



Adaptive Services Framework

IBM and Cisco Initiative for interoperable service and support systems

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Agenda

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- Brief history of fault management
- What's needed
- Review joint ASF efforts
- ASF standard interfaces
- The case of a Common information Model
- Cisco problem and fault management

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The Way It Was *Not so long ago!*

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- **Modest complexity**
(10^2 - 10^4 elements / system)
- **Single system and network vendor**
(little if any connectedness between systems)
- **Single, controlled architecture**
(one de facto standards authority)
- **Well defined system states**
- **Well defined state change messages**

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The Open-Systems Explosion

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- **Great complexity**
(10^5 - 10^6 elements / system)
- **Multiple vendors – for each element of the system:**
Servers, workstations, network elements, software
- **Multiple architectures for each domain**
- **Multiple standards authorities**
- **Limited scope of knowledge of system states**
- **Multiple poorly defined state change messages**
- **Management by educated guess!**
(event correlation, rules, AI, etc.)

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Remediation – Can we go back?

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- **Non-reversible:**
 - Complexity
 - Number of vendors
 - Number of architectures
- **Indeterminate**
 - Number of standards authorities
- **Reversible:**
 - Control of ability to share system knowledge, system state
 - Syntax, semantics, transport of state-change messages, events

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What's Needed

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- **A way to learn what the overall system is**
 - What elements make up the system?
 - How are they connected?
 - What are the dependency relationships?
 - What are the states of each element?
 - How do we detect and effect state changes?
- **A way to allow management systems to communicate about the management environment**
 - Semantics, syntax, transport
- **Flexible standards for all of the above**

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Elements of Autonomic Computing

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1. First Element of Autonomic Computing: system "know thyself"

System identity, knowledge at many levels, current status, ultimate capacity, and all connections to other systems to govern itself..

2. An autonomic computing system cannot exist in a hermetic environment

While independent in its ability to manage itself, it must function in a heterogeneous world and implement open standards -- in other words, an autonomic computing system cannot, by definition, be a proprietary solution.

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Introduction to ASF

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- Partnership between Cisco and IBM
- Focused on service automation standardization
- Based on autonomic computing principles

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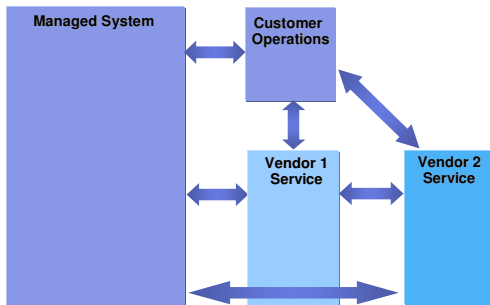
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The Service Problem

Division of Responsibility

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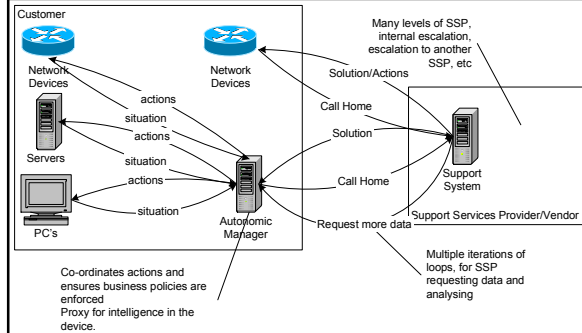
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A Simple View of ASF

