

Operation and maintenance

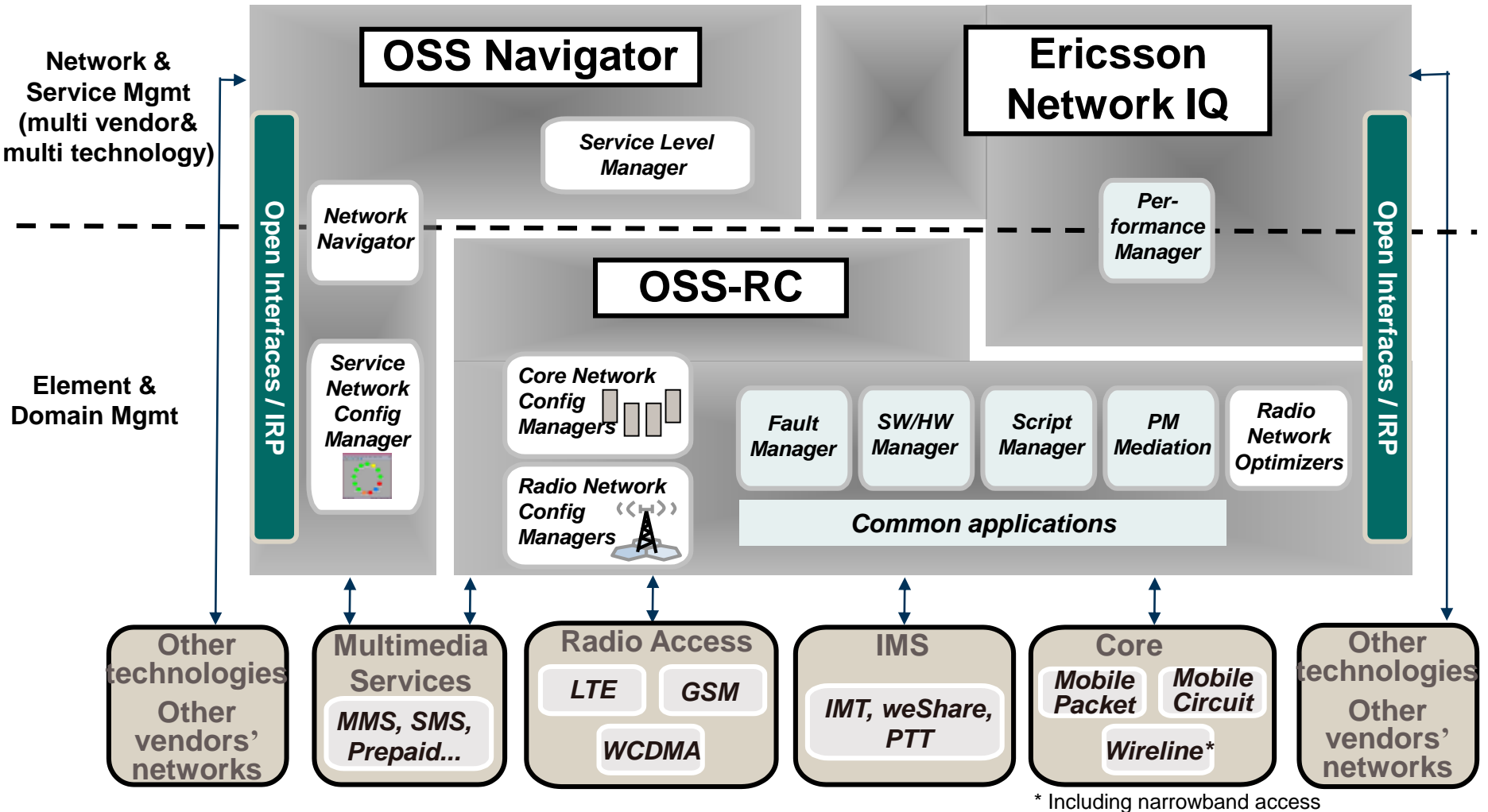
Dibuz Sarolta

Network management system

- Network management layer
 - Complete NW view
 - Multi technology
 - Multi vendor
- Sub-NW management layer
 - Responsible for one subnetwork
 - Single vendor or technology
- Element management layer
 - Managing the network element (NE) only
 - Embedded into to NE

