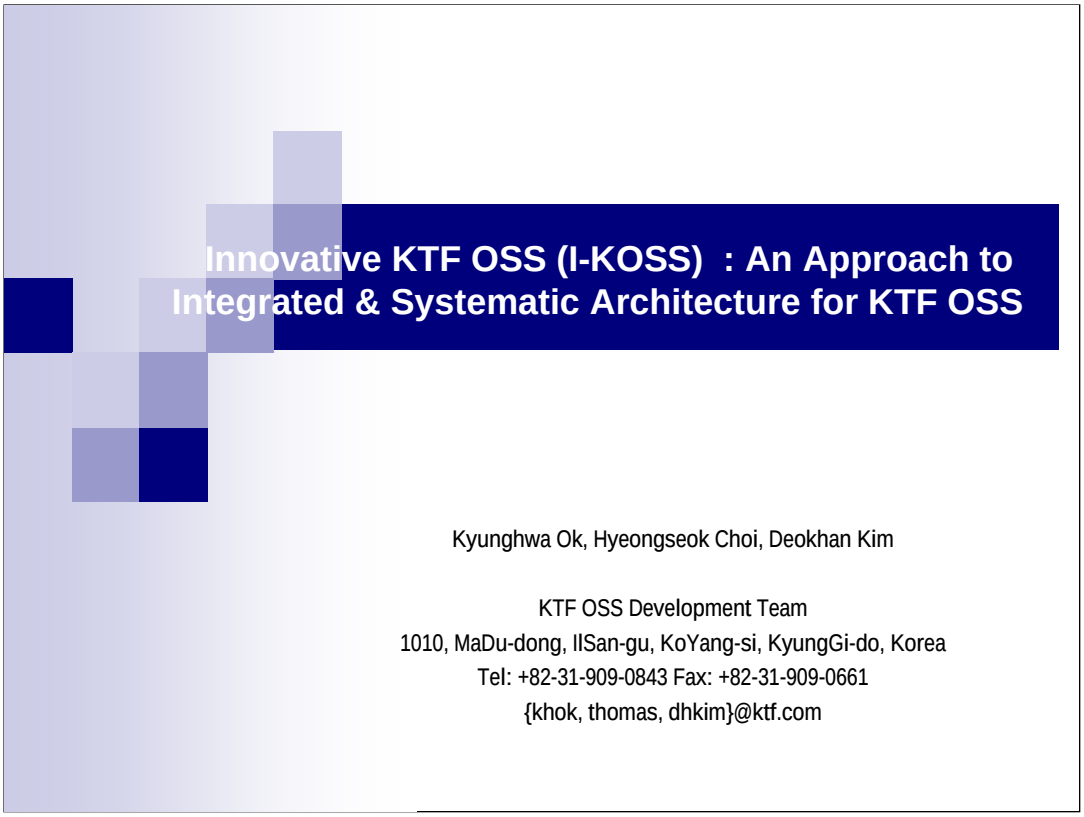


Kyunghwa Ok, Hyeongseok Choi, Deokhan Kim

KTF OSS Development Team
1010, MaDu-dong, IlSan-gu, KoYang-si, KyungGi-do, Korea
Tel: +82-31-909-0843 Fax: +82-31-909-0661
{khok, thomas, dhkim}@ktf.com

Abstract

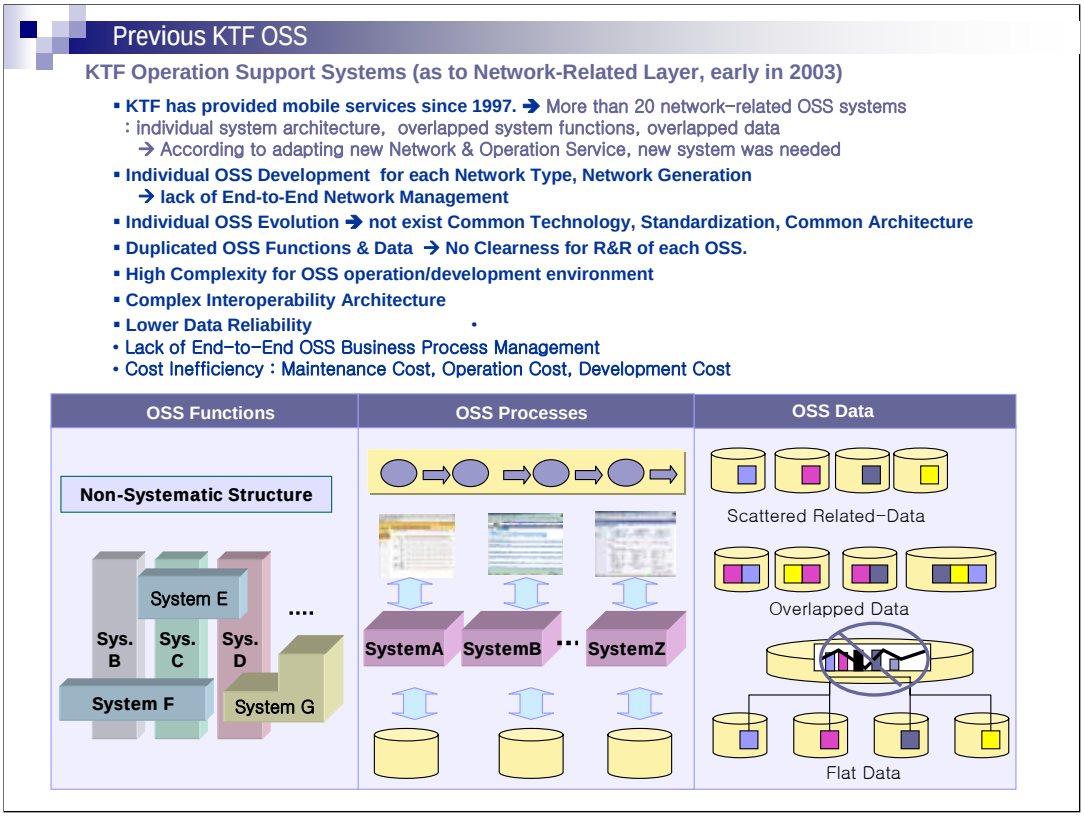
Most of telecommunication service providers are confronted by carrying the various network services at higher quality and providing the customer satisfaction with the better customer services. New services, new network elements, customer-oriented mind, importance of service quality, and so on. As the telecommunication service providers apply those changes more rapidly, OSS systems need to support the related applications more rapidly. The OSS systems can not be flexible to apply new application and upgrade legacy application, and have more complex system architecture. These problems cause the cost inefficiency about operation/maintenance cost, development cost. In addition, the user inconvenience and the overhead of operating business can be the factor for the increase of indirect costs. KTF has the similar problems about legacy OSS systems.

