Activities
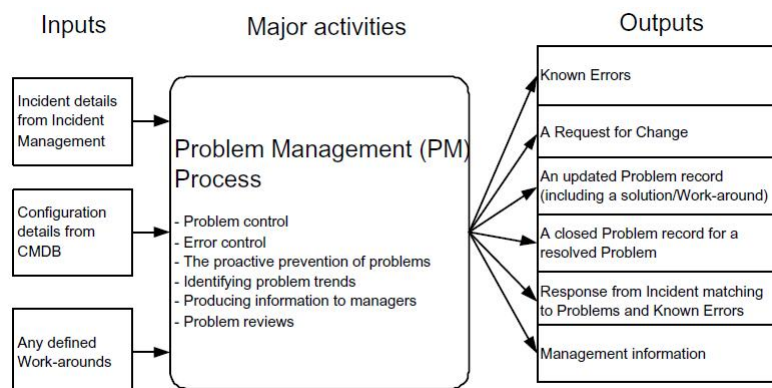
Problem control and error control

1. Problem control

2. Error control

Error in registrated CI

Known errors from Testing and Development

Change Advisory Board

Service Desk & Incident Management

Tracking and monitoring of Problems	Problem identification and recording
	Problem classification
	Problem investigation and diagnosis
	RFC and Problem resolution and closure

Tracking and monitoring of Errors	Error identification and recording
	Error assessment
	Record error resolution → RFC
	Close error and associated problem(s) — Change successfully implemented

Proactive Problem Management
- trend analysis, preventive actions, major problem reviews

3. Proactive problem management

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Benefits

- Benefits from problem management
  - Better IT service quality.
  - Permanent solutions
  - Increased learning within the organization
  - Better first-time fix rate in Service Desk

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Challenges in problem management

• More challenges
  – "Linking incidents to problems is difficult"
  – "Lack of good metrics"
  – "We have no experience in implementing a knowledge base"

Number of problems
Number of RFCs created by PM
Problem resolution time
Number of workarounds
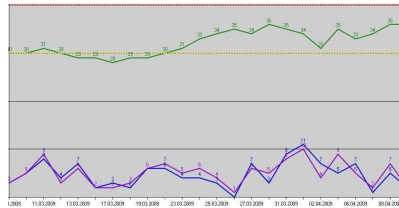
How to make it simple

It is not a problem…
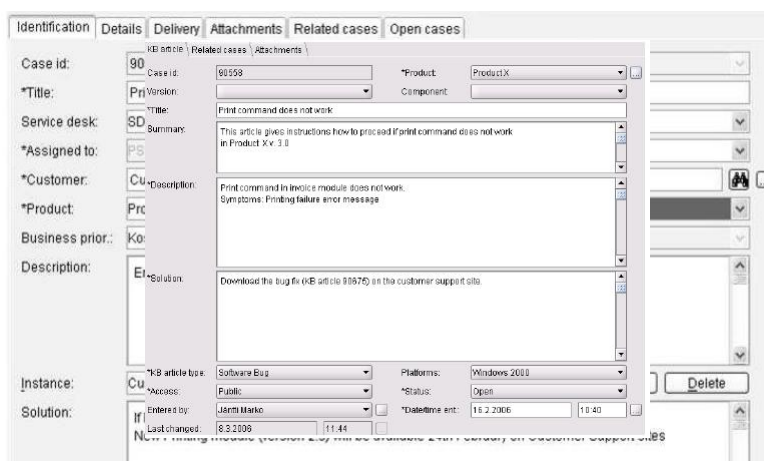
…when we have a solution.

