Web Services: the Unifying Future Management Technology?

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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
Other Technologies

- 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
Babel of Management Technologies

SM: Service Management
SR: SLA/SLS Repository

SrNP: Service Negotiation Protocol

PMT: Policy Management Tool
PR: Policy Repository

ND: Network Dimensioning

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

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