In order to improve the KTF OSS architecture, we have researched and are carrying out the re-engineering activities to realize the systematic KTF OSS. This paper introduces an approach methodology and main directions for integration and re-engineering of KTF OSS with high complexity. We implemented and are implementing innovative KTF-OSS (named by I-KOSS) as a three year plan(2004~ 2006).

We are expecting the cost-effective OSS ,OSS process innovation, convenient user interface, rapid OSS business flow, the higher data reliability and so on.

Keywords

I-KOSS, Integration, KTF, Re-Engineering



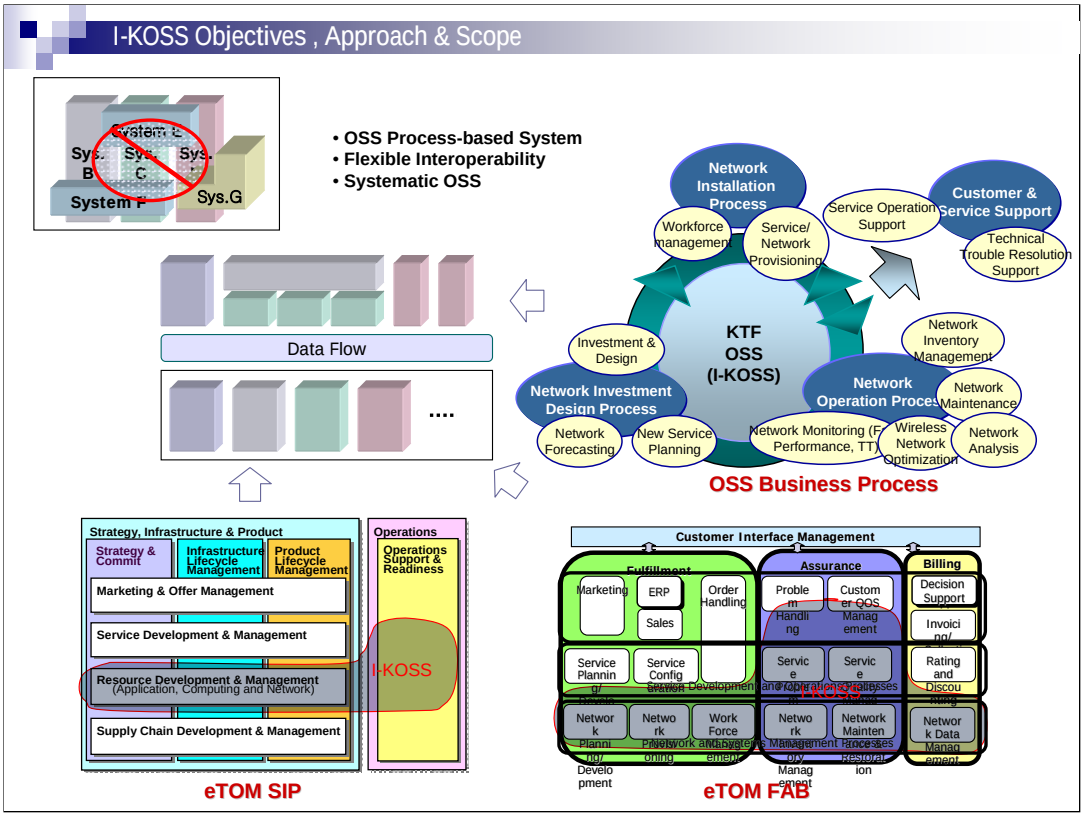
KTF had about 20 OSS systems at network-related layer early in 2003. Each system was developed individually and not systematically according to network operation environment as following :

- network evolution, various network elements
- various services
- various user/system requirements
- change operation organization & roles

Furthermore, individual OSS evolution caused overlapped data and functions and didn't approach the common technology/architecture/standard. This means that each OSS is not cleared as to roles and responsibility. The more adapting user requirements and upgrading systems, the higher complexity for OSS operation/development environment. The main problems were following like as :

- Lack of end-to-end network monitoring and control
- Lack of end-to-end OSS business process support
- Complex interoperability architecture
  (Peer-to-peer interface inter-OSS, intra-OSS, not standard interface method)
- Lower data reliability
- Cost inefficiency
- Break off information flow
- Overload for operator activities

We classified into OSS functions part, OSS processes part and OSS data part for analyzing KTF OSS. Some functions of each OSS have been overlapped and the operator had to access a few systems in order to carry out any operation business job. In case of OSS data, the related-data and functions for operation activity were scattered, which caused the data duplication. Also, OSS data were flat data and were not upgraded analysis data in order to support operation activities and decision making.



