Information Services for Replica Management

Brief Tutorial on R-GMA Usage

Heinz.Stockinger@cern.ch

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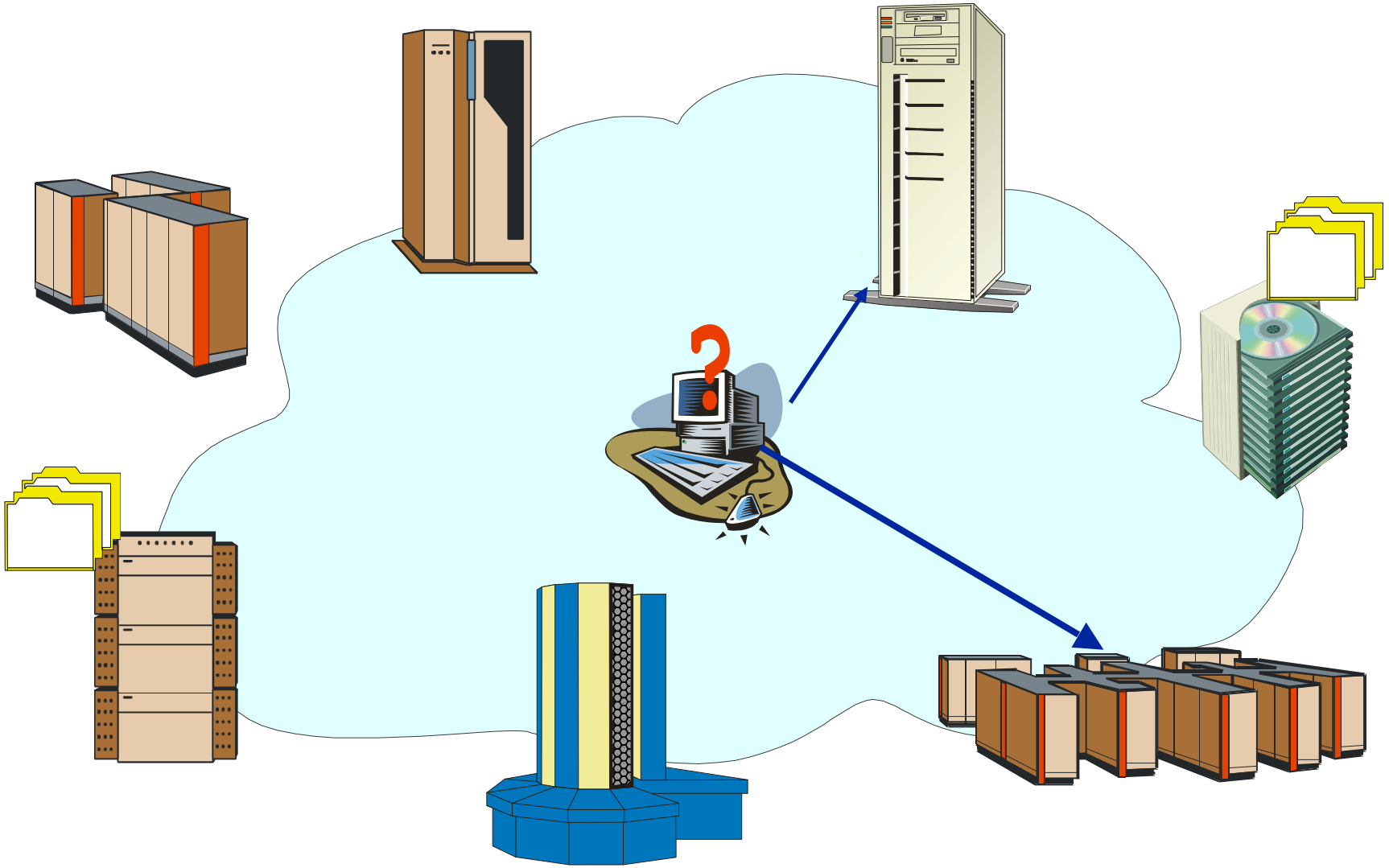
Outline