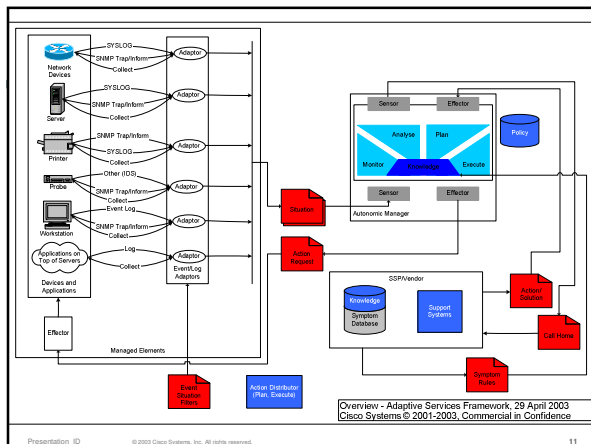
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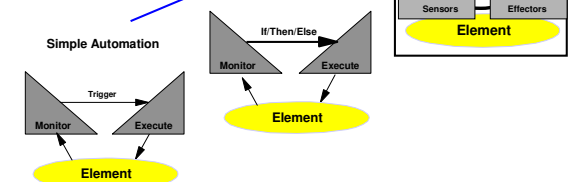
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Automation versus an Autonomic Architecture

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An **autonomic element** contains a continuous control loop that monitors activities and takes actions to adjust the system to meet business objectives

Autonomic elements learn from past experience to build action plans



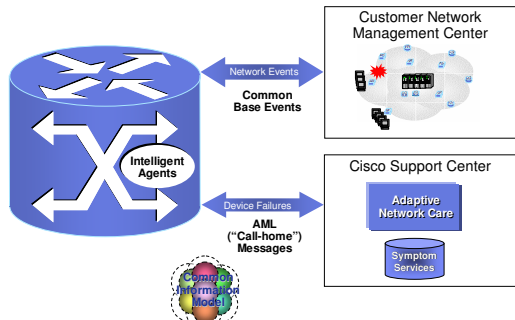
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Driving Intelligence Into The Network

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Components of ASF for Standardisation

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- Call Home Format
- Situations -> Common Base Events
 - Canonical Situations (a means of correlation, grouping and viewing events and logs)
- Common Situation Filter Format
- Common Action Format
 - Canonical Actions
 - Corrective Actions
- Common Symptom Format
- Adaptive Message Language (next gen MML)

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Adaptive Services Framework Whitepaper

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Adaptive Services Framework Whitepaper – Cisco

http://www.cisco.com/application/pdf/en/us/guest/partners/partners/c644/cmigration_09186a008020d c7.pdf

Adaptive Services Framework Whitepaper – IBM

http://www-3.ibm.com/autonomic/pdfs/Cisco_IBM_ASF_100.pdf

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Q and A

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Backup Slides

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Sample Call Home Message

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Basic Structure:

```
<mml>
  <header>
    <type>Call Home</type>
  </header>
  <body />
  <attachments />
</mml>
```

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MML Header

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```
<header>
  <time>2004-06-08T14:51:59</time>
  <name>LINECARD_FAILURE</name>
  <type>Call Home</type>
  <level>7</level>
  <source>MDS9000</source>
  <priority>2</priority>
  <deviceId>DS-C9216-K9@C@FOX071005UF</deviceId>
  <contractId>2261097</contractId>
  <serverId>DS-C9216-K9@C@FOX071005UF</serverId>
</header>
```

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MML Body

```
<body>
  <msgDesc>module 2 three consecutive failure
  encountered</msgDesc>
  <sysName>ams-bsh-sw1</sysName>
  <sysContact>storage-admin@cisco.com</sysContact>
  <sysContactEmail>storage-admin@cisco.com</sysContactEmail>
  <sysContactPhoneNumber>+408-527-0007</sysContactPhoneNumber>
  <sysStreetAddress>Kabelweg 39-47 1014BA Amsterdam The
  Netherlands</sysStreetAddress>
  <chassis>
    <name>DS-C9216-K9</name>
    <serialNo>FOX071005UF</serialNo>
    <partNo>73-8294-02</partNo>
    <hwVersion>1.0</hwVersion>
    <swVersion>1.3 (4a)</swVersion>
  </chassis>
  <nvp>
    <name>process_name</name>
    <value>Platform Manager</value>
  </nvp>
</body>
```

MML Attachments

```
<attachments>
  <attachment>
    <name>show tech-support</name>
    <type>command output</type>
    <mime>text/plain</mime>
    <atData>

`show version`
Cisco Storage Area Networking Operating System (SAN-OS) Software
TAC support: http://www.cisco.com/tac
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distributed under license. Some parts of this software are covered
under the GNU Public License. A copy of the license is available
at http://www.gnu.org/licenses/gpl.html.