OSS Overview

The OSS portfolio



O&M capabilities - FCAPSI

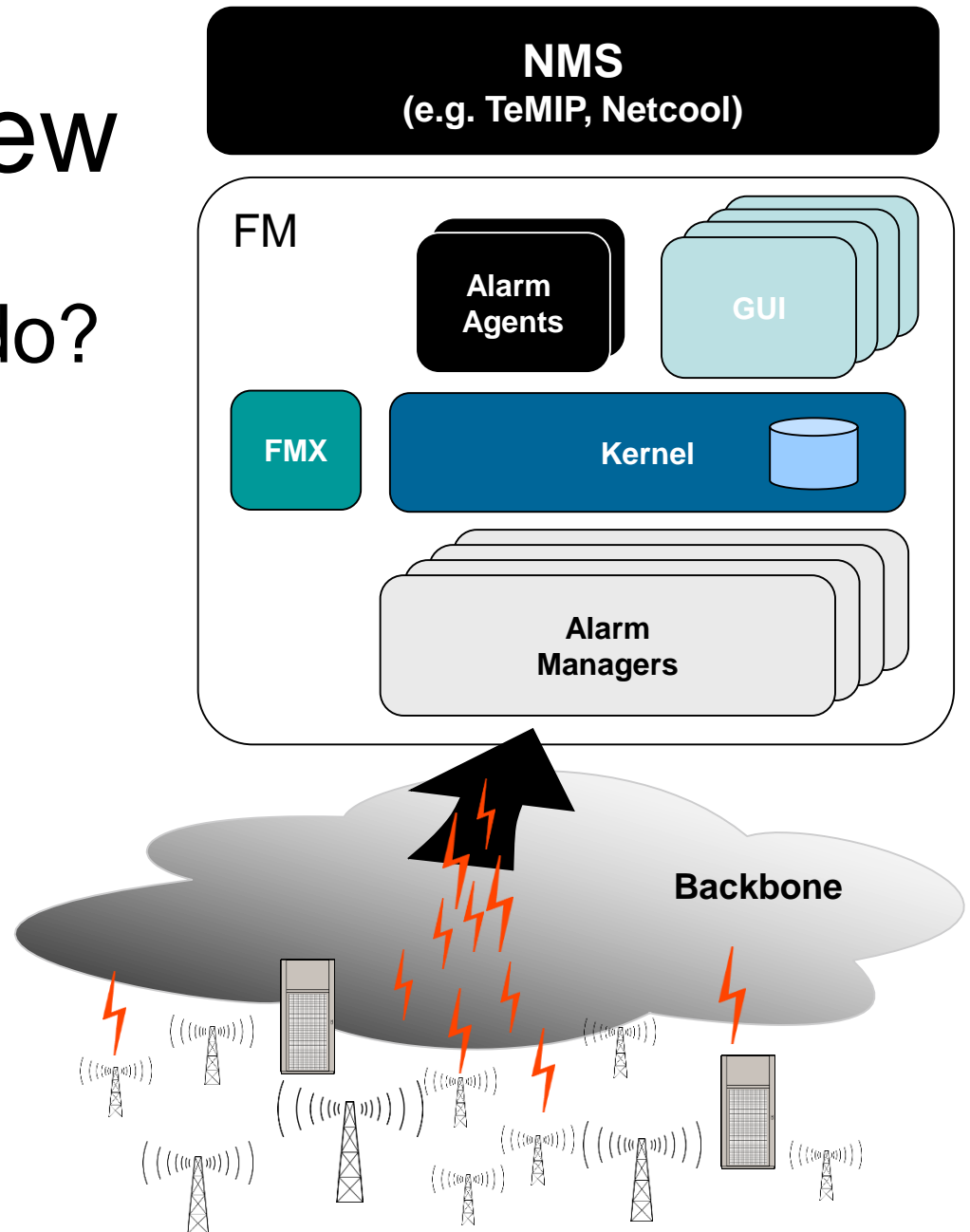
- Fault management
- Configuration management
- Accounting
- Performance management
- Security
- Inventory management

