

Simple LDAP Schemas for Grid Monitoring

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1

Motivation

- Provide a relatively simple set of object classes
- Deploy an LDAP server
- Gain experience

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2

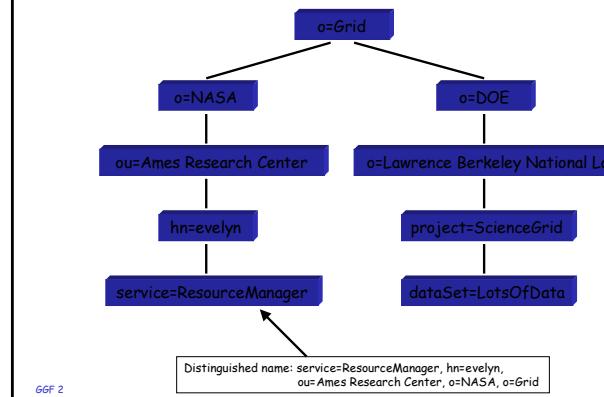
LDAP

- Protocol to access directory services
- Defines format of data
 - Each object is a set of <name, value> pairs
 - Each object is an instance of one or more types called object classes
 - Objects organized in a tree called the directory information tree (DIT)
 - Objects named by their position in the tree

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3

LDAP Directory Information Tree



Information in Directory Service

- Event schemas
 - Defined by the Grid Forum and individual projects
- Producer information
 - So that consumers can find them
- Consumer information
 - So that producers can find them
 - Useful for archives
- No event information
 - Events go directly from producers to consumers

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5

Event Schema

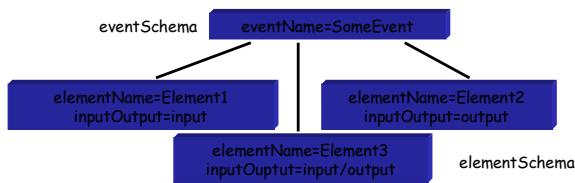
- Name
- Input and output element name spaces
- One or more element schemas
 - Name
 - Type
 - Description
 - Default units and accuracy
 - Input, output, or both

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6

Event Schema Sub-Tree

- 2 object classes
 - eventSchema
 - eventElement



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7

eventSchema Object Class

Name	Type	Required or Optional	Number of Values	Description
eventName	String	Required	1	The name of the event this type applies to.
inputNameSpace	String	Required	1	The name space used for the parameters specified when requesting an event, the input.
outputNameSpace	String	Required	1	The name space used for the event, the output.
description	String	Optional	1	A description of this event type.

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8

elementSchema Object Class

Name	Type	Required or Optional	Number of Values	Description
elementName	String	Required	1	The name of the element.
type	String	Required	1	The type of the element (char, int, float, string, ...).
units	String	Optional	1	The default units for the element.
accuracy	String	Optional	1	The default accuracy for the element
minOccurrences	Integer	Optional	1	The minimum number of times this element must appear in the event it is associated with.
maxOccurrences	Integer	Optional	1	The maximum number of times this element can appear in the event it is associated with.
inputOutput	String	Required	1	If the element is used in the parameters specified when requesting an event (input), the event itself (output), or both.
description	String	Optional	1	A textual description of the element.

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9

Example Event Input & Output

Subscribe

EventName: Ping
 NameSpace: <http://www.gridforum.org/Performance/EventParameters>
 Period: 600 seconds
 TargetHostName: bar.lbl.gov

Event

EventName: Ping
 NameSpace: <http://www.gridforum.org/Performance/Events>
 SourceHostName: foo.nas.nasa.gov
 TargetHostName: bar.lbl.gov
 TurnAroundTime: 13 ms
 TimeStamp: 2000-11-09T21:53:45Z

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10

Example Event Schema

dn: eventName=Ping, ou=Performance Working Group, o=Grid Forum, o=Grid
 eventName: Ping
 inputNameSpace: <http://www.gridforum.org/Performance/Events>
 outputNameSpace: <http://www.gridforum.org/Performance/EventParameters>
 description: The round trip time between two hosts.

dn: elementName=TargetHostName, eventName=Ping, ou=Performance ...
 elementName: TargetHostName
 type: string
 minOccurrences: 1
 maxOccurrences: 1
 inputOutput: input/output
 description: The name of the host to ping.

dn: elementName=Period, eventName=Ping, ou=Performance ...
 elementName: Period
 type: integer
 minOccurrences: 0
 maxOccurrences: 1
 inputOutput: input
 description: How often to send the measurement.

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11

Example Event Schema II

dn: elementName=SourceHostName, eventName=Ping, ou=Performance ...
 elementName: SourceHostName
 type: string
 minOccurrences: 1
 maxOccurrences: 1
 inputOutput: output
 description: The name of the host that performed the ping.

dn: elementName=RoundTripTime, eventName=Ping, ou=Performance...
 elementName: RoundTripTime
 type: integer
 minOccurrences: 1
 maxOccurrences: 1
 inputOutput: output
 description: The round trip time of the ping.