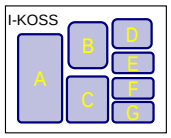
We have a few objectives to adapt I-KOSS architecture as following

- Settlement of systematic telecommunication operation and management which is flexible to network evolution and business environment.
- Making clear for the roles and responsibility of KTF-OSS and the definition of master-plan for each KTF OSS.
- Customer-oriented operation and management system (“Have a good time” Management)
- Standard KTF-OSS processes management system
- End-to-end Network/Service management

I-KOSS is based on KTF operation processes and legacy OSS systems assets. We collected the various information through operator/developer interview, process/system analysis sheet, question paper and so on. We also refered to eTOM FAB and SID models. First of all, we defined the scope of operation processes and we classified those processes. The operation processes within I-KOSS scope are mainly divided into “network installation process”, “network investment & design process” , “ network operation process”, “customer & service support process” and “ I-KOSS operation support management process” . In case of legacy OSS systems , we proposed the re-engineering solutions from non-systematic system structure to systematic system structure in order to support operation processes. We defined the role and responsibility for each process activity and the relationship between the OSS system functions and OSS processes.

It is important to synchronize the system functions and operation processes in order to support OSS-related business activities efficiently.

I-KOSS Concept



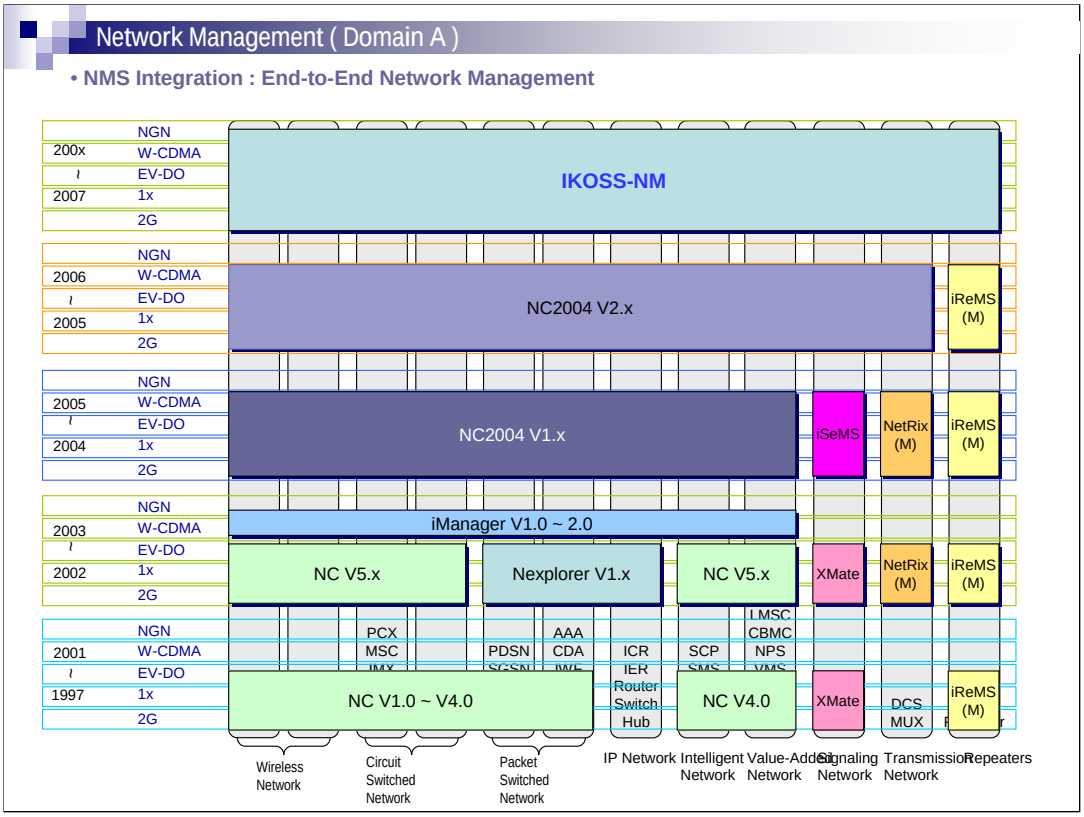
- More than 20 Systems ➔ divided into 7 domains , re-engineering to 15 systems
- Each domain is defined according to business processes and functions at network-related OSS area.
- Each domain has more than 1 system
- The future requirements & new functions will be implemented the existing system within each domain area.
- Each system will be evolved or re-engineered (integrated/separated) step by step.
- To make clear the role and responsibility for each system.

Domain	Domain Details	Related Legacy System	I-KOSS Major System
Domain A	• **Network Monitoring/Assurance Domain** • End-to-End Network Fault/Performance Monitoring	NetCommander, iSeMS iReMS, AROMA, …	NetCommander
Domain B	• **Network Planning Domain** • Network Investment & Design / Mobile Coverage Map	NetProbe, CoverageMap,…	NetProbe
Domain C	• **Network Work Force Management Domain** • Workforce Management (including field-job) , TT Management	MobileOSS, iReMS, NetTTS, iPotal	NetWorker
Domain D	• **Network Inventory Management Domain** • Network Inventory Data Management	NetPost, BASE, NetRix	NetPost
Domain E	• **Network Quality Analysis Domain** • Customer-Oriented/NE-oriented Network Quality Analysis	SAS, NetQMS	SAS, NetCube
Domain F	• **Customer Claim Support t Domain** • Customer Complain Management (as to Network Problem)	SIMS, MOSS	NetWindow
Domain G	• **OSS System Support Domain** • OSS Process Management System • Business Process Monitoring & Control • OSS-related Knowledge Management	OSS Prime, OSS Master, iPotal	OSS Prime, OSS Master

This paper will explain mainly about I-KOSS system integration which is based on OSS processes. We considered a few principles to define the direction of I-KOSS.