Fault management

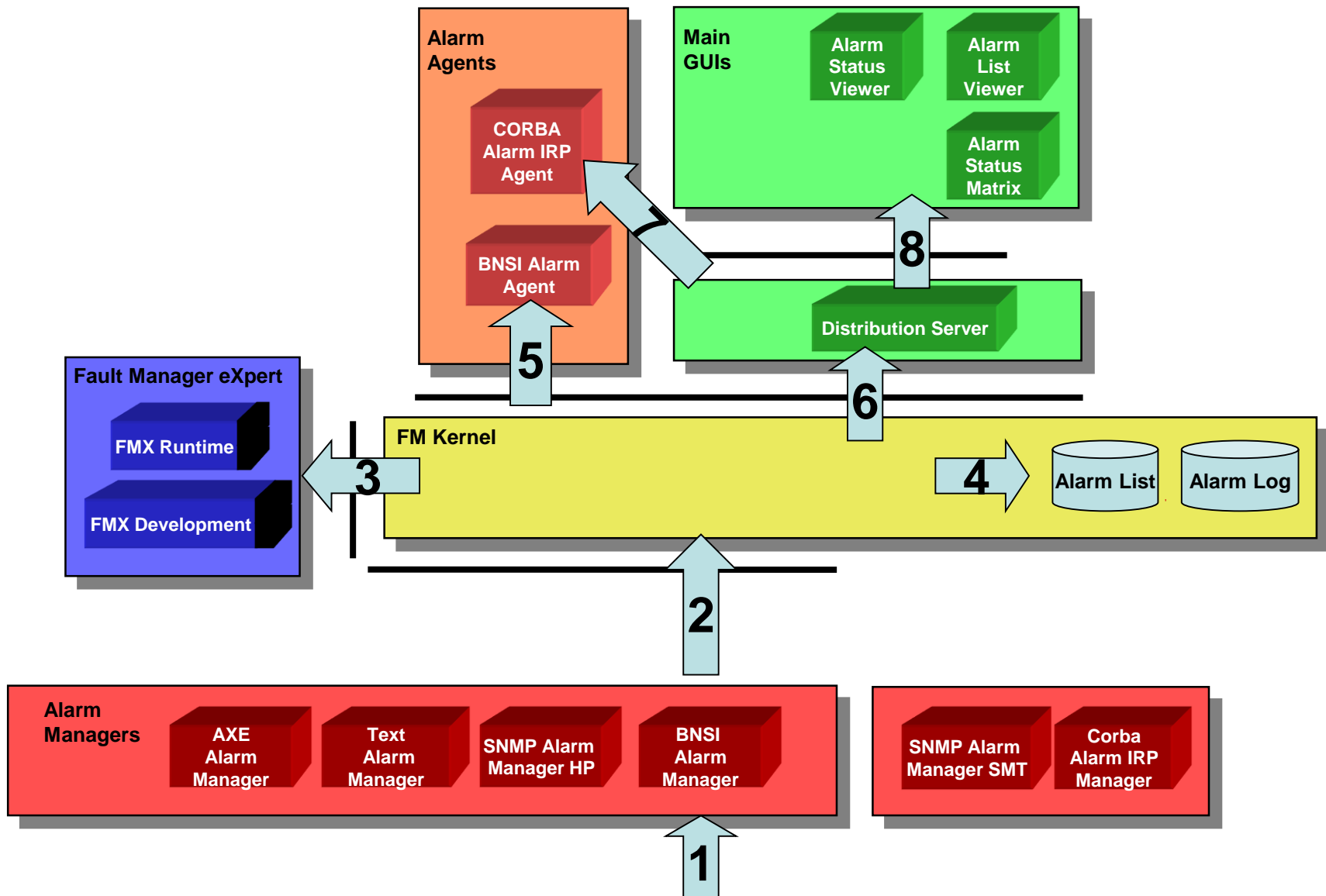
- Detecting, diagnosing & correcting of faults in the NW
- Alarm handling
- Diagnostic tools to isolate faults

FM overview

- What does FM do?
 - collect
 - pre-process
 - store
 - alert
 - view and
 - forward alarms



FM Alarm Flow Overview



Configuration management

- CM tools provide the operator with
 - An efficient way of configuring, verifying and viewing large amount of parameters that are defined in the network
 - Gathering and storing configuration information from the NW
 - Tracking changes that are made to the configuration

Configuration Management

Replanning configuration actions:



- Planned area: model of the actual NW



- Fallback area: store it



- Planned area



- Consistency check

- Update with planned area

Accounting

- Collection and processing of accounting data
- Maintaining billing policy
- Updating tariff information