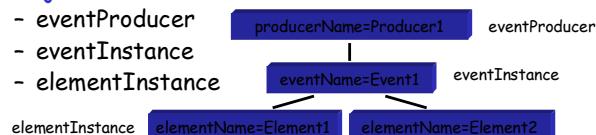
dn: elementName=TimeStamp, eventName=Ping, ou=Performance ...
 elementName: TimeStamp
 type: string
 minOccurrences: 1
 maxOccurrences: 1
 inputOutput: output
 description: The time the measurement was performed.

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12

Producer Information

- Where to contact the producer
- What protocol to use
 - Transport: TCP, UDP, SSL
 - Encoding: Simple XML, SOAP
- Events provided
 - Inputs & Outputs
- Object classes:
 - eventProducer
 - eventInstance
 - elementInstance



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13

eventProducer Object Class

Name	Type	Required or Optional	Number of Values	Description
producerName	String	Required	1	A unique name for this event producer under the entity where it sits in the DIT.
hostName	String	Required	1	The host name the producer is running on.
port	Unsigned Integer	Required	1	The port the producer is listening to.
protocol	String	Required	1+	A protocol that the consumer supports in the form of a URI. This URI is of the form http://<defining organization info>/<protocol name>/<protocol version>.
description	String	Optional	1	A textual description of the event producer.

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14

eventInstance Object Class

Name	Type	Required or Optional	Number of Values	Description
instanceName	String	Required	1	The name of this event instance. There may be multiple instances of the same event available from a producer so the eventName cannot be used as the unique name in the DIT.
eventName	String	Required	1	The name of the event.
inputNameSpace	String	Required	1	The name space used for the "input": the parameters specified when requesting the event.
outputNameSpace	String	Required	1	The name space used for the "output": the event and the elements of the event.
eventLocation	String	Required	1	The location of the schema for the event in the LDAP DIT.

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15

elementInstance Object Class

Name	Type	Required or Optional	Number of Values	Description
elementName	String	Required	1	The name of the element.
relation	String	Optional	1	The relation of the value in the event or event parameters to the value provided in the value attribute. The possible relations are =, !=, <, <=, >, and >=.
value	String	Optional	1	The value of this element in every event that is generated that matches this instance.
units	String	Optional	1	The units for the value.
accuracy	String	Optional	1	The accuracy of the value.
inputOutput	String	Required	1	If this element is for input, output, or input/output.

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16

Example Producer

```
dn: producerName=HostMonitor, hostName=turing.nas.nasa.gov, ...
hostName: turing.nas.nasa.gov
port: 1234
protocol: http://www.gridforum.org/Performance/ProducerConsumerProtocol/XML/b1.0
description: A host monitor.

dn: instanceName=Ping1, producerName=HostMonitor, hostname=turing ...
instanceName=Ping1
eventName: Ping
inputNameSpace: http://www.gridforum.org/Performance/EventParameters
outputNameSpace: http://www.gridforum.org/Performance/Events
eventLocation: eventName=Ping, ou=Performance Working Group, o=GridForum, ...

dn: elementName=SourceHostName, instanceName=Ping1,
producerName=HostMonitor, hostName=turing.nas.nasa.gov, ...
elementName: SourceHostName
relation: =
value: turing.nas.nasa.gov
inputOutput: input/output
```

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17

Example Producer II

```
dn: elementName=TargetHostName, instanceName=Ping1,
producerName=HostMonitor, hostName=turing.nas.nasa.gov, ...
elementName: TargetHostName
relation: =
value: *.nas.nasa.gov
inputOutput: input/output

dn: elementName=Period, instanceName=Ping1,
producerName=HostMonitor, hostName=turing.nas.nasa.gov, ...
elementName: Period
relation: >=
value: 60
units: seconds
inputOutput: input
```

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18

Consumer Information

- Not defined with as much detail
 - Don't have much experience yet
- Where to contact the consumer
- What protocol to use
- Object class: eventConsumer

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19

eventConsumer Object Class

Name	Type	Required or Optional	Number of Values	Description
consumerName	String	Required	1	A unique name for this event consumer under the entity where it sits in the DIT.
hostName	String	Required	1	The host name the consumer is running on.
port	Integer	Required	1	The port the consumer is listening to.
protocol	String	Required	1+	A protocol that the consumer supports in the form of a URL.
description	String	Optional	1	A textual description of the event producer.

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20

Directory Information Tree

- Tree formed using organizations rooted at o=Grid
 - ou=Performance Working Group, o=Grid Forum, o=Grid
 - ou=Ames Research Center, o=NASA, o=Grid
 - "dc" naming scheme better?
 - dc=nas, dc=nasa, dc=gov, o=Grid
- Event schemas
 - Under the organization that defines them
- Producers
 - Under the host it runs on or the organization it runs in
- Consumers
 - Under the host it runs on or the organization it runs in

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21

Status & Future Work

- Schema loaded into LDAP server in GMA testbed
- A few event schemas defined
- Try it out - see GMA testbed web page for how
- Refine schema
 - Any suggestions?

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22