- To guarantee the seamless operation environment which can carry out the existing operation activities
- To maximize the reusability of existing operation services modules and infrastructures
- To insure of the efficiency of the operation activities
- To provide the integrated environment for operation business system and operator's roles
- To possess OSS core technology
- To guarantee of system expandability for new network equipment and new services
- To minimize the system maintenance cost
- To minimize the dependency S/W platform

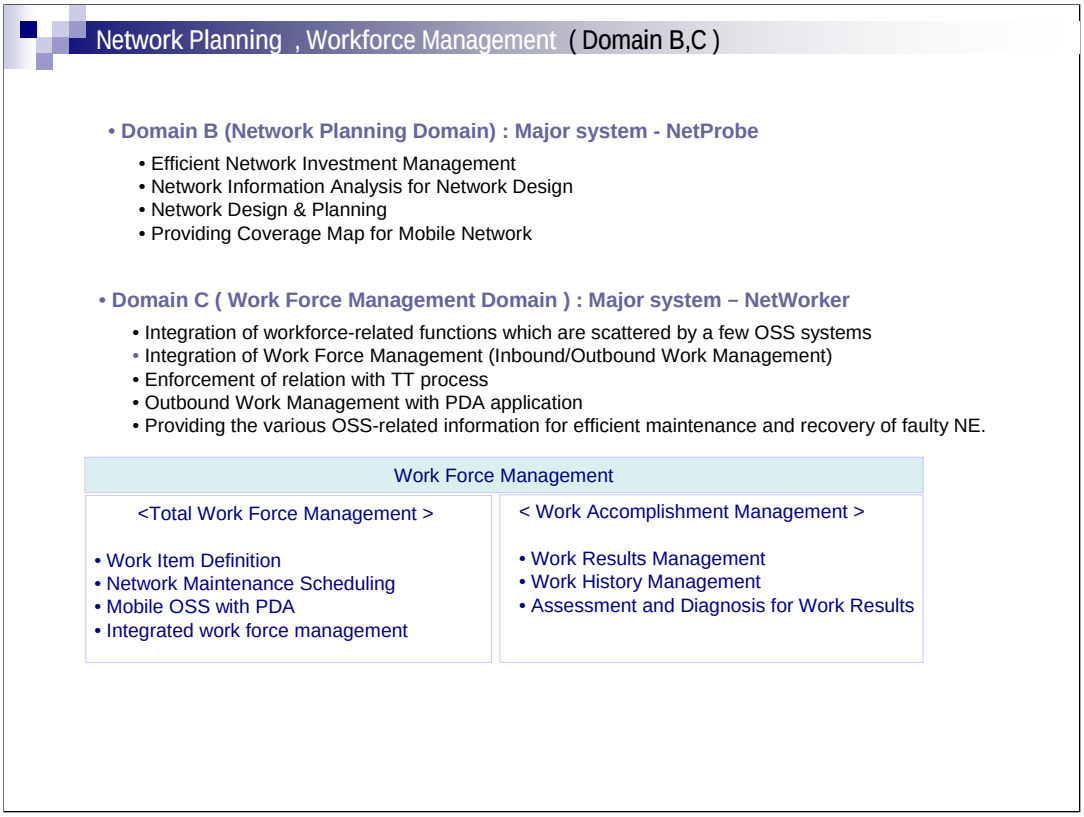
After analyzing the legacy OSS and operation processes, we defined 7 OSS domains which cover the network-related OSS processes : network management (monitoring/assurance) domain, network planning domain, work force management domain, network inventory management domain, network quality analysis domain, customer claim support domain and OSS system support domain. Each domain is defined according to business processes and functions at network-related OSS area and has more than one system.



First, we introduce the end-to-end integrated network management, specially network monitoring/assurance domain. The network monitoring/assurance domain has many legacy systems for each network generation and network type. KTF has served the various mobile services like as IS-95AB, cdma1X/Ev-Do, W-CDMA. And there are so many network types like as transmission network, intelligent network, signaling network, repeaters, mobile network, circuit-based/packet-based switch network, IP network and value-added network, etc.

