Future Direction of Network and Service Management : Telco's Perspective

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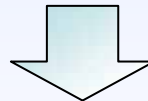# Overview
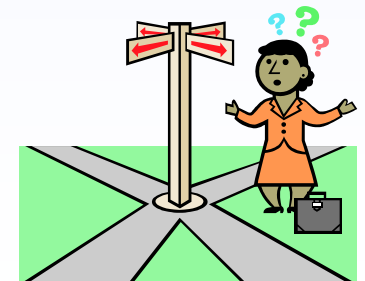
1. **The Need for More Advanced Network Management Functions from Network Managers and Field Engineers**

2. **Customer-focused Network and Service Management**

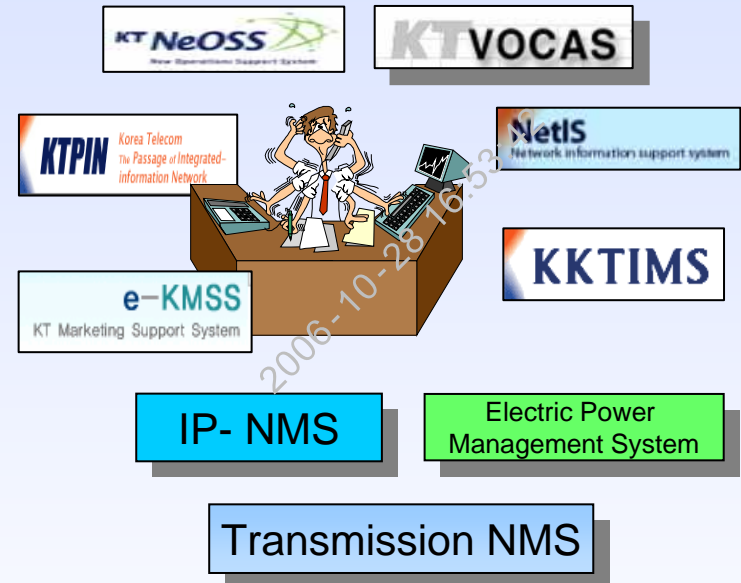3. **Management of New technologies (Future Network)**

Future Direction of Network and Service Management
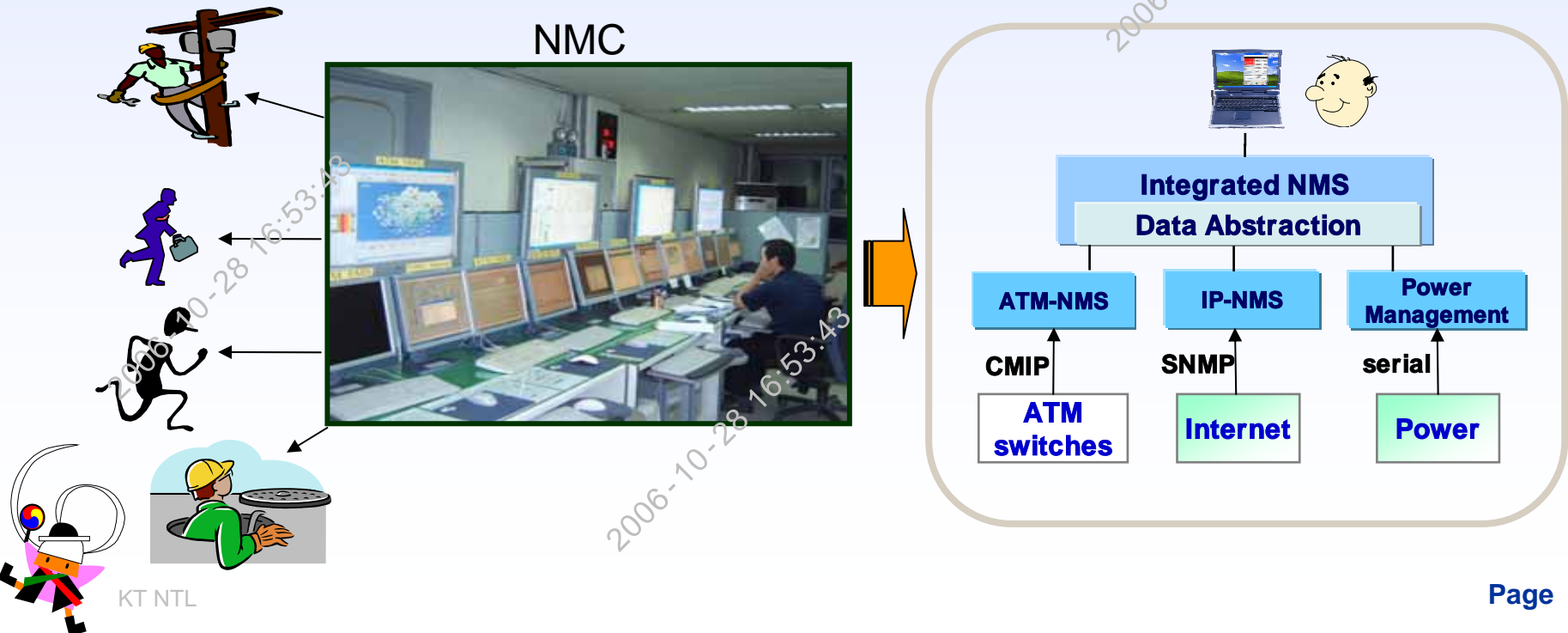
Voice of Network Managers