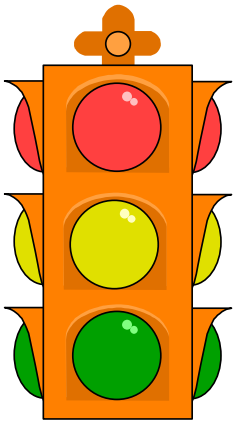
- Information Service + Reptor
- RGMA
  - Consumer
  - Producer
  - Registry
- Schema Details
  - what do we need to add
  - Use GLUE in the future

Information in the Grid



Introduction

- Currently (testbed version 1.4.3) we use **MDS**
  - LDAP based information service (IS)
- edg-replica-manager (2.0.x) queries MDS for:
  - SEs, VOs and dedicated VO directories on SE
  - **ldapsearch -x -l 30 -L -h lxshare0393.cern.ch -p 2135 -b 'mds-vo-name=local,o=grid' 'objectclass=*'**
- MDS has several problems as pointed out by EDG
- **R-GMA** shall replace MDS soon
  - we expect that R-GMA "works"



What do we need from IS?

- Information about StorageElements:
  - available SEs
  - supported VOs
  - storage space (will be hidden when SRM is in place)
- Information about ComputingElements
- Other Services:
  - RLS
  - Optor
  - RMC

Reptor + Information Services

- configurable Information Service (IS) interface:
  - class.infoService=org.edg.data.reptor.info.InfoServiceStub
    - static configuration file is required
  - class.infoService=org.edg.data.reptor.info.**RGMAInfoService**
    - retrieve information dynamically from R-GMA
- easily extensible to add any other IS
- R-GMA is currently the main IS
- MDS can be added easily but already done through R-GMA

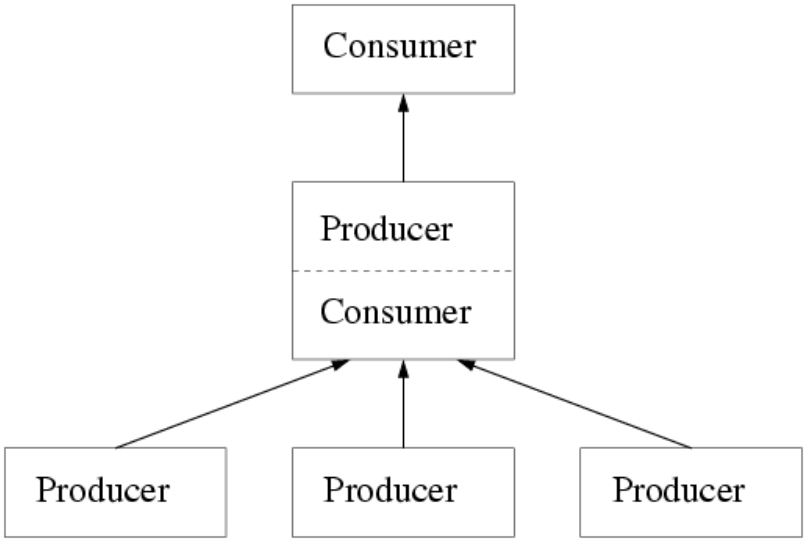
Information Services

R-GMA

Schema - Details

R-GMA

- Relational Grid Monitoring Architecture (R-GMA)
  - developped by WP3 - based on GMA standard



  - http://hepunx.rl.ac.uk/edg/wp3/documentation/

What do we use from R-GMA?

- Reptor currently uses the following tables that are equivalent to MDS objects:
  - StorageElement
  - StorageElementProtocol
  - StorageElementLinkingTable
  - ComputingElement
  - CloseStorageElement
- new:
  - ReplicaLocationService
  - ReplicaOptimizer
  - ReplicaMetadataCatalog

How do I query R-GMA ?