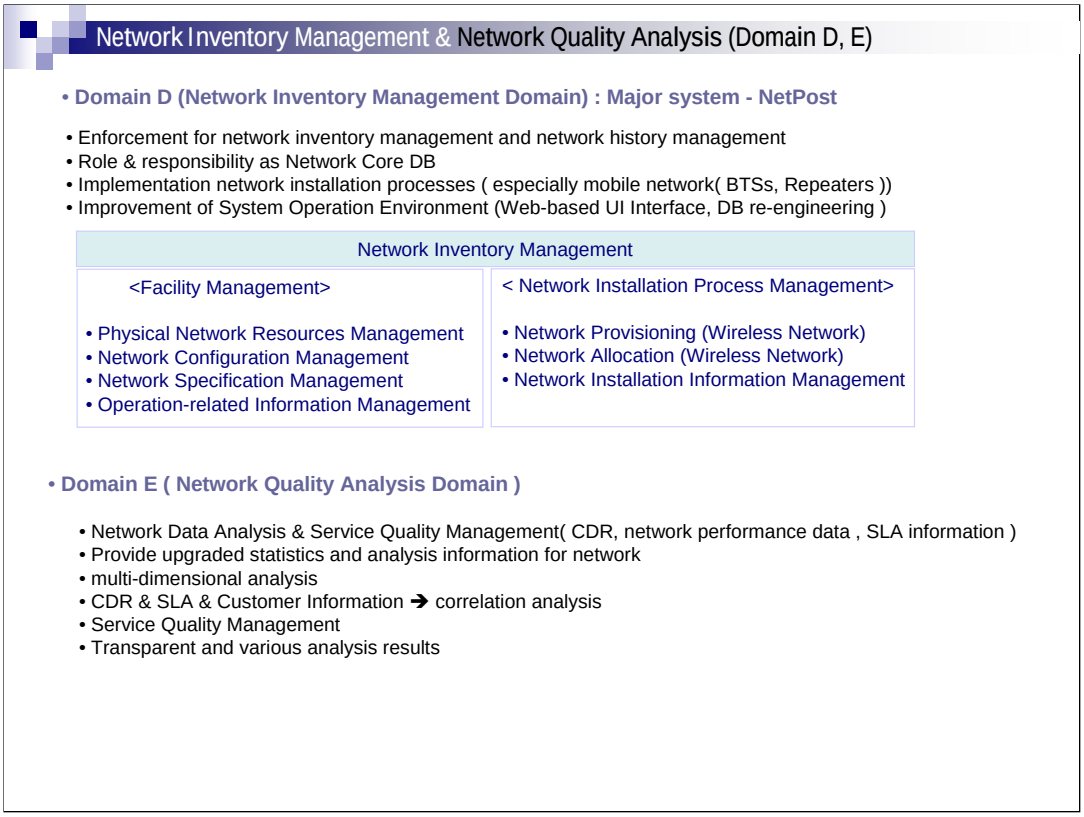
Before adapting I-KOSS architecture, a several of network management systems were developed and operated as network generation and network types, IS-95/cdma1/EvDo network management system, IP network management system, W-CDMA network management system, signaling network management system, transmission network management system and repeater management system.

Now, we are developing the integrated network management system to support the end-to-end network management. The main system of this domain is named as “NetCommander”.



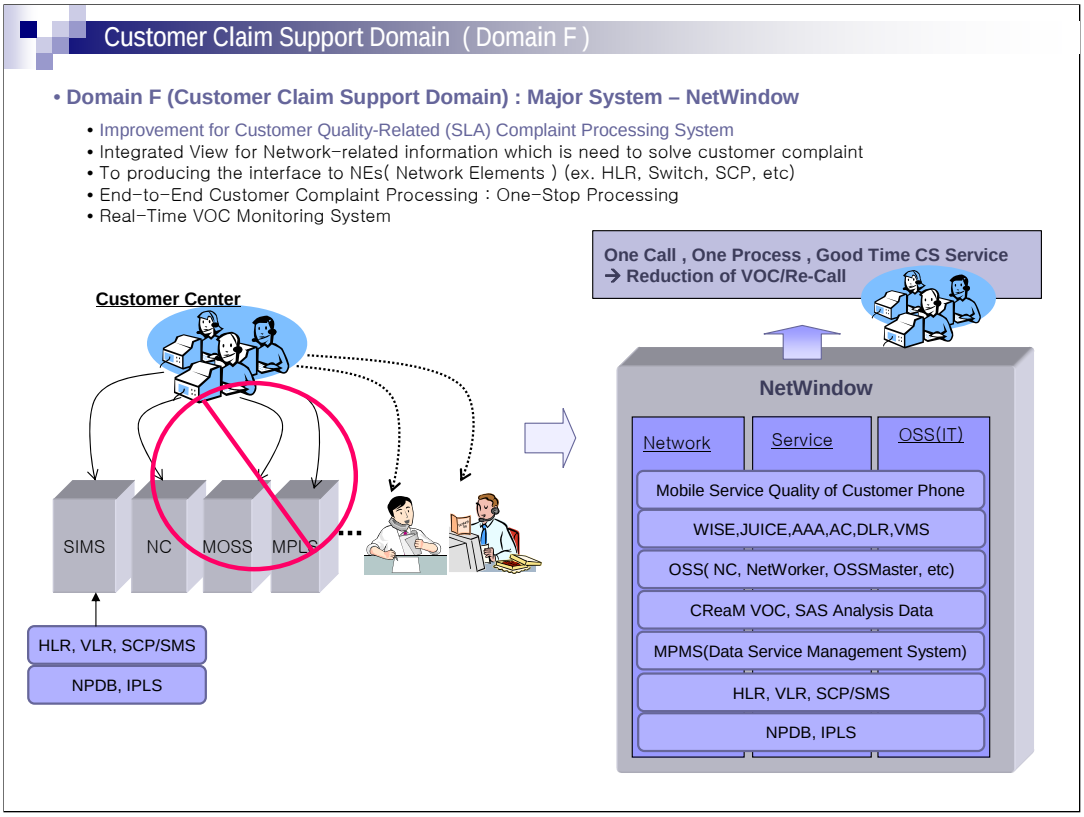
"Network Planning" domain is responsible for network design and planning for the efficient investment. The major system "NetProbe" provides the various information like as network investment volumes and scopes based on the various network analysis results. Also "NetProbe" provides the coverage states for wireless network on GIS map. The coverage state is used to determine whether network planner invest network resources (BTS or repeater) in any location or not.