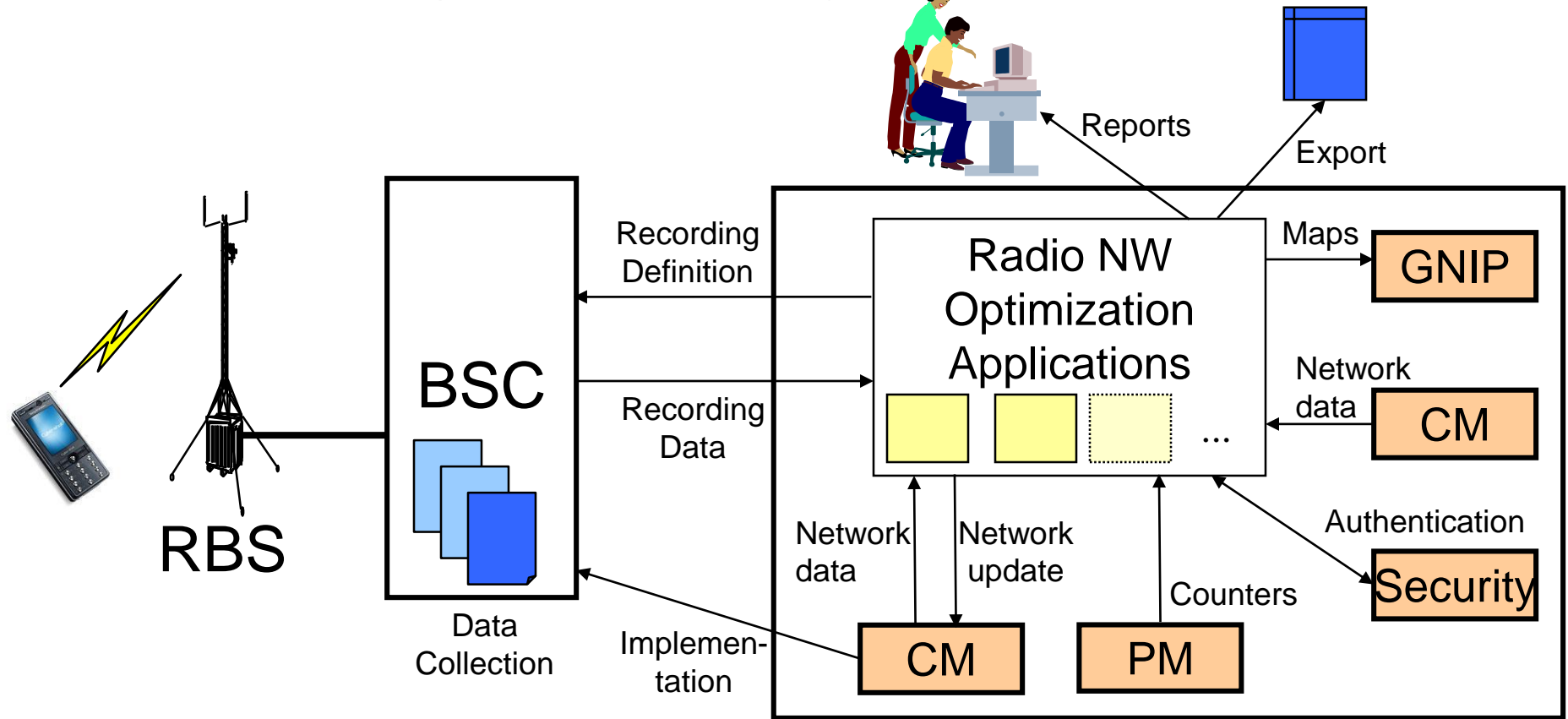
Performance management

- Determines the efficiency and performance trends of the NW
 - Throughput
 - Utilization
 - Error rates
 - Response times
- Metrics
 - Per port
 - End user experience
- Real-time or off-line tools

Performance management flow

- Counters
 - ROP (Recording Output Period) 15 minutes
 - Statistics (KPIs and counters) for trend analysis
 - 3GPP defines KPIs
- Events
 - Detailed troubleshooting
 - Used in traces
 - Cell traces
 - UE traces
 - Measurements -> performance alarms
- Definition
 - Targets
 - Measurements
 - Report layout
 - Alarm thresholds
- Collection
 - Data from NEs
- Processing
 - Parse and format
 - Storage
- Output
 - Reports
 - Alarms

Radio NW Optimization GSM - Common Structure



Security

- Communication towards NEs via secured protocols
- Firewall and router configurations
- Hardening
- Vulnerability analysis
- User Authentication
 - Password protection- password service
 - Public Key authentication
- User Authorization

User Authorization

- Restricting the usage of the OSS system for user groups
- example
 - Authorization to run an O&M application
 - Allowing to perform an operation
 - Authority model
 - Target: NE or application
 - Activity
 - Type: connecting activities to targets