Problem Management Roles
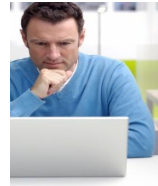
- Problem Manager
  - Improves the problem management process
  - Reviews the efficiency and effectiveness
  - Produces performance reports for management
  - Allocates resources
- Problem Management Team Member
  - Identifies and investigates problems
  - Creates RFCs (Requests for Change) to solve problems
  - Monitors the progress of Known Error resolutions

Problem Ticket

Knowledge Base article

Lessons learnt from improving IT Service Problem Management

- Identified challenges in problem management
  - "Employees do not understand the difference between an incident and a problem"
  - "There is no problem record in the IT service desk tool"
  - "The organization does not have a documented problem management process"
  - "Lack of a person who improves problem management"
  - "No time for finding root causes. The support is always fire-fighting with increasing number of incidents"

Lessons learnt from improving IT Service Problem Management

- Discuss PM concepts with service desk, product development teams, testers, customers and other relevant stakeholders
- Pilot the introduction of Problem management with one team
- Market problem management ideology and benefits continuosly
- Collect improvement ideas regarding problem management to the IT service management tool

Lessons learnt from improving IT Service Problem Management

- The key challenges are related to understanding concepts (Incident, Problem, Service Request, Change) and differences between them
- Incident and problem management as too strong processes may cause difficulties for change management
- Focus should be set on proactive support instead of reactive one
- Interfaces between problem management and incident management & change management must be crystal clear

Report case
Follow up cases
Reports
FAQ
Knowledge base
User account
Logout
Home

Known error:

92445 **siirtymäpainike toiminnon kohdistamisella**
Ratkaisu ongelmaan, jossa siirtymäpainikkeet menevät päällekkäin

Instruction:

93791 **Asennusohjeet Forum- ja Efekto-, Henki-, Aqua- ja Community 5.1**
Tämä artikkeli sisältää asennusohjeet Forum- ja Efekto-, Henki-, Aqua- ja Community - ohjelmistojen versioon 5.1

93792 **Asennusohje työasemaan Forum- ,Efekto-, Henki-, Aqua- tai Community v. 5.1**
Tämä artikkeli sisältää ohjeen, kuinka Forum- ,Efekto-, Henki-, Aqua- tai Community asennetaan työasemaan.

Powered by Requeste

Lessons learnt from improving Problem Management

- Identification of problem sources is essential
  - Incident management (incidents that reoccur, incidents that are complex)
  - Third party service providers
  - Testing, projects and product development (Development Known Errors)
  - Release management
  - Other technical specialist groups (server, network, application services)

Tutorial exercise

- Discuss the following questions in small groups:
1. How would you transform the reactive support to proactive one?
2. What is the main difference between incidents and problems?
3. How would you measure the performance of problem management?

Module 4: Change Management

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*Management of Change or
Change of Management?*

Goals

- The goal of the *Change management process* is to ensure that standardised methods and procedures are used for efficient and prompt handling of all Changes (ITIL v2, OGC 2002)
- Why changes are needed?

Implement problem solutions

Respond to customers' and users' changing needs

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Key concepts

- In IT service management
  - Request for Change
  - Change categories   **Change Advisory Board**
    - Normal change
    - Standard change
    - Emergency change
    - Major change
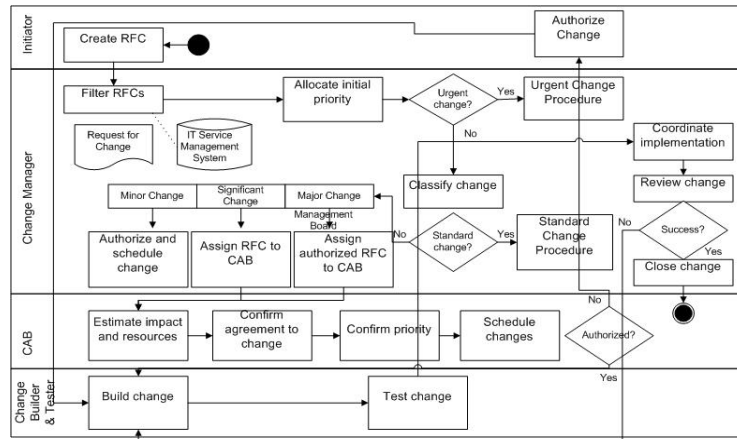- In Software Engineering   **Configuration Control Board**
  - Software Change Order
  - Categories
    - Error correction
    - Enhancement
    - New feature