- Too many OSSs and NMSs
- The number of systems are still increasing
- Some needs manual data input
- Data and format inconsistency
- Takes long time to prepare statistical reports
- lack of useful information for preventive maintenance
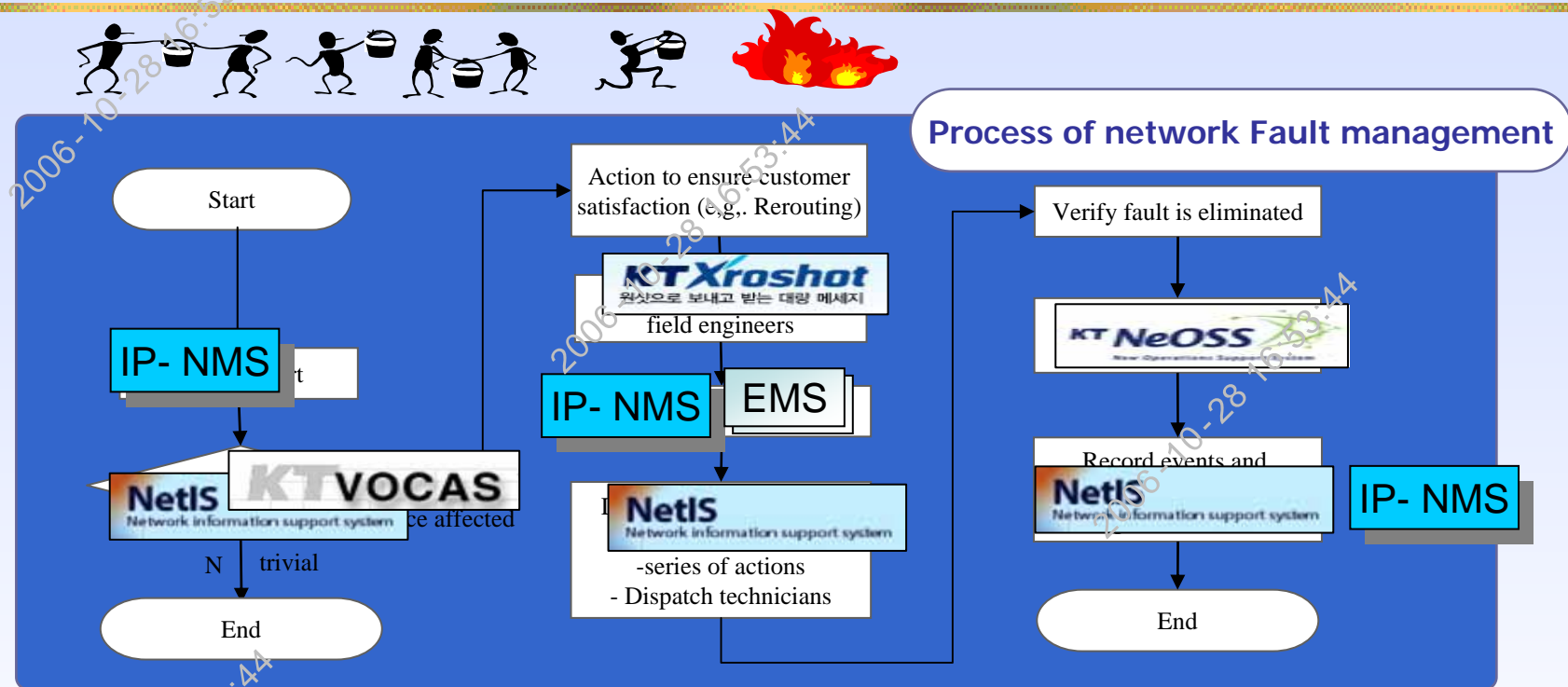
KT NeOSS

KT VOCAS

KTPIN Korea Telecom The Passage of Integrated-information Network

NetIS Network information support system

e-KMSS KT Marketing Support System

KKTIMS

IP- NMS

Electric Power Management System

Transmission NMS

Voice of Network Managers

◆ **Integrated Management of Heterogeneous Networks**

  ► One manager handles various NMSs
    - Internet, ATM, Transmission, Electric Power, etc.