- Use SQL:
  - `select seId from StorageElement;`
- **API**s (Java, C++, Perl etc.)
- **Command line interface** (similar to MySQL)
  - Supports single query and interactive modes
- **R-GMA Broswer** via web:
  - JSP application dynamically generating web pages
  - Supports pre-defined and user-defined queries
- **Pulse**: Client Java GUI

Where can I use R-GMA ?

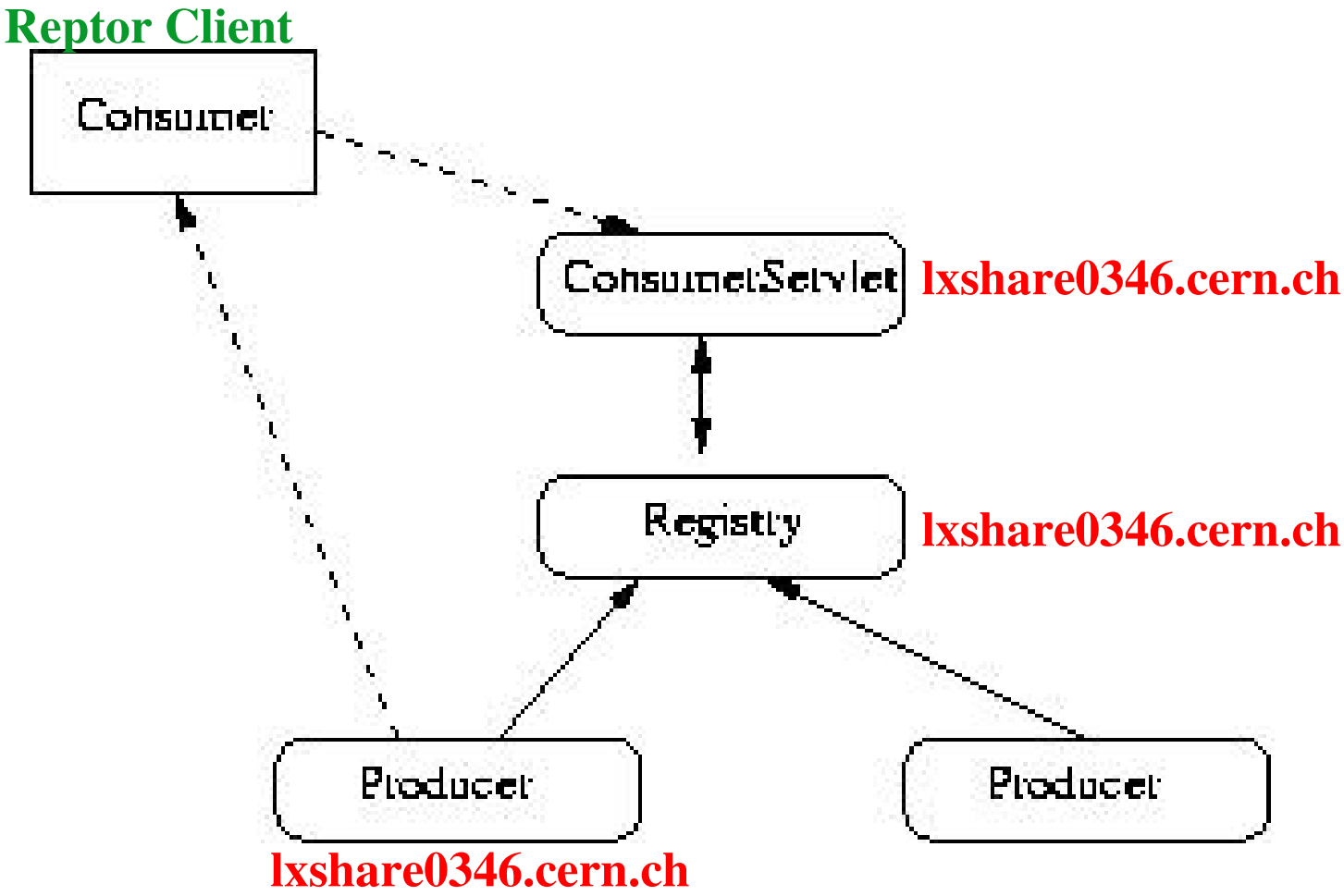
- R-GMA Producer for WP2:
  - server runs on **lxshare0346.cern.ch**
- **Client** software:
  - WP2_HOME/wp3
  - edg-replica-manager.conf:
    - class.infoService=org.edg.data.reptor.info **RGMAInfoService**
  - use it on any machine with WP2 sw (e.g. AFS)
- Reptor contains a preliminary test program:
  - **edg-rm test**