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7 Rs for change management

Raised
Relationship
Reason
Responsible
Resources
Return
Risks

Change Management Activities

Change management roles

- Change Manager
  - agree with Service Management on a goal of the *Change management process*
  - measure efficiency and effectiveness of change management
  - improve change management methods and tools
- Change Advisory Board
  - Assist change manager in evaluating changes
  - Provide recommendations for implementing change
- Emergency Change Advisory Board

Istekki Oy

- Established in 2009, operation started 1.1.2010
- Owners: Northern Savo Healthcare District and City of Kuopio
- Provides ICMT (Information, Communication & Medical Technology) services
- ISO/IEC 20 000 certificate
- Turnover 2012 29.4 M€
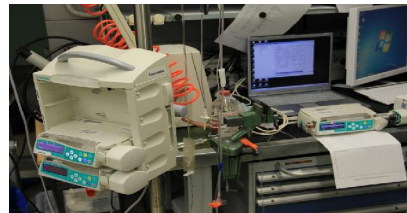- Number of employees: 220

Figure: Infusion pumps under maintenance

Lessons learnt from improving change management

- No reports implemented for change management
- Solution: Implement the following change management reports
    - Number of change requests (by service area)
    - Number of major changes
    - Change throughput time
- Evaluation of changes is not visible
- Solution: Add new datafields to the change record in the ITSM tool
    - Reason for change as a separate field
    - Post-implementation review of change
- Change management is not measured systematically
- Solution: Define 3 key metrics what you can measure

Tutorial exercise

- Discuss the following questions in small groups:
1. Why change management is so difficult?
2. What is the main difference between a change request and a service request?
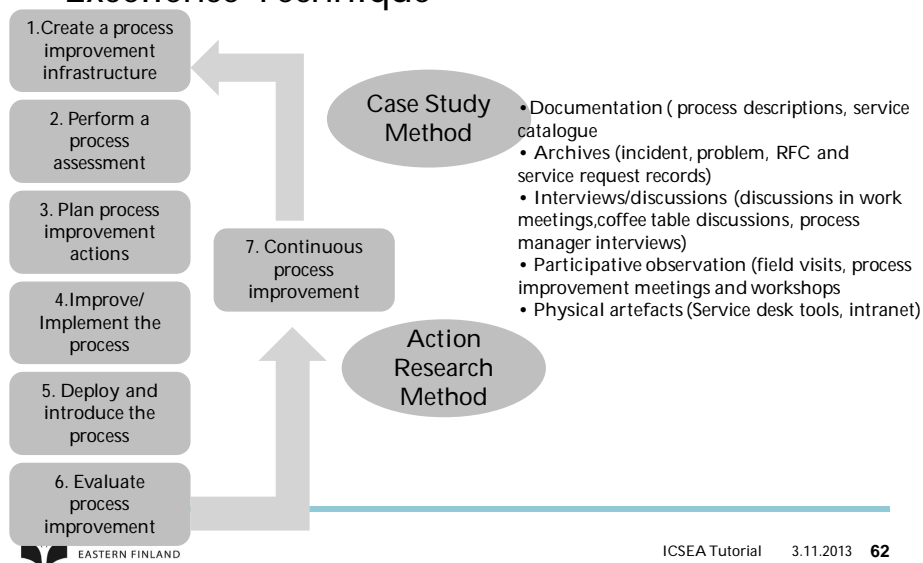3. How would you measure the performance of change management?