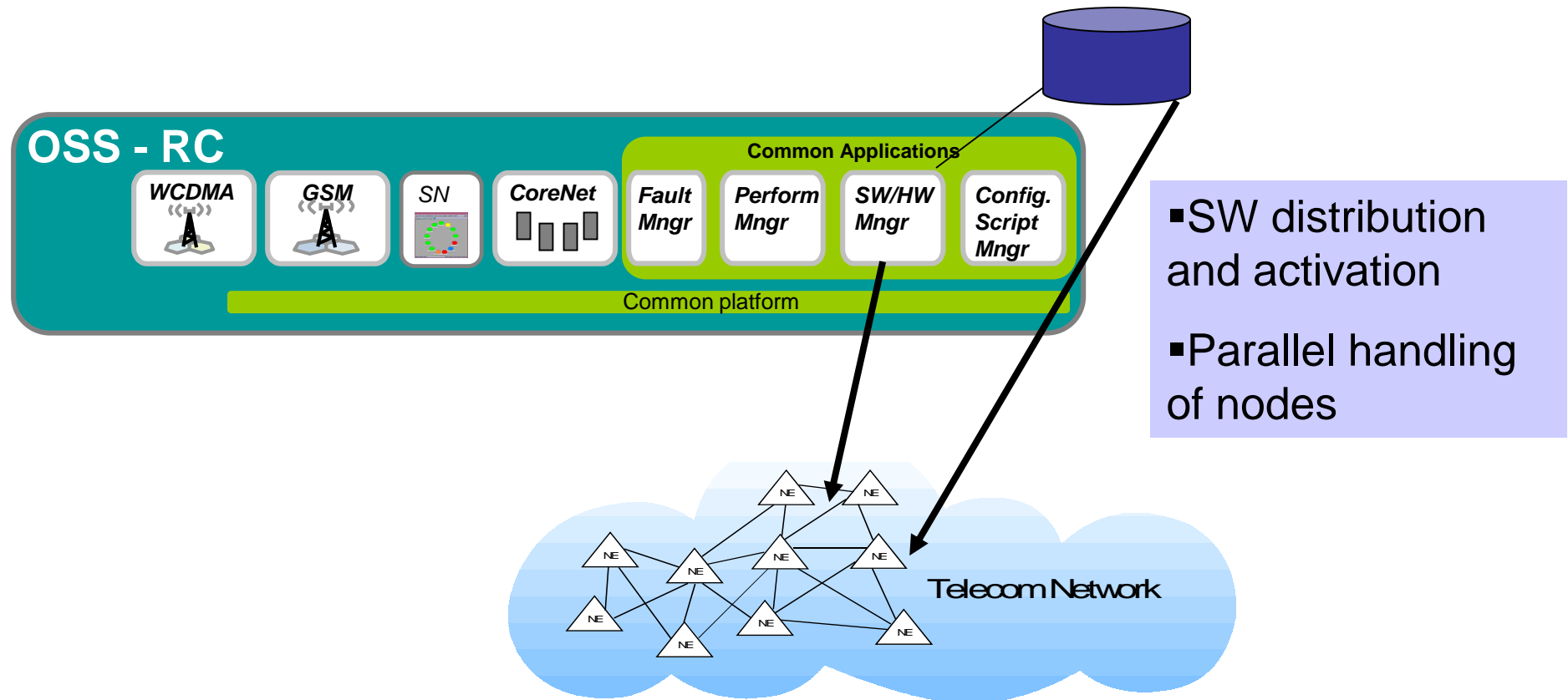
Software & Hardware Management

- SW & HW inventory to keep track on software and hardware installed
- Software deployment across the technologies to secure the best network quality
- Parallel batch jobs to secure fast software deployment
- Back-up creation and restore
- Distribute/install license keys



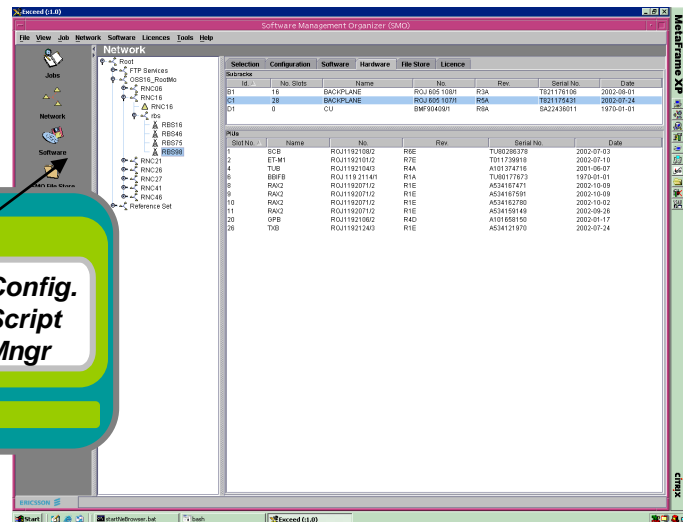
Software Deployment Overview

Software deployment for nodes in 2G and 3G networks, as well as for core network nodes.

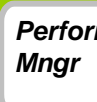
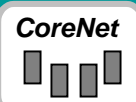


Network Inventory Overview

Northbound interface
(CLI based)