  ► NMSs are dedicated to specific management domains
    - There are too many PC monitors and GUI windows

  ► Managers need an Integrated NMS which shows whole networks and equipments status

NMC

Integrated NMS
Data Abstraction

ATM-NMS	IP-NMS	Power Management
CMIP	SNMP	serial
ATM switches	Internet	Power

Voice of Network Managers

Process of network Fault management

Start

IP- NMS

NetIS
Network information support system

KT VOCAS

ce affected

N | trivial

End

Action to ensure customer
satisfaction (e.g,. Rerouting)

KT Xroshot
원산으로 보내고 받는 대량 메세지

field engineers

IP- NMS | EMS

NetIS
Network information support system

-series of actions
- Dispatch technicians

Verify fault is eliminated

KT NeOSS
New Operations Support System

Record events and

NetIS
Network information support system

IP- NMS

End

Daily and monthly reports

Daily Reports
1. Daily Work Log   2. Fault Analysis Report   3. Traffic Analysis Report 4. Syslog Analysis

Monthly Report 1. Monthly Network Fault Analysis report   2. Monthly Traffic Analysis Report
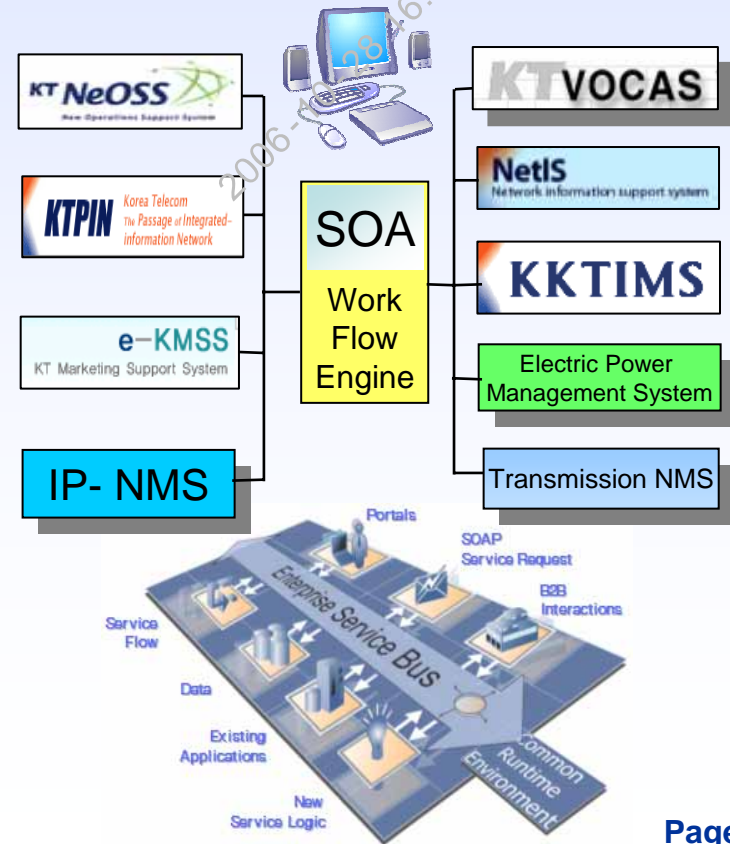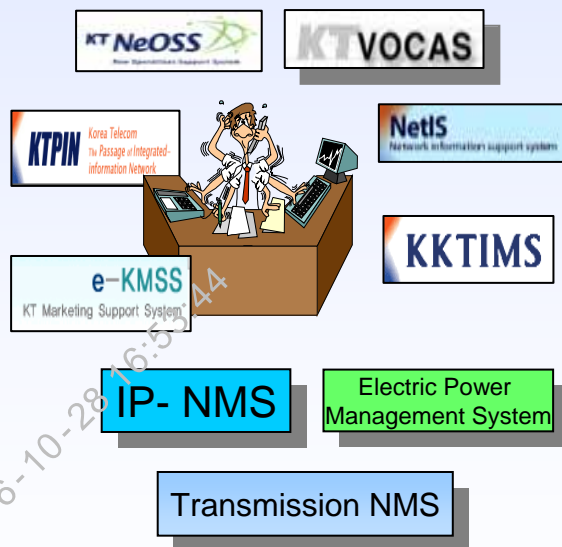
Every Quarter : Network and Customer Information
1. Network Topology Map   2. Customer and Access Network Information   3. Server Information