"NetWorker", the major system of the domain C, is the total network-related work force (inbound/outbound work) management system. Specially, NetWorker provides the PDA work-force management environment in order to support the outbound work management. Most of operators work at outside because of maintaining and operating the BTSs and repeaters. It is possible to access the network information in order to take an action and to insert the work results on time through PDA at outside.



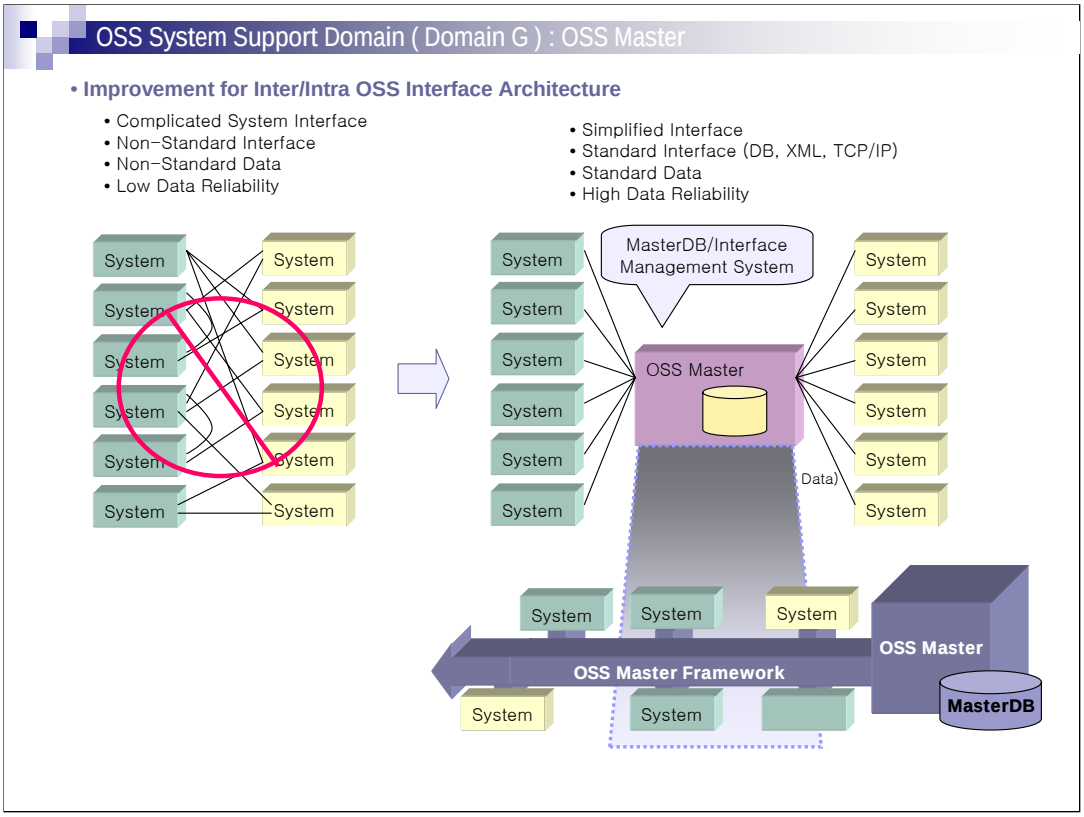
There are also another OSS systems which are re-engineered within I-KOSS scope. First of all, “NetPost” system which is responsible for managing the inventory status and the location of network facilities, i.e, network inventory management domain. NetPost has two main functions : Facility Management and Network Installation Process Management. The network installation process management has mainly network provisioning/allocation functions and provides the installation-related information for wireless network. The wireless installation process can be done very often according to the change of wireless environment. Also, NetPost is needed the improvement for system architecture like as DB design, user interface, process-based work flow. NetPost is requested the enforcement for network inventory management as network core DB.

The Network quality analysis domain will be developed to support for the more upgraded network and service quality analysis. The major system will carry out the various multi-dimensional analysis from CDR, statistics data from NE, OSS data and so on.