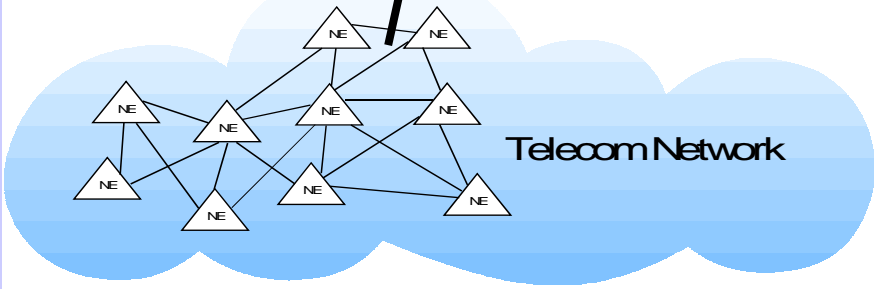


OSS - RC



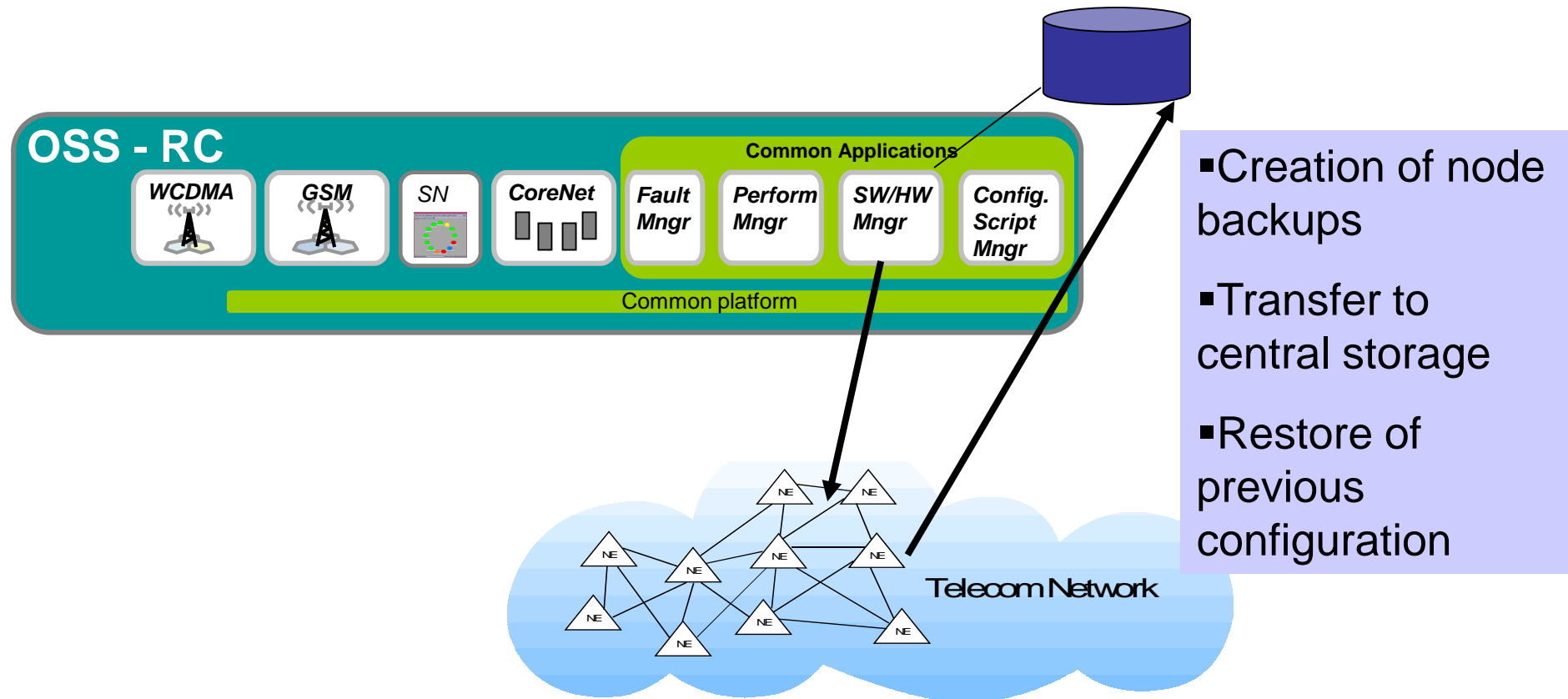
Common Applications

Common platform



- Retrieval of HW, SW and license inventory information from the network
- Export interface towards external management system

Backup Administration Overview



Self Organizing Networks (SON)

- Standard requirements defined by 3GPP on simplifying O&M of LTE NWs
- Minimizing OPEX
- High level of automation
- SON architectures
 - Centralized
 - SON algorithms reside on the OSS servers
 - Distributed
 - SON algorithms reside on the NW elements
 - Hybrid

Self Organizing Networks (SON)

- Self planning
 - Self configuration
 - Self optimization
 - Automated Neighbour Relation:
 - Based on detected cell reports from the UE automatic discovery of undefined LTE cell neighbours
- Self healing