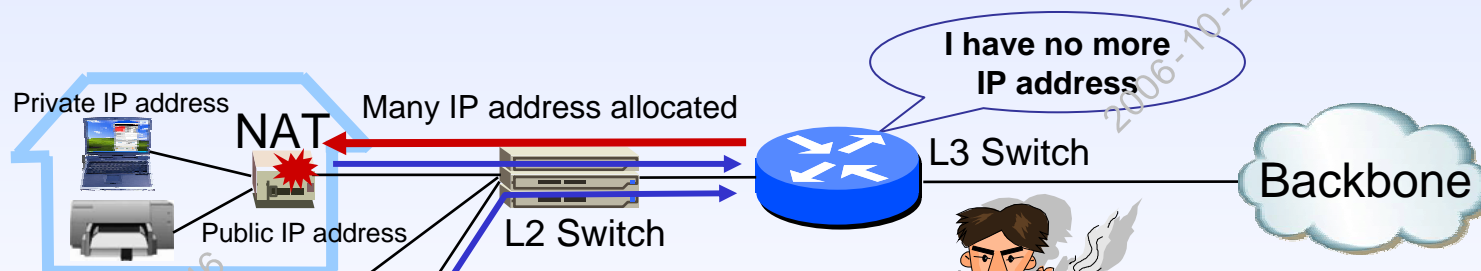# Voice of Network Managers

◆ **Automation of work process**
   ▶ **15% automated, 85% manual job**
❷ **NMS be the core of workflow in NMC, and control the complicated work processes**

Voice of Network Field Engineers

◆ **Access Network Faults → Dispatch Engineers to remote-site**

   ▶ **Current NMS lack of detailed diagnosis/config functions**

      ▶ **NMS was designed to monitor N/W in company-wide scale**

◆ **NMS has to support remote-config/diagnosis function and provide knowledge how to correct it.**

I have no more IP address

Private IP address

NAT   Many IP address allocated   L3 Switch   Backbone

Public IP address   L2 Switch

Public IP address

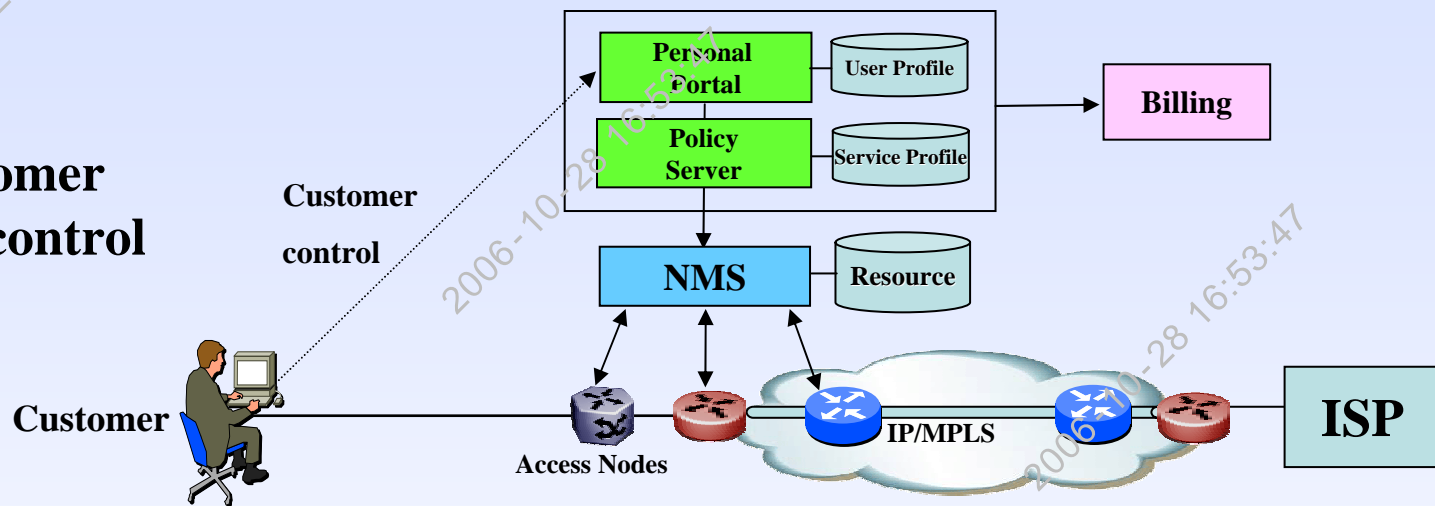IP address not allocated

```
HANSHIN_APT#sh arp
Protocol  Address          Age (min)  Hardware Addr   Type    Interface
Internet  210.223.248.5        0     Incomplete      ARPA
Protocol  Address          Age (min)  Hardware Addr   Type    Interface
Internet  210.223.248.4       15     000b.6aa2.209e  ARPA    Vlan1
Internet  210.223.248.3       12     0003.0ecb.fb51  ARPA    Vlan1
Internet  210.223.248.2        4     000b.6aa2.209e  ARPA    Vlan1
Internet  210.223.248.13      10     0002.2ad3.06ee  ARPA    Vlan1
Internet  210.223.248.15      10     0002.2ad1.0152  ARPA    Vlan1
Internet  210.223.248.9        5     000b.6aa2.209e  ARPA    Vlan1
Internet  210.223.248.8        8     000b.6aa2.209e  ARPA    Vlan1
Internet  210.223.248.11      13     00e0.98a8.7e98  ARPA    Vlan1
Internet  210.223.248.10       0     000b.6aa2.209e  ARPA    Vlan1
Internet  210.223.248.18       0     000b.6aa2.209e  ARPA    Vlan1
Internet  210.223.248.19       0     000b.6aa2.209e  ARPA    Vlan1
```