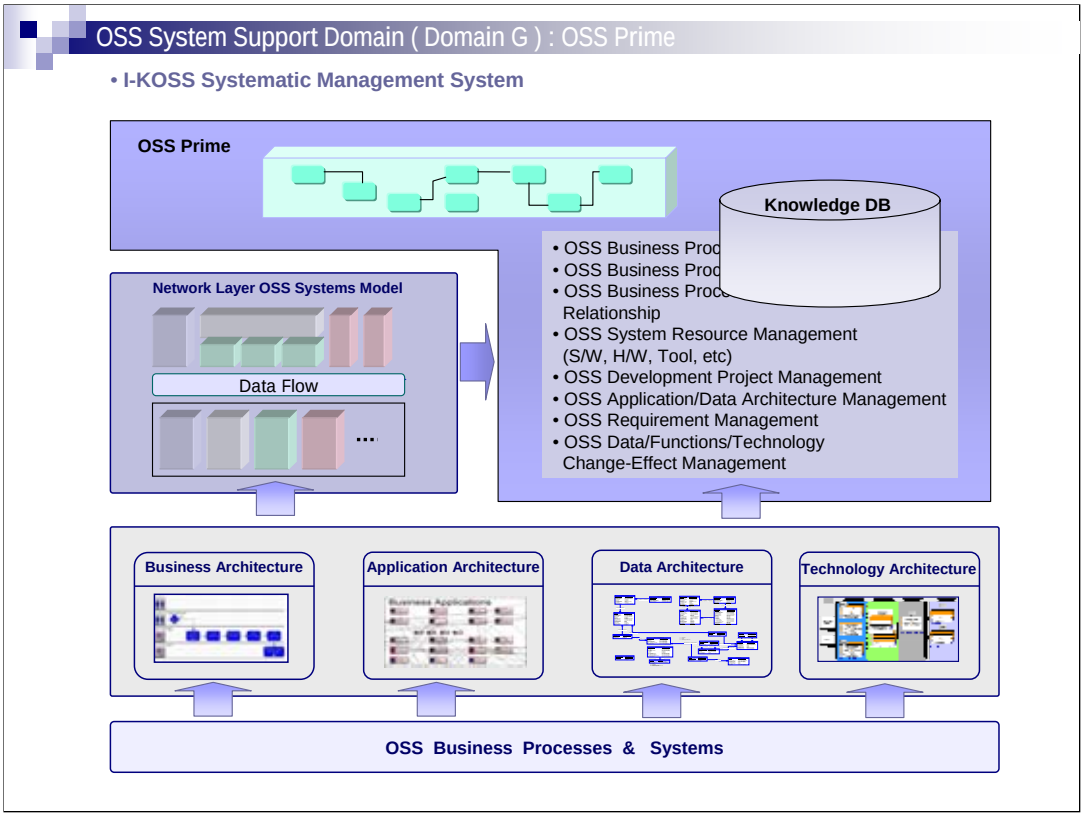


There are so many kinds of customer complains for service and network qualities. I-KOSS NetWindow system will be developed in order to solve those complains at one stop, one view. If any customer complain for SLA is happened, the customer consultant will seek the reasons that the problem is caused. To find the reason, the customer consultant accesses a several of OSS systems or queries the related operator/manager about the problem. So it is hard to trace the reason about the problem and there is not any processing results and history.

NetWindow system is the integrated customer claim support system which is supported to solve the customer claims, specially network and service quality claims. NetWindow provides the network-related information, service-related information as interoperating with other OSSs and as accessing the network elements directly. In addition, this system provide GIS-based user interface. Most of customer quality complaints are related to mobile network like as BTSs, repeaters. As providing the GIS based UI environment, the customer consultant can see the status, location and quality information of BTSs and repeaters near by the place which the customer claim is happened.

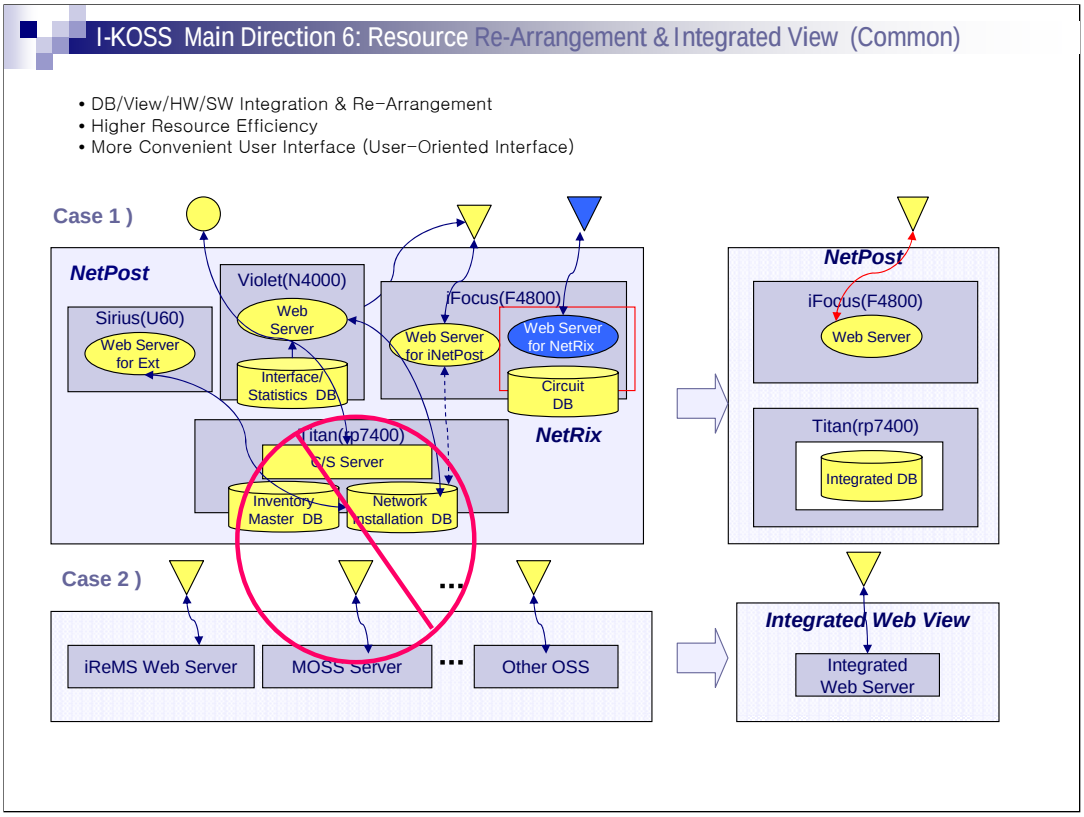


There were no standard interface specification and no standard interface data format in past KTF OSSs. The interfaces among OSSs were so complicated as peer-to-peer links. The similar data in one system were transferred other OSS by different period and different interface method. Even if each system has some functions like as interface management and checking data consistency, the functions are short of guaranteeing the data consistency and data reliability . So the operator did not believe if the provided data could be reliable or not. OSS Master system was developed in order to provide interface data and interface link management functions. The provider system provides the requested data through one path which is linked with OSS Master, the OSS Master provides those data to other OSS/BSS through the standard interfaces (XML,TCP/IP,…) .



