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*Fly to the perfect e-World with ROCOZEN*

**minimumCORBA ORBs  
in L4 Router**

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# SNMP and Embedded CORBA



**miniSORBA**



# Growth of SNMP

- Before 1990's
  - Increasing Importance of Network and Distributed Computing Environment
  - Few Agent Groups Compatible each other
  - Problems in Management of NE
  - Increasing Hosts and Complexity of Network Topology
- Growth of SNMP(Simple Network Management Protocol)
  - Adequate Price/Performance
  - Simple Standard for Heterogeneous Environment



# Functions of SNMP

- Get
  - Manager retrieves scalar object value from agent
- Set
  - Manager updates scalar object value in agent
- Trap
  - Agent notifies events to manager



# Building Blocks of SNMP

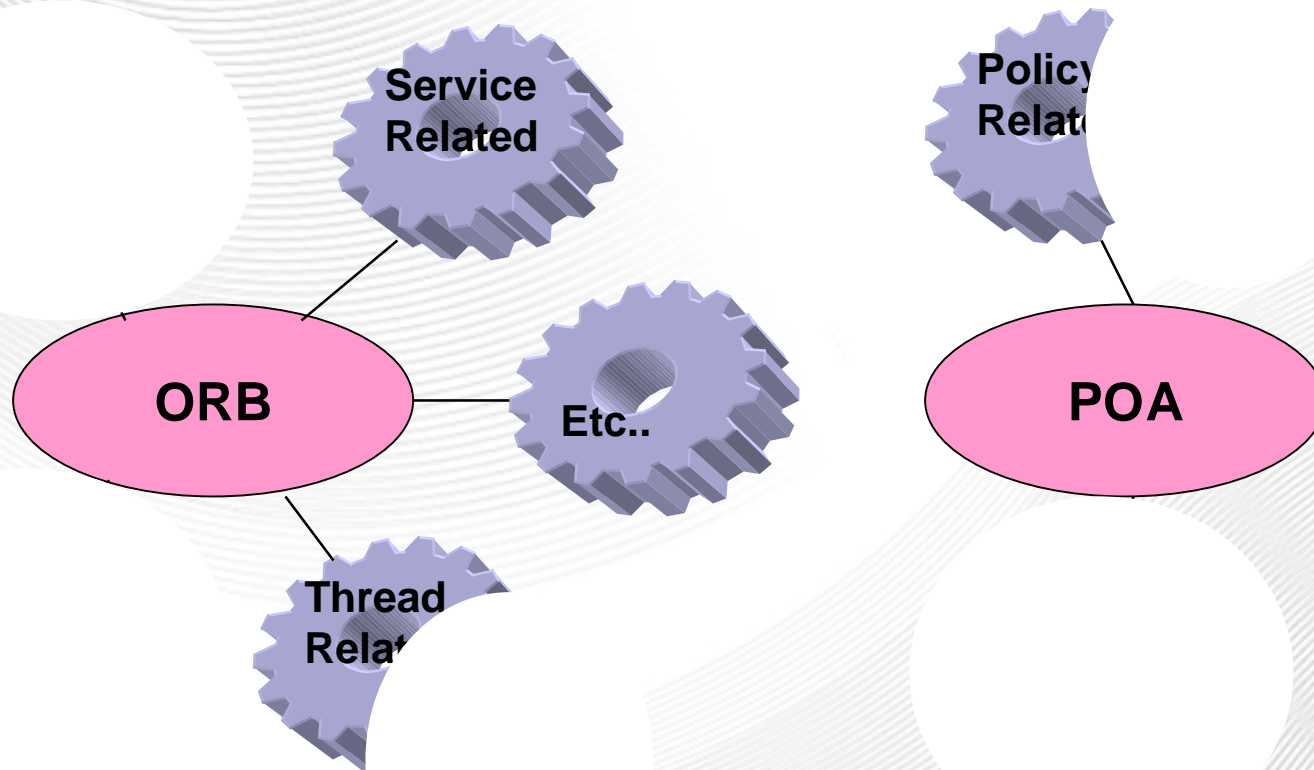
- **Management System**
  - Provides Interfaces on Network Monitoring Information to Network Administrator
  - Has Databases for Analysis of Management Data, Management of Failure
- **Agent for Network Element**
  - Built in Network Elements (Host, Router, Bridge, Hub)
  - Sending Management Information and Conducting Actions
  - Notifying Monitoring Information to Management System
- **MIB**
  - Database containing Information of NE
- **Network Management Protocol**
  - Asynchronous request/reply message protocol based on UDP