KT NTL

Customer-focused Network and Service Management

◆ **Customer Self-control**

▶ **Customer changes service profiles of provisioned services.**

▶ **BoD, Voice Mail, Parental Care, Presence and Location, Context-aware Services etc.**

▶ **NMS has to monitor customer controlled network and resources**

Customer-focused Network and Service Management

◆ **Traffic Management : from a customer experience perspective**

  ▶ **Problems occur with interacting services within media streams**

  ▶ **NSP introduces deep packet inspection technologies**

  ▶ **To analyze how interacting services affect each other**

  <Case> A company is connected to Internet with 10Mbps leased line. When **N** people are using VoIP phone, **M** people access IP-TV and the performance of both service are degraded.

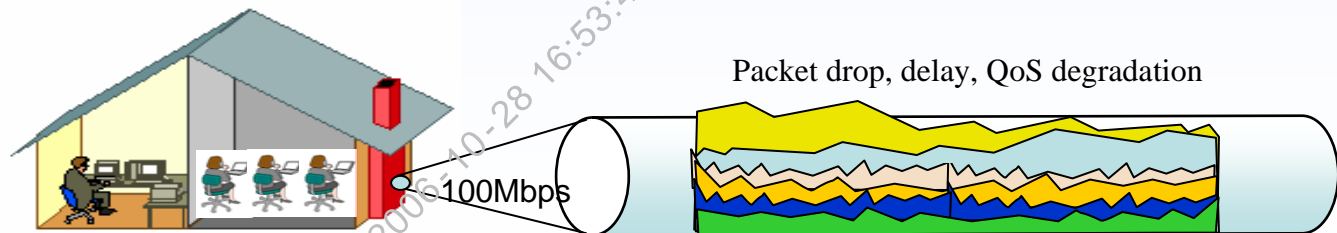 Q1 : Who is responsible for the degradation of quality?

