Heterogeneous Tools for Heterogeneous Network Management using WBEM

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DMTF Developers Conference, 2002
Cork – Second city of the Irish Republic

Cork Institute of Technology

- 12,000 students
- Engineering, Science, Business
Heterogeneous Telecom Networks.

Network consisting of multiple devices each using different network technologies.

Rapid roll out of e-commerce and m-commerce applications.

Typical network protocols:
- Simple Network Management Protocol
- Common Management Information Protocol
Simple Network Management Protocol (SNMP)

- Created as a short term solution to manage elements in the growing internet and other attached networks.

- Based on Manager/Agent model
- Small set of commands to exchange information
Common Management Information Protocol (CMIP)

- Built on the Open Systems Interconnection (OSI) model.
- Used mainly for management of Telecom Devices.
- Improves on many of SNMP’s weaknesses.
- Invoking methods, event notification and filtering
- High resource requirements & expensive to implement
Management of new Wireless Networks

- Single Management application for each network protocol

- Manage systems using a common standard.

- WBEM standardises the description and use of managed resources in networks.

- Now controlled by the DMTF consortium.
SNIA CIMOM
Java based implementation of WBEM initiative.
Simulating Heterogeneous Elements & Networks

- Dynamic TMN Agent Toolkit based on JMX is used to develop CMIP agents to develop SNMP and CMIP agents.

Diagram showing the architecture of the simulation, including SNMP and CMIP agents, Metadata Generator, and WBEM Server.
Developing the Heterogeneous Manager

JSP is a technology for developing web pages that include dynamic content.

JavaBeans are Java classes that follow certain coding conventions. Re-usable.

WBEM Client API allows access to CIMOM.

The CIM Object Manager is responsible for the communication between clients, providers and the CIM Repository.

Provider API enables retrieval of dynamic data from managed resources.

WBEM Client API allows access to CIMOM.
Developing the Heterogeneous Manager

2. Create EIMtModel and write MOF

```java
[Provider("org.snia.wbem.System_InfoProvider")]
class System_InfoProvider : CIM_LogicalElement {
    string Name;
    [Override("InstallDate"),
     Provider("org.snia.wbem.System_InfoProvider")]
    datetime InstallDate;
    [Override("Status"),
     Provider("org.snia.wbem.System_InfoProvider")]
    string Status;
}
```

compiled mof to java classes
WBEM provider classes obtain dynamic data from managed resources.

Providers classes therefore incorporate SNMP and CMIP functionality.

AdventNet SNMP API and Monfox DynamicTMN GDMO Manager API.
SNMP Demo Manager Class

- Developed using AdventNet SNMP API
- Multi-thread for each operation
We b a s e d  M a n a g e r
Conclusion

- Shown how various industry tools and technologies can be successfully integrated with the WBEM initiative to develop a platform independent heterogeneous network management system.

- As users’ understanding of the benefits of WBEM and particularly CIM grow, WBEM implementations will increase accordingly.

<table>
<thead>
<tr>
<th>Product Name</th>
<th>Function</th>
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<tbody>
<tr>
<td>Sun JDMK</td>
<td>SNMP agent generation</td>
</tr>
<tr>
<td>AdventNet Agent toolkit</td>
<td>SNMP agent generation</td>
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<tr>
<td>AdventNet SNMP API</td>
<td>SNMP interfaces to agents</td>
</tr>
<tr>
<td>Monfox DynamicTMN</td>
<td>CMIP Manager/Agent toolkit</td>
</tr>
<tr>
<td>Java Server Pages</td>
<td>Generation of dynamic contents</td>
</tr>
<tr>
<td>Javabeans</td>
<td>Web based Management</td>
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<tr>
<td>SNIA CIMOM</td>
<td>WBEM implementation</td>
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## Further Information

<table>
<thead>
<tr>
<th>Tools Used</th>
<th>WWW Address</th>
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<tr>
<td>CIM</td>
<td><a href="http://www.dmtf.org/download/specs/CIM">http://www.dmtf.org/download/specs/CIM</a></td>
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Questions & Answers