# Recent Paradigm and CORBA

- Problems
  - CMIP/SNMP can't integrate distributed, complex and heterogeneous application
  - Difficult for finding the cause of failure
- Recent Paradigm
  - CMIP/SNMP to CORBA based Network Management

# minimumCORBA



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Embedded, Real-time CORBA

# Motivations for CORBA Network Management

- Fully distributed, not point-to-point
- Increased use of Java management apps
  - IDL suitability for modeling
  - Good readability
  - More O-O than SNMP
  - Simpler than CMIP/GDMO
  - Standardized mappings from SNMP & CMIP
- Standard language mappings ease customization
- CORBA broadly deployed in Telecom
  - Already used between management systems
  - Used by carriers for IT
  - Expertise more accessible than NM-specific protocols

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# Case Study



**miniSORBA**

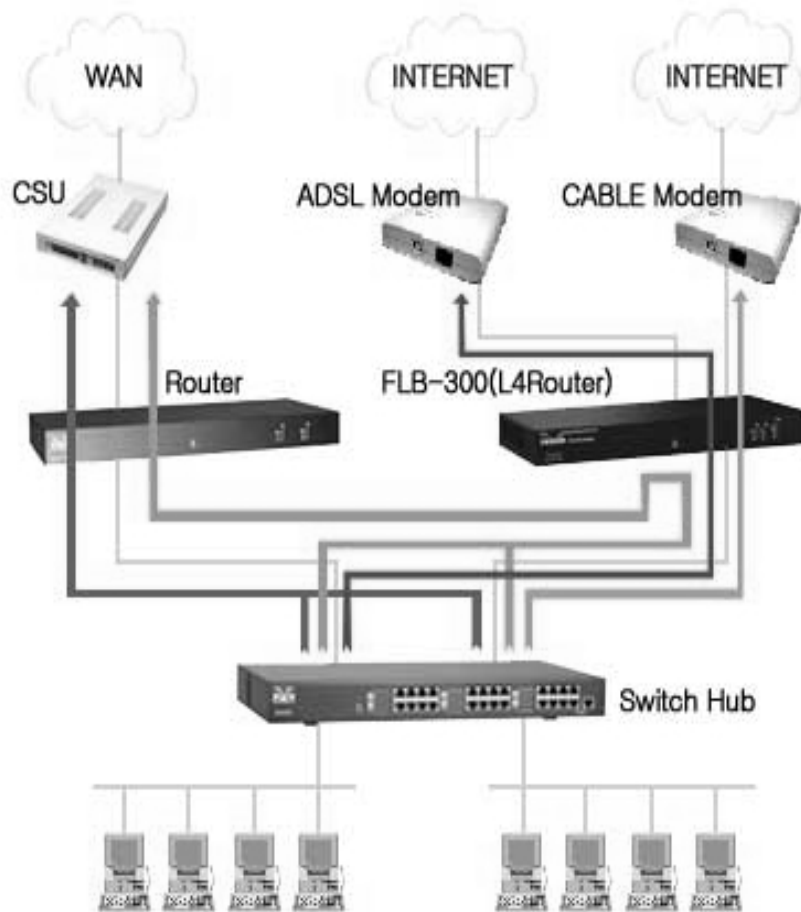
# Characteristics of Equipment (I)



FLB-300 (Layer 4 Router)

- Traffic Distribution Equipment Supporting both exclusive line and multiple ADSL/Cable Modem
- Backup and failover function for disconnection of either of the line using the other line