Conclusion

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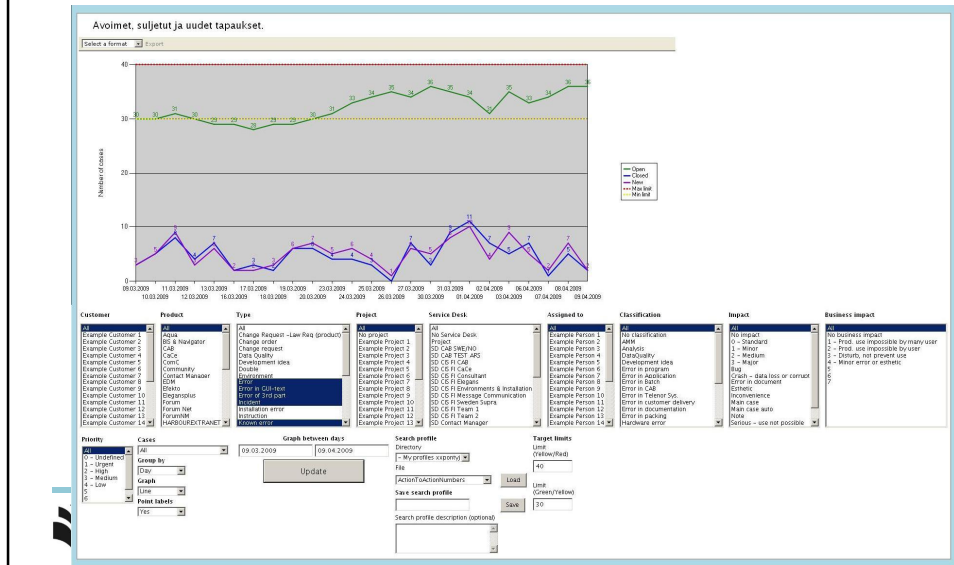
What did we learn?

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Tutorial conclusion

- Software engineering and IT service management concepts
  - Need for concept mapping (e.g., Software Change Order = Request for Change; Known defect = Known Error)
- Application Management creates a link between software development and IT service management
- Application developers participate in designing new or changed services
- ITSM improvement starts typically from incident management
- Problem management is a key to proactive support
- Change management is a complicated process due to various types of changes

Attachment 1: Keys to IT Service Management Excellence Technique

1. Create a process improvement infrastructure

2. Perform a process assessment

3. Plan process improvement actions

4. Improve/ Implement the process

5. Deploy and introduce the process

6. Evaluate process improvement

7. Continuous process improvement

Case Study Method

Action Research Method

• Documentation (process descriptions, service catalogue
• Archives (incident, problem, RFC and service request records)
• Interviews/discussions (discussions in work meetings,coffee table discussions, process manager interviews)
• Participative observation (field visits, process improvement meetings and workshops
• Physical artefacts (Service desk tools, intranet)

Attachment 2 a: How to measure IT service management

Attachment 2 b: How to measure IT service management
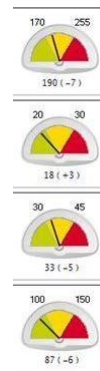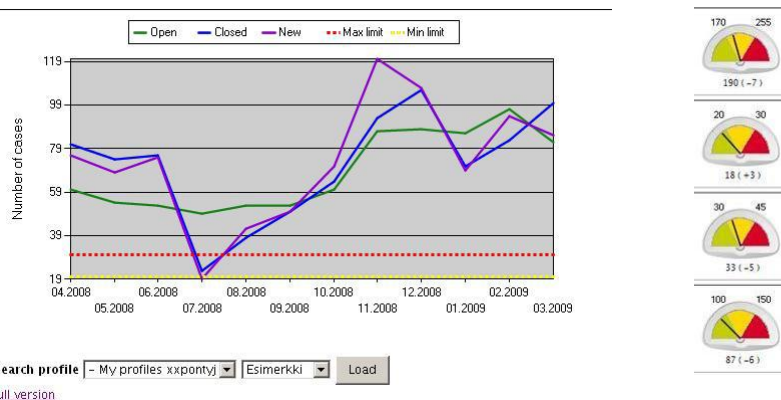
Thank you!!!

Questions, comments?

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Software Engineering Research
Unit, KISMET project

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