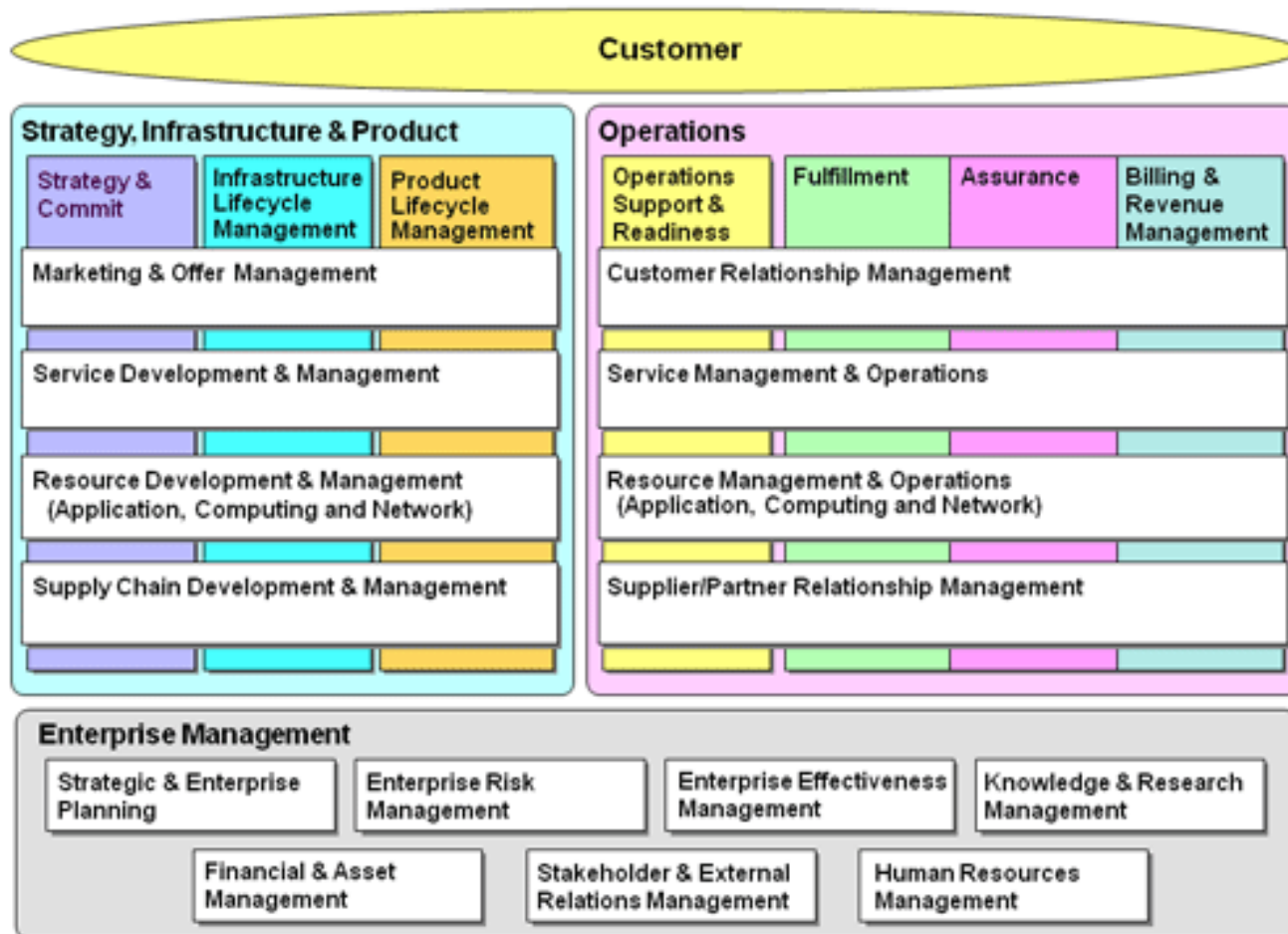
Business Support System

- A Telecom Service Provider runs its business operations towards its subscribers
- Processes of a BSS:
 - product management,
 - order management,
 - revenue management
 - customer management

