Fly to the perfect e-World with ROCOZEN

minimumCORBA ORBs in L4 Router

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SNMP and Embedded CORBA
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
minimum CORBA

ORB

Service Related

Etc..

Thread Related

Policy Related

POA

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
Characteristics of Equipment (I)

- 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

FLB-300 (Layer 4 Router)
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

<table>
<thead>
<tr>
<th></th>
<th>Internal Line</th>
<th>External Line</th>
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<tbody>
<tr>
<td>Line</td>
<td>1 x 100 BaseT</td>
<td>2 x 100 BaseT</td>
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## System

<table>
<thead>
<tr>
<th></th>
<th>CPU</th>
<th>O/S</th>
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<tbody>
<tr>
<td>Type</td>
<td>MPC860 T or P (50 MHz)</td>
<td>Linux(2.2.14 Kernel)</td>
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<table>
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<tr>
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<th>Memory</th>
<th>Protocol</th>
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<tbody>
<tr>
<td>Type</td>
<td>DRAM</td>
<td>Routing</td>
</tr>
<tr>
<td></td>
<td>Flash</td>
<td>Static, RIP v1/2, OSPF v1/2, BGP</td>
</tr>
<tr>
<td></td>
<td>Boot Rom</td>
<td>Multicast</td>
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<tr>
<td></td>
<td></td>
<td>PIM SM/DM, DVMRP</td>
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</table>

<table>
<thead>
<tr>
<th></th>
<th>Protocol</th>
<th>Additional Functions</th>
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</thead>
<tbody>
<tr>
<td>Traffic Control</td>
<td>NAT, PAT, DHCP, Security, Load Sharing, IPX/SPX</td>
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<tr>
<td>Management</td>
<td>Packet Filtering, Access List</td>
<td></td>
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<tr>
<td>etc.</td>
<td>CLI, Telnet, CORBA, TFTP, MIP I/II</td>
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</tr>
<tr>
<td>Power</td>
<td>Firewall, PPPoE, Web Management, IP Aliasing</td>
<td></td>
</tr>
<tr>
<td>Cooling System</td>
<td>110~220/15 W</td>
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</tr>
<tr>
<td>Power</td>
<td>Natural Cooling</td>
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</table>
System Architecture (I)

- Using miniSORBA
- Notifying Monitoring and Management Information

- Network Management System
- Supporting Remote Control of NE and Fault Tolerance
System Architecture (II)

CORBA Based SNMP Agent

minimumCORBA Is embedded in NE

SNMP Manager

SNMP Protocol Stack

SNMP->CORBA Gateway

CORBA Notification Service

ORB

Network Manager

Notification Conversion

CORBA GET/SET

Object Server (MIB)

Notification Service

GET/SET

GET/SET
Network Management System
Conclusion

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