OSS Prime system will be developed newly to support I-KOSS system management. It is important to manage and develop the OSS system based on OSS processes and I-KOSS concept. OSS Prime is responsible for managing the OSS processes and OSS-related resource and activities. OSS Prime has the functions as following:

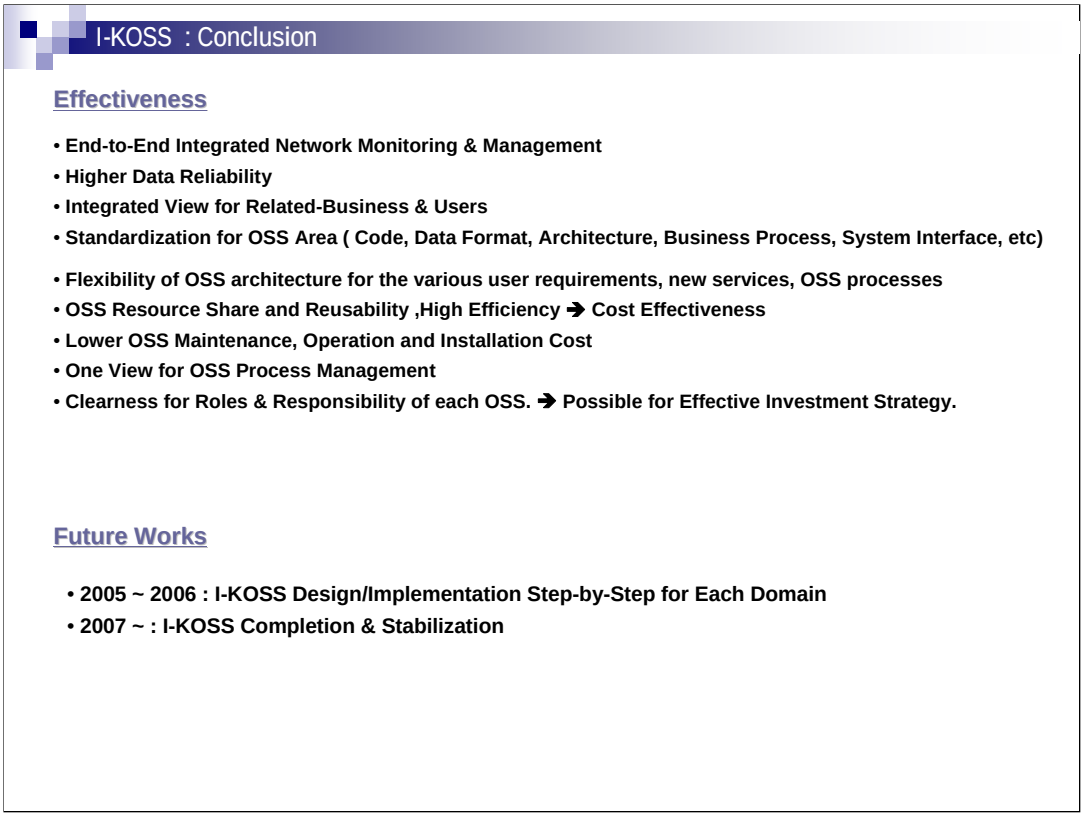
- OSS business process management
- OSS business process principle & standard management
- Relationship between OSS business process and OSS system functions
- OSS system resource management (S/W, H/W, Tools. etc)
- OSS development project management (project procedure, project output)
- OSS application and data architecture management
- OSS user requirement management
- OSS data/function/technology change-effect management
- OSS-related knowledge management



In addition to the integration and re-engineering for each OSS system, we are also approaching the re-arrangement for database, user interface view, applications in order to accomplish the higher resource efficiency. There are two samples which will be consolidated the user interface, functions and database. In upper case, “NetPost” is the system which is responsible for network inventory management domain. The system has a several user interfaces like as C/S client, three web clients for each purpose. These interface clients are integrated to single web-based client. Also, as the results of I-KOSS re-engineering plans, the circuit management functions which was developed on other system (“NetRix”) are integrated to NetPost system. At the end, “NetPost” consists of one integrated DB , one integrated web server and one integrated web user interface.

In lower case, each system has individual web server and web interface. We will carry out the consolidation jobs to integrate the related-web applications.

These approaches are very important to save the OSS installation cost and maintenance cost as well as user convenience.



This paper introduced the next OSS architecture and directions of KTF. We are now approaching to accomplish the I-KOSS architecture. Each domain is implementing and will implement the applications as the directions of I-KOSS. We are expecting a several of the effectiveness through applying I-KOSS concept.

- End-to-end integrated network monitoring & management
- Higher data reliability
- Integrated view for related-business & users
- Standardization for OSS area
- Flexible of OSS architecture for the various user requirements, new services and OSS processes
- OSS resource (H/W, S/W, Tool) share and the higher reusability
- Lower OSS maintenance, operation and installation cost
- one integrated view for OSS process management
- Clearness for roles & responsibility of each OSS

References

[1] TMF, “eTOM Solution Suite” ,TMF GB921, Version Release 5.0, April, 2005.

[2] TMF, White Paper, “Understanding Business Process Management for Communication Service Providers”, March,2005

[3] TMF, “SLA Management Handbook” GB917, Evaluation Version 1.5, June, 2001.

[4] Z. Benahmed Daho, NOMS 2004, “ An Information Model for Service and Network Management Integration : from needs towards solutions”, April, 2004.

[5] M3100, “Generic network information model”, ITU-T recommendation, 1995.