# Characteristics of Equipment (II)

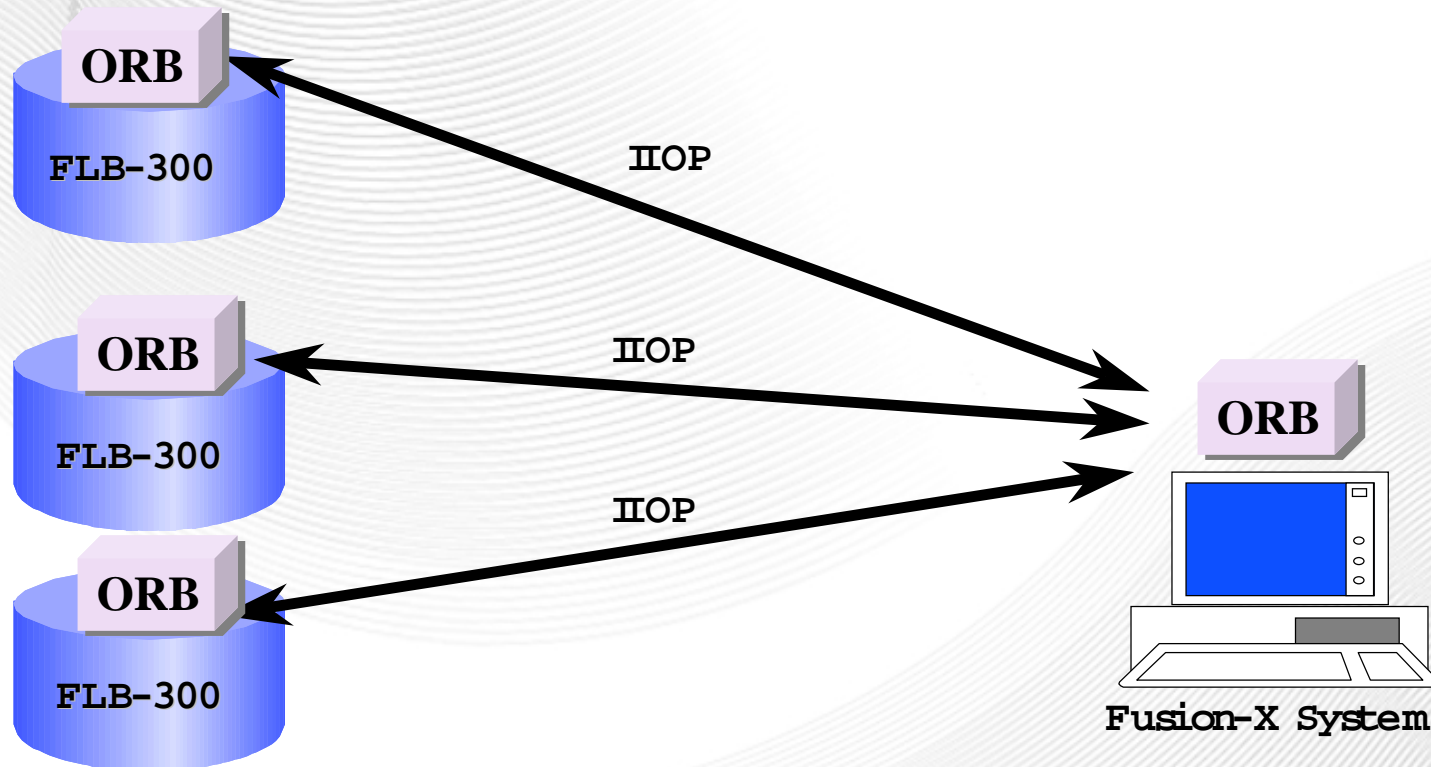


- Blue Line
  - Specific online game
  - Use T1/E1/512K router directly
- Green Line
  - General online game
  - Connect via FLB-300
- Orange Line
  - Web, FTP, Multimedia
  - Use Cable modem via FLB-300
- Red line
  - Web, FTP, Multimedia
  - Use ADSL modem via FLB-300

# Specifications of Equipment

Interface	Internal Line	1 x 100 BaseT		
	External Line	2 x 100 BaseT		
System	CPU	MPC860T or P (50MHz)		
	O/S	Linux(2.2.14 Kernel)		
	Memory	DRAM	16M	
		Flash	4M	
Boot Rom		512K		
Protocol	Routing	Static, <u>RIP v1/2</u> , <u>OSPF v1/2</u> , <u>BGP</u>		
	Multicast	<u>PIM SM/DM</u> , <u>DVMRP</u>		
Additional Functions		NAT, PAT, DHCP, Security, Load Sharing, <u>IPX/SPX</u>		
Traffic Control		Packet Filtering, Access List		
Management		CLI, Telnet, CORBA, TFTP, <u>MIP I/II</u>		
etc.		Firewall, PPPoE, Web Management, IP Aliasing		
Power		110~220/15W		
Cooling System		Natural Cooling		

