Web Services: the Unifying Future Management Technology?

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Background and Panel Role

- **In the past I have done work on OSI-SM and CORBA as management technologies / built platforms**

- **Current networking, network management and service engineering research activities**
  - Tend to use whatever technology is available/fashionable/ easy-to-use
  - Have to deal with a plethora of relevant technologies ☹

- **I have followed with scepticism the emergence of WBEM and SOAP in recent years…**

- **…but I am warming up to the idea of WSDL/UDDI**
  - Look like Internet/Web-based "CORBA"

- **Neutral stance (but hope it will not be just hype)**

How Did We Get Here?

- ◆ **SNMPv1 in the early 1990's an interim solution**
  - ● Was supposed to be replaced by CMOT (CMIS/P Over TCP)

- ◆ **Many problems, some fixed in SMIv2, some other in SNMPv2/v3 but still a flawed approach**
  - ● Information model rudimentary
  - ● Tables and table rows not true composite objects
  - ● No key distribution for v3 security
  - ● Not good for intrusive management (i.e. configuration), mostly used for monitoring

- ◆ **SNMPconf, COPS-PR tried to address the configuration problem but got nowhere either**

- ◆ **It seems IETF will not develop SNMP further**

◆ **TL1 – used for SONET/SDH etc.**

◆ **Cisco's CLI for IP routers**

◆ **OSI-SM (CMIS/P-GDMO) – mostly used in TMN but is gradually being replaced by CORBA**

◆ **Lightweight Directory Services (LDAP)**

◆ **CORBA – a general distributed object technology that is also used in management**

◆ **Other distributed object technologies (RMI, DCOM, …)**

◆ **Java/Web-based Management**

◆ **Management by delegation, mobile code, mobile agents**
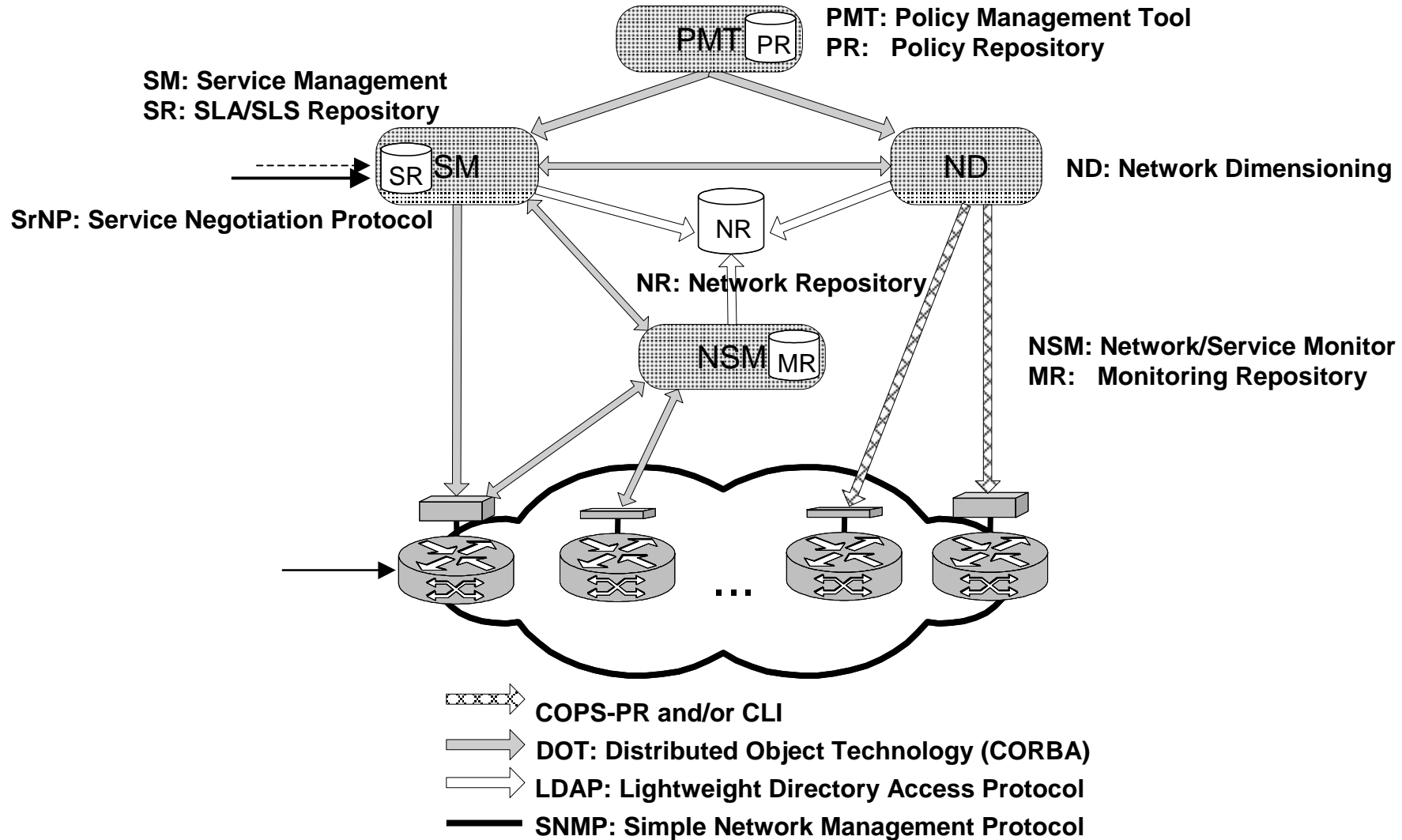
◆ **Many papers/panels in IM/NOMS/DSOM over the years**