  A1: The service provider who sold VoIP and IP-TV services

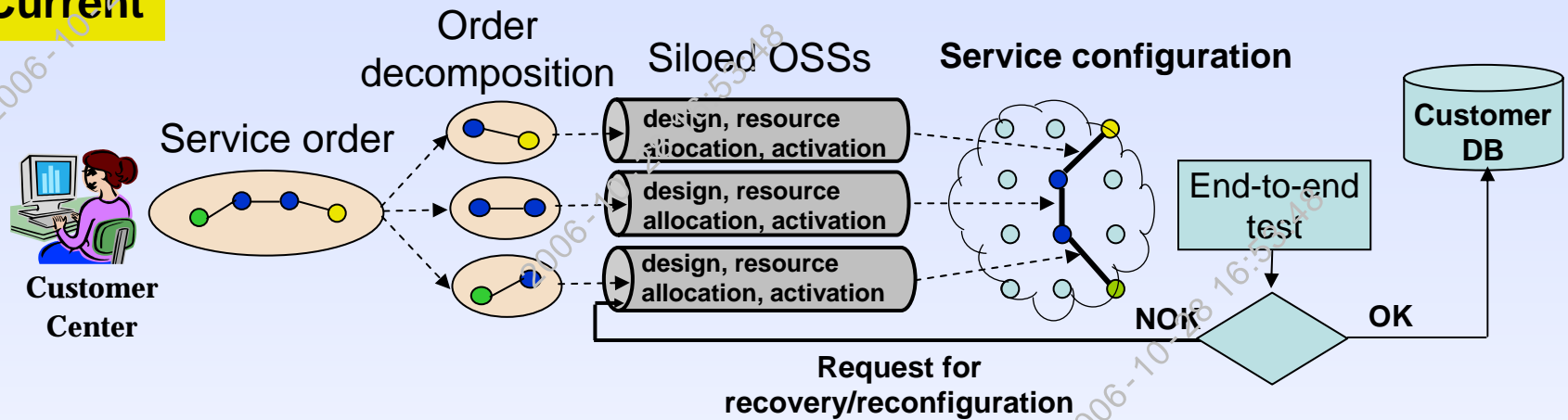 Q2 : Among the **N** VoIP and **M** IP-TV channels, which one and how the quality is degraded?

  A2: ???

  Q3 : If some packets are dropped by priority control, how can the service provider explain it to customers?