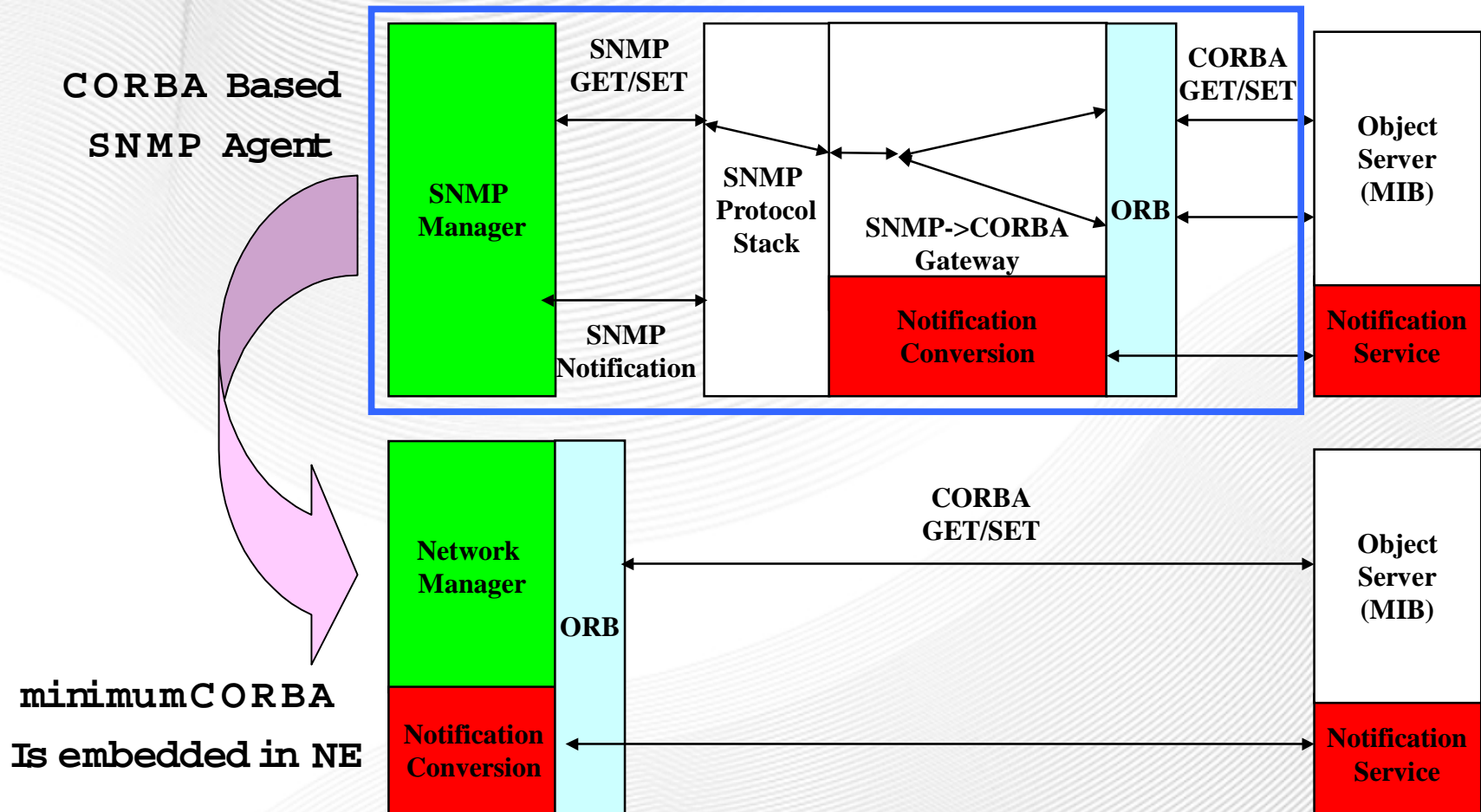
# System Architecture (I)