An Example of Today's Mess

◆ **In a resource management system we built for IP DiffServ over MPLS, we had to use:**

- **CLI for "asking" edge LSRs to setup LSPs through LDP**
- **COPS-PR for configuring the DiffServ PIB**
- **CORBA for uploading SLS-to-LSP mapping information to edge LSRs (used also for admission control)**
- **SNMP for localised monitoring**
- **CORBA for notification-based network-wide monitoring**
- **LDAP for policy, configuration and monitoring repositories**
- **Service Negotiation Protocol – SrNP, a management protocol we developed ourselves in XML over HTTP**

UniS

PMT: Policy Management Tool
PR: Policy Repository

SM: Service Management
SR: SLA/SLS Repository

ND: Network Dimensioning

SrNP: Service Negotiation Protocol

NR: Network Repository

NSM: Network/Service Monitor
MR: Monitoring Repository

COPS-PR and/or CLI

DOT: Distributed Object Technology (CORBA)

LDAP: Lightweight Directory Access Protocol

SNMP: Simple Network Management Protocol

XML-based Approaches

◆ **Easy to specify and build new protocols**
  - **We naturally chose to do SrNP in XML**

◆ **Wide range of available tools**

◆ **Textually-encoded packets**

◆ **But most important:**
  - **XML is widely used to pass data between applications**
  - **Potential economies of scale and relevant benefits from XML-based management approaches**

◆ **Potential disadvantages:**
  - **Computationally expensive / verbose textual "encodings"**
  - **But this may not really be a problem**

SOAP/WSDL/UDDI

- ◆ **An Internet/Web-based distributed object technology**
- ◆ **SOAP an RPC protocol like GIOP**
- ◆ **WSDL a XML-based service/"object" specification language with inheritance**
- ◆ **UDDI similar to Naming Service**

- ◆ **No standardised programming language mappings**
  - ● A good thing (although no code portability)
- ◆ **Loose data type coupling in comparison e.g. to CORBA static method signatures, more like DII**
  - ● Also a good thing

Can This Be a Potential Solution?

◆ **The same issues as for using CORBA in management**

◆ **But parts of the solution are missing:**
  - **Notification framework**
  - **Transaction framework**
  - **Security framework**

◆ **On the other hand, there is a lot of momentum and such features should/could be developed**

◆ **Note that XMLconf is a (measured) small step in the direction of XML-based management**

◆ **I believe Web-services will be used in higher management layers (network/service)**

◆ **Not sure about network element access, time will tell**