--snip--

  </atData>
</attachment>
</attachments>
```

Sample CBE from syslog

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Mar 24 08:44:53 bgp-peer1 5949993: May 14 04:44:53: %BGP-5-ADJCHANGE:
neighbor 192.168.1.1 Down - Peer closed the session

Mar 24 08:46:47 bgp-peer1 5950409: May 14 04:46:47: %BGP-5-ADJCHANGE:
neighbor 192.168.1.1 Up

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```
<CommonBaseEvent observerTime="2004-03-24T08:44:53.02" extensionName="BGP_Neighbor_Down"
version="2.0">
  <affectedComponentId componentAddressType="HostAddressType">
    <componentType name="SystemName"/>
    <componentAddress xsi:type="HostAddressType">
      <hostname>bgp-peer1</hostname>
    </componentAddress>
  </affectedComponentId>

  <reporterComponentId componentAddressType="HostAddressType">
    <componentData application="syslog-parse3.pl" executionEnvironment="Windows"/>
    <componentType name="SystemName"/>
    <componentAddress xsi:type="HostAddressType">
      <hostname>keithspc</hostname>
    </componentAddress>
  </reporterComponentId>

  <situation reporterSeverity="2" reporterPriority="2" categoryName="AvailableSituation">
    <situationData localInstanceId="bgp-peer1FF1080081893FF5949993">
      <msg>%BGP-5-ADJCHANGE: neighbor 192.168.1.1 Down - Peer closed the session</msg>
      <sequenceNumber>5949993</sequenceNumber>
      <extendedDataElements name="neighbor" type="string">
        <values>192.168.1.1</values>
      </extendedDataElements>
    </situationData>
    <situationType reasoningScope="External" xsi:type="AvailableSituation">
      <operationDisposition>DOWN</operationDisposition>
      <processingDisposition>FUNCTION_BLOCK</processingDisposition>
      <availabilityDisposition>NOT_AVAILABLE</availabilityDisposition>
    </situationType>
  </situation>
</CommonBaseEvent>
```

```
<CommonBaseEvent observerTime="2004-03-24T08:46:47.02" extensionName="BGP_Neighbor_Up"
version="2.0">
  <affectedComponentId componentAddressType="HostAddressType">
    <componentType name="SystemName"/>
    <componentAddress xsi:type="HostAddressType">
      <hostname>bgp-peer1</hostname>
    </componentAddress>
  </affectedComponentId>

  <reporterComponentId componentAddressType="HostAddressType">
    <componentData application="syslog-parse3.pl" executionEnvironment="Windows"/>
    <componentType name="SystemName"/>
    <componentAddress xsi:type="HostAddressType">
      <hostname>keithspc</hostname>
    </componentAddress>
  </reporterComponentId>

  <situation reporterSeverity="1" reporterPriority="1" categoryName="AvailableSituation">
    <situationData localInstanceId="bgp-peer1FF1080082007FF5950409">
      <msg>%BGP-5-ADJCHANGE: neighbor 192.168.1.1 Up</msg>
      <sequenceNumber>5950409</sequenceNumber>
      <extendedDataElements name="neighbor" type="string">
        <values>192.168.1.1</values>
      </extendedDataElements>
    </situationData>
    <situationType reasoningScope="External" xsi:type="AvailableSituation">
      <operationDisposition>UP</operationDisposition>
      <processingDisposition>FUNCTION_BLOCK</processingDisposition>
      <availabilityDisposition>AVAILABLE</availabilityDisposition>
    </situationType>
  </situation>
</CommonBaseEvent>
```