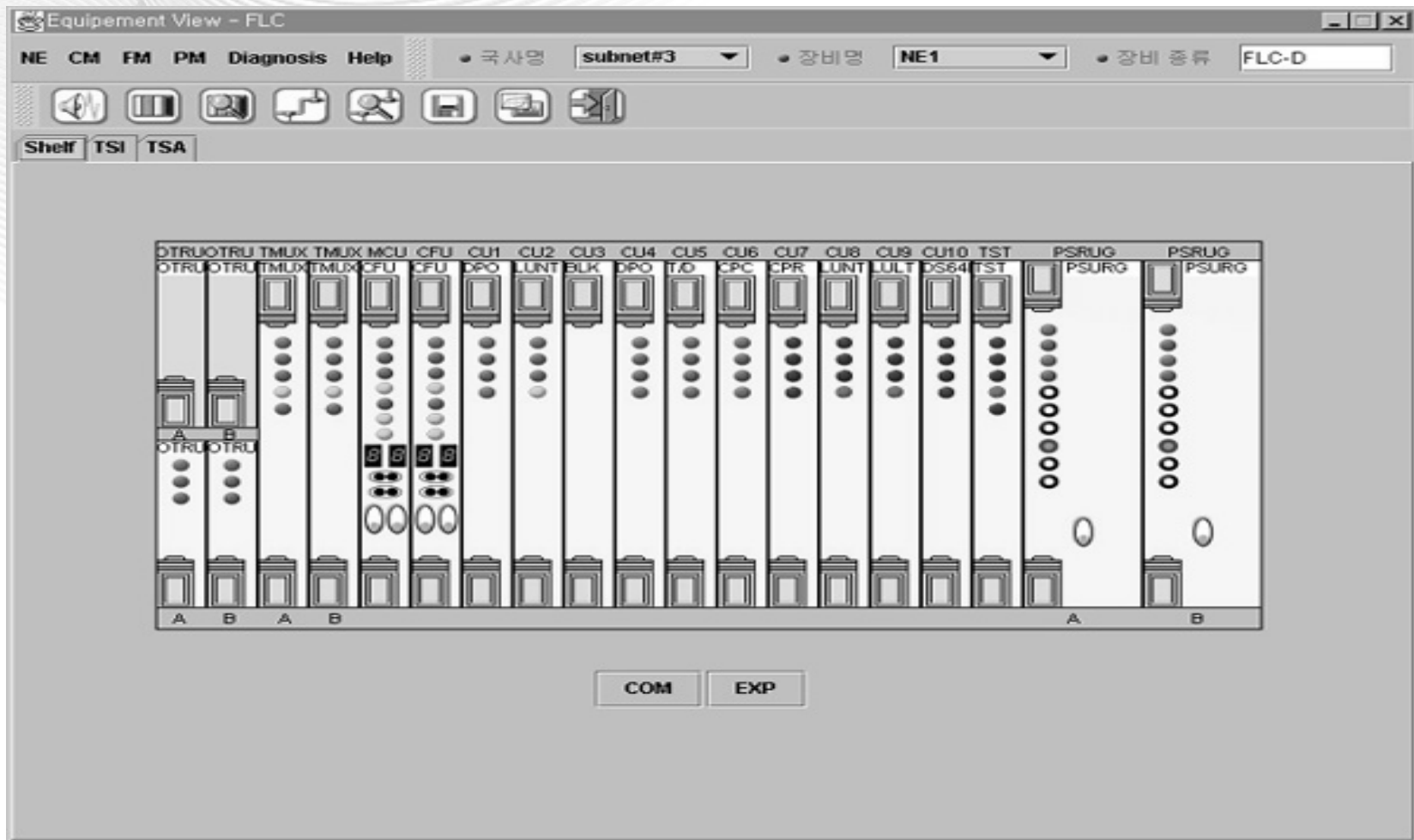
- Using miniSORBA
- Notifying Monitoring and Management Information

- Network Management System
- Supporting Remote Control of NE and Fault Tolerance

# System Architecture (II)



# Network Management System





# Conclusion

- CORBA architecture will cover problems in SNMP/CMIP network management system
- minimumCORBA can replace SNMP in embedded devices
- minimumCORBA can provide more abundant services than SNMP's
- The key issue is supporting heterogeneous OS and various requirements