Software deliveries and maintenance

Case: GSM networks

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Contents of the presentation

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Application Systems (AS)

Global Application System (GAS)

- Core products
- Functional blocks
- Standard functionality

Market Application System (MAS)

- Core products
- Signaling products
- Parameter setting
- Per operator or country

SW running at the customer site

- Core products
- Signalling products
- Parameter setting
- Exchange data
- Per site
New major release of the SW is introduced...

- Approximately once per year for each network element
- The new SW release includes the following:

**NEW FEATURES BASED ON CUSTOMER REQUIREMENTS**

**NEW FEATURES SPECIFIED BY THE GSM STANDARDISATION BODY**

**SW IMPROVEMENTS**

**SW package: R8**
Different types of SW deliveries

✖ New software release (SW development process)
  – “pilot customer”
  – mass distribution after General Availability (GA)

✖ Network expansion
  – SW exists and no verification needed
  – Network configuration changes with exchange data

✖ New network/customer
Software development process

by Risto Kivioja:

Network modeling → Node modeling → I&V preparation → Integration & Verification

Requirements → SW design → Basic Test → SW products

by Kenneth Manner:

Design time → Verification time

Pre-study/Feasibility → Execution → Verification

PRA
Software development process (pilot customer case)
Software development process - Industrialization

✓ System test
  - negative test, load test, capacity test, …

✓ Global Application System (GAS) verification
  - to verify functionality on a network level

✓ First Office Application (FOA)
  - “pilot customer”
  - the first live implementation of the SW
  - certain tests in a live network

✓ General Availability (GA)
  - SW ready for mass production and deliveries
SW delivery flow (mass distribution case)

Marketing activities

Marketing & sales → Contract → Order of SW

SW delivery activities

Verified Global Application System (GAS) → MAS build-up → Functional change → MAS Verification → Customer acceptance

Network expansions

Central SW store → New exchanges → Network rollout
Function change method

1) Separate the EX- and SB-sides
2) Load the SW on SB-side
3) Transfer data from EX- to SB-side (data conversion)
4) Change B-side executive
5) Test the new SW
6) Run the sides parallel
Global supply and support organization

Product Design Centers all around the world

Product units (PU) (1 per node)

AS Supply Offices (4)

Field Support Centers (several)

Customers (1-2 per FSC)

BSS/
OSS

APZ/IO

CSS

BTS

BSS/
OSS

VAS

PSS

FSC

FSC

FSC

FSC

Cust. X

Cust. Y

Cust. X

Cust. Y

Cust. X

Cust. Y

Global supply and support organization
AS Supply Offices (ASO)

Dallas: The Americas
Madrid: Southern Europe, Middle East and Africa
Jorvas: Northern and Eastern Europe incl. CIS
Melbourne: Asia-Pacific
ASO product portfolio

- Circuit switching products - MSC/VLR, HLR, ...
- Packet switching products - GPRS
- Base Station System - BSC, BTS
- Network management - OSS, ...
- Intelligent networks - Prepaid, VPN, ...
- Other products - SOG, BGW, VoIP, ...
- 3G network elements - UMTS, ...

The product portfolio covers GSM network products and also the next evolution phases following GSM
MAINTENANCE of the SW - SUPPORT of the customer!

✖ Maintenance of SW:
  – preventive: correction handling
  – corrective: trouble report handling

✖ Support of the operator:
  – Support services: help desk, emergency support, consultation, spare part service

✖ The support chain
  – 1st, 2nd and 3rd line support - follow the sun...

✖ A support case: Y2k ...
What is SW maintenance?

- The **quality assurance activities** (e.g. inspections of code and documentation, testing ...) **during the development phase** aim at removing the faults as early as possible, latest before introducing the SW in a live network.

- After delivery to the customer the SW maintenance is both **PREVENTIVE** and **CORRECTIVE**.

- The goal of SW maintenance is to:
  - to minimize "preventive maintenance" and to reduce "corrective maintenance", by systematic analysis of the SW in use.
  - to keep the SW as UPDATED as possible during the SW's lifecycle.
PREVENTIVE maintenance

- The goal of preventive maintenance is to secure that a solution to a problem of one customer is delivered to all customers with the same SW, and thereby prevent the appearance of that fault anywhere else.
- This is the generic flow of correction handling:

Customer

Ericsson

Trouble Report

Analysis of TR

Solution to fault = correction

Correction package

To ALL customers!
CORRECTIVE maintenance

- The goal of corrective maintenance is to quickly find a solution to the problem reported by the customer - the solution or correction should be maintainable.
- This is the generic flow of trouble report handling:

  Customer → Ericsson → Customer

  Trouble Report → Analysis of TR → Quick solution = Emergency Correction → Final solution = Approved Correction → Correction package
Support of the operator

- The operator usually receives support in Operation & Maintenance issues according to the Service Contract made with the network supplier. The level of service varies depending on the content of the contract.
- Here are some examples of typical support services:

  - **Help desk**
    - takes care of all incoming questions from the customer
    - usually maintained at the 1st line support organisation
    - registers all contacts (phone calls, mail, etc.) and follows that the questions are being answered in a timely manner
  
  - **Emergency support**
    - usually 24h support in emergency situations, such as complete exchange failure etc.

  - **Trouble report handling**
    - reporting procedures for trouble reports following agreed answering times
    - statistics of TRs

  - **Spare part service**
    - in case of HW fault the operator can get a replacing spare part without the need for own stock of spare parts
The maintenance and support chain for GSM SW

1st line support:
Customer Support Competence

2nd line support:
SW Supply & System Support Competence

3rd line support:
Core Product Competence
The support follows the sun ... 

The *Follow the sun*-concept enables the utilization of all 2nd line support organisations around the world. The support doesn’t have to stop when office hours are over at one hub, since the support cases can be handed over to the following hub where day time is starting!
The Millennium issue - the Problem

× The basic problem is...

Year with 2 digits

00

instead of 4

2000
Millennium Issue – Critical Dates

Today only 32 days left until the millennium shift…
The Millennium issue - the Support

*The Millennium Program is one of our highest priorities within Ericsson.*

- The Ericsson millennium program was established at corporate level already in 1997

- Extensive program has been conducted throughout the organization and monitor the progress from top executive level

- Ericsson reported no disturbances in our systems or products related to the date shift to 9 September 1999 (9-9-99)
Abbreviations

AS       Application System
ASO      Application system Supply Office
FOA      First Office Application
FSC      Field Support Center
FSO      Field Support Office
GA       General Availability
GAS      Global Application System
MAS      Market Application System
PU       Product Unit