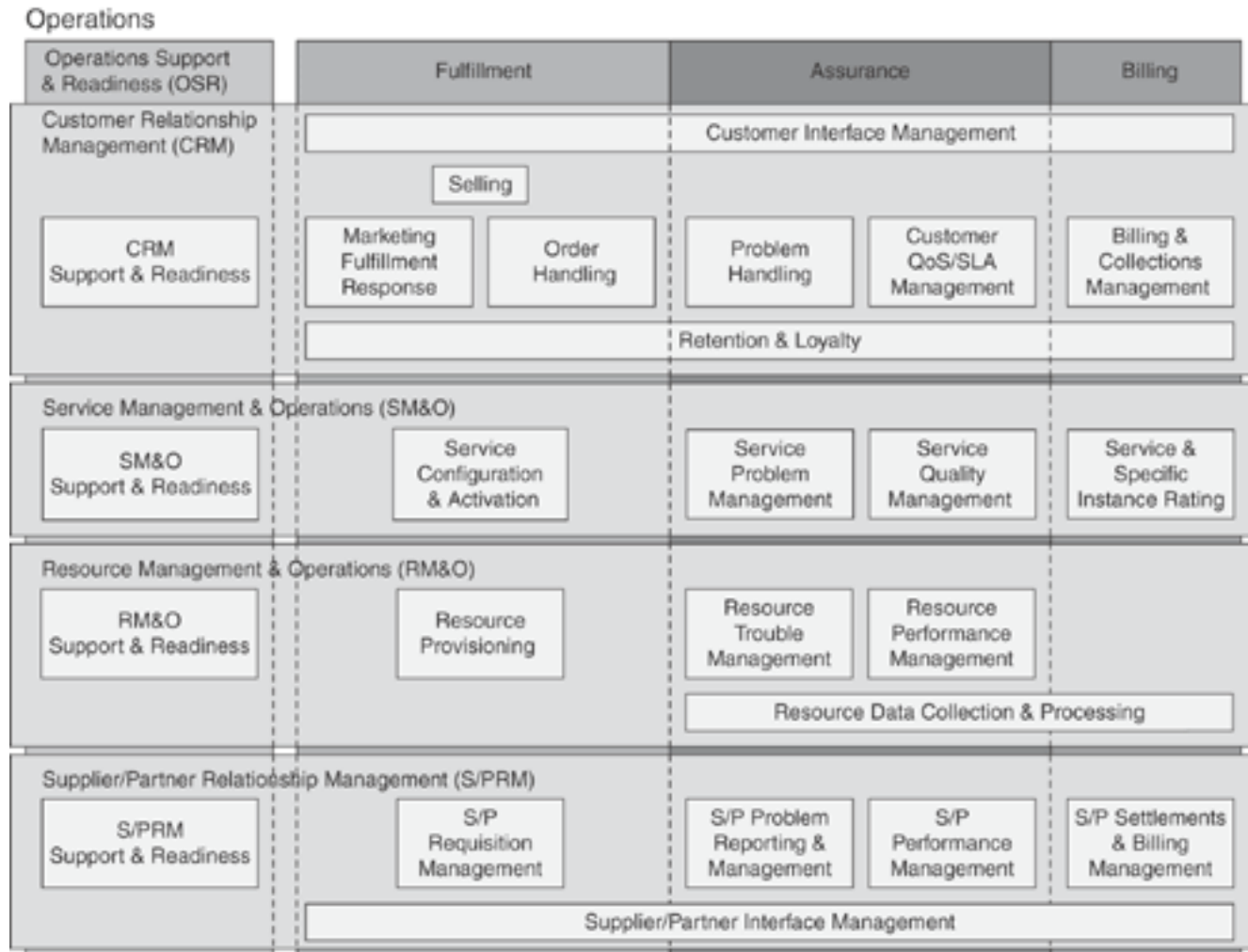
eTOM (enhanced Telecom Operations Map)

- Telekom Management Forum & ITU standardized interfaces to allow consistent management of NEs from different suppliers
- a reference framework and common language for defining and integration BSS (Business Support System) and OSS (Operational Support System)

Conceptual Structure of eTOM



eTOM Model for operations



Analytics



Why analytics

- NW elements generate huge amount of data
- In other industries same trends happen M2M communication
- Internet of things (IOT)
 - Tera/peta Byte
 - structured
 - unstructured
- Analytics can give insights about trends connected this data
 - Reporting - what happened
 - Analyzing - why happened
 - Predicting - what will happen

Big data possibilities

- Adequate
- Accurate
- Actionable
- (Big) Volume
- Variety
- Velocity (even real time)
- Scaling up analytics
 - Real time
 - Increasingly complex problems
- Analytics as a service
- Securing customer privacy
- Domain-specific analytics platform and SDK

Insight

- Customer Service Provider challenge:
 - Increased complexity of NW management,
 - M2M and huge data volumes,
 - good input to automated decision making
- Based on KPIs: data collected from the telecom NW from several sources, together with time information (even real time)
- Predictive analytics
- Simple creation of new use cases is important
 - Optimize & enrich operations,
 - Create new business opportunities
- Network-near analytics
- Built in domain expertise

Customer Experience Management

- Customer care
- Network operation Center
- Marketing

- Measurement of the perceived individual customer experience across the terminal, radio access and mobile core
 - In real-time
 - For all customers 24/7
 - With high accuracy
- Automatically provides the most probable cause and suggested action

Example of a telecom analytics product

Utilities



Automotive



Transportation



Smart Cities



Shipping



X-market apps



Insight

Exposure / Insights / Action

Analytics

Knowledge Extraction / Business Logic / Data Mgmt

SmartMediation / Correlation / Filtering

Big Data



Terminals & Modems



Probes



Wireless Nodes



CAN BUS



Structured & Unstructured Data



Log Files



Fault and Performance



Trouble Ticket



Charging & Billing



CRM



Social Network