Packet drop, delay, QoS degradation

100Mbps

Customer-focused Network and Service Management

Current

Order decomposition

Siloed OSSs

Service configuration

Service order

Customer DB

design, resource allocation, activation

design, resource allocation, activation

design, resource allocation, activation

End-to-end test

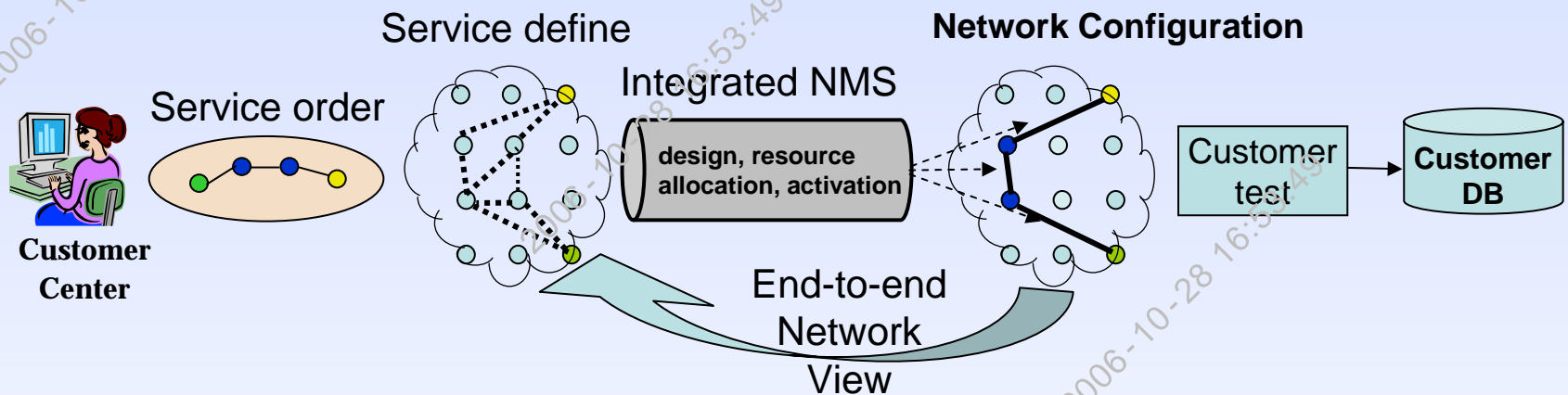**Customer Center**

NOK

OK

Request for recovery/reconfiguration

◆ **Current service provisioning process**

▶ **Reactive and slow-working process**

Customer-focused Network and Service Management

Future

Service define

Service order

Integrated NMS

Network Configuration

design, resource
allocation, activation

Customer Center

Customer test

Customer DB

End-to-end
Network
View

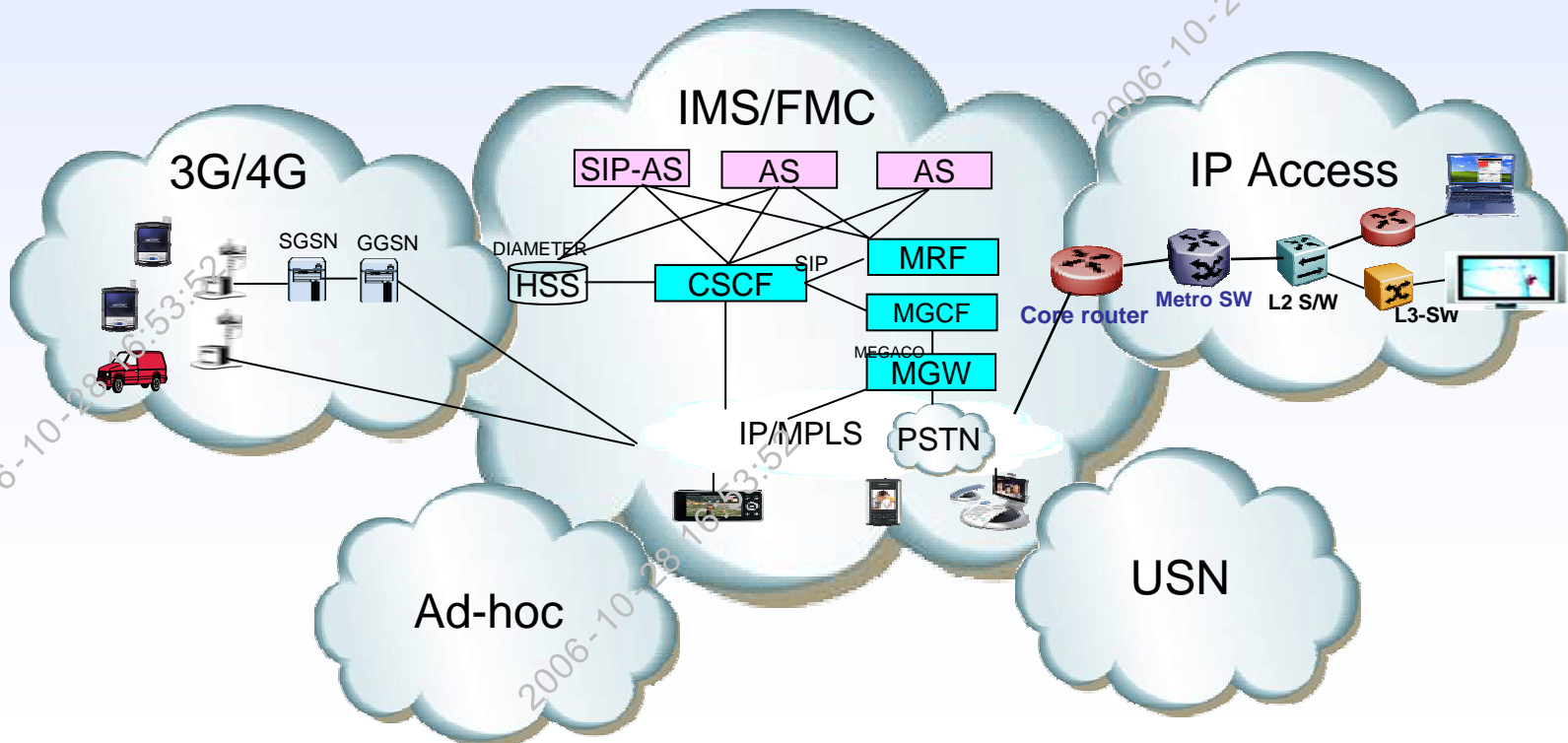◆ **Future service provisioning process → Real-time**

   ▶ **An Integrated NMS manages all physical and logical resources**

   ▶ **Base on the resource information, Service is defined according to the contracted QoS and rate**

   ▶ **NMS validates the network capability, and configure an end-to-end connection.**

   → PBNM can reduce human intervention to design, allocate resources and activate equipments.
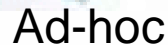
Management of New Technologies

◆ **IMS/FMC → Rich communication with mobile & fixed devices**

▶ **Multimedia data exchanged across various networks with multiple owners.**

▶ **SP-SP Interworking : TMF, Infranet**

▶ **Research Challenges**
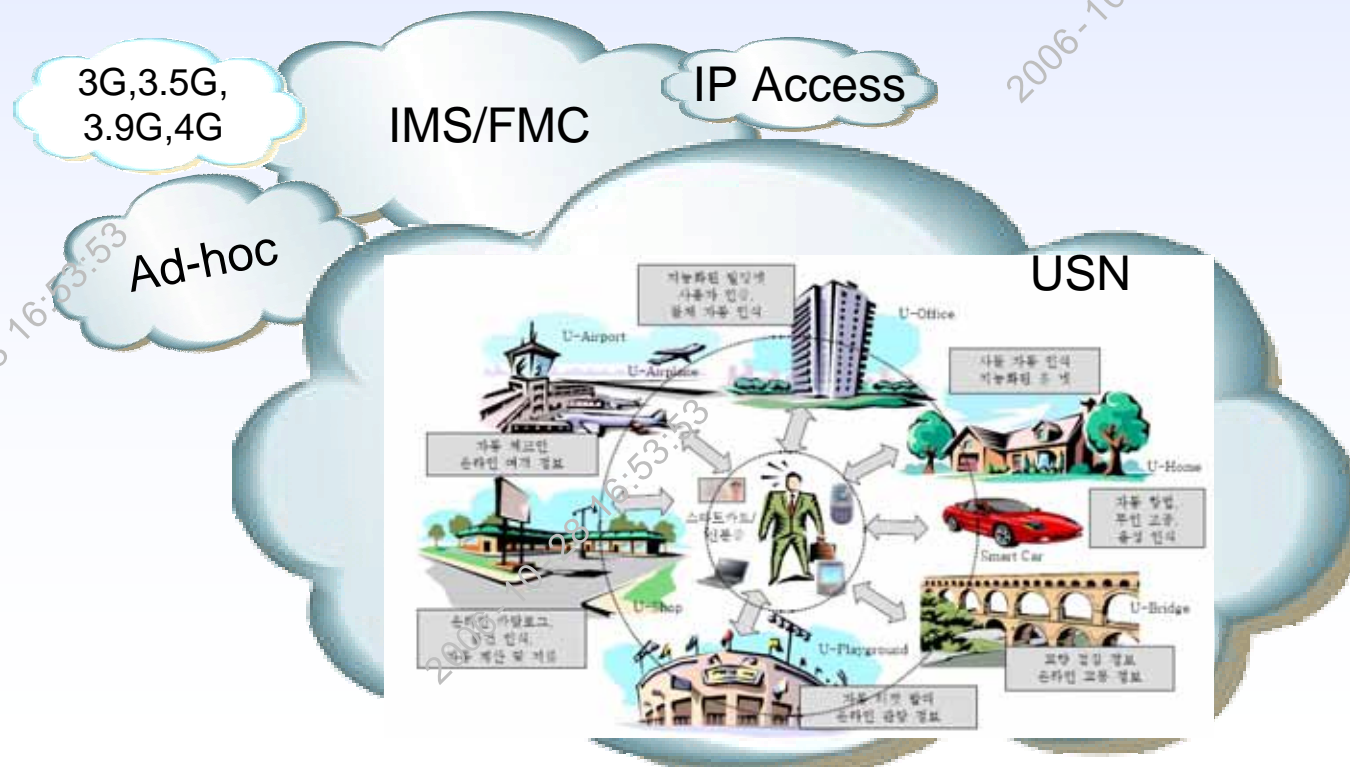
● **Auto-configuration → Networks with different Policies**

Management of New Technologies

◆ Ad-hoc network Management

- ▶ **Resource states and communication performance**
- ▶ **Topology Management → Network Performance**
- ▶ **Multi-hop routing →Delay-tolerant service → Infostation Management**
- ▶ **Mobile Device Management**

3G,3.5G, 3.9G,4G

IMS/FMC

IP Access

USN

Ad-hoc

Management of New Technologies

◆ USN

▶ **Sensor Resource Management**

▶ **In-network service (processor and storage)**

- Aggregate and reduce the huge amount of data from sensors

▶ **Sensor calibration & Fraud Management**

- Cleansing mechanism to protect the propagation of corrupted data

Summary

◆ **The Need for Advanced Network Management Functions from Network Managers and Field Engineers**

- ▶ Integrated Management of Heterogeneous Networks
- ▶ BPM
- ▶ Support of remote- configuration and auto- diagnosis

◆ **Customer-focused Network and Service Management**

- ▶ Fault
- ▶ Traffic
- ▶ Provisioning

◆ **Management of New technologies (Future Network)**

- ▶ IMS and FMC
- ▶ Ad- hoc
- ▶ USN

Life is wonderfull **KT**

Thank You

Dream and Real World