    R-GMA tests ...

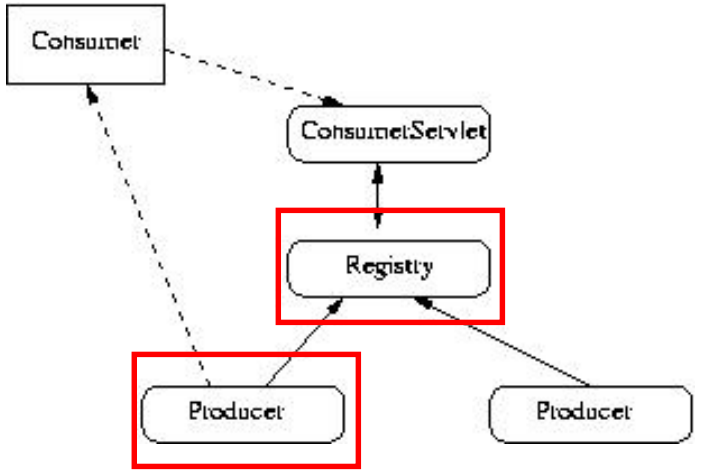
    * RLS: lxshare0342.cern.ch

    * ROS: lxshare0343.cern.ch
- R-GMA documentation also in Reptor User Guide

Reptor – R-GMA and WP2 testbed

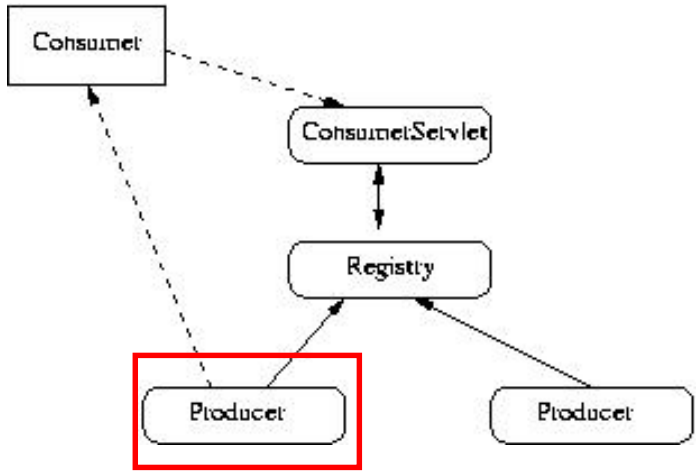


R-GMA Producer - 1



- MySQL DB backend
- 3 main databases:
  - schema
  - registry (for R-GMA registry)
  - rgma (actualdata - can have any name)
- Example producer:
  - http://ppewww.ph.gla.ac.uk/cgi-bin/cvsweb.cgi/edg-reptor/test/java/rgma/RGMAServer.java

R-GMA Producer - 2




```
static DataBaseProducer myProducer = null;

myProducer = new DataBaseProducer("jdbc:mysql://lxshare0346:3306/rgma",
   "rgma","rgma");
```

```
myProducer.add("StorageElement","",0);

myProducer.add("ReplicaLocationService","",0);
```

Tables and Schema

```
mysql> connect schema;
Connection id:    6360
Current database: schema

mysql> show tables;
+----------------+
| Tables_in_schema |
+----------------+
| info           |
| producerTables |
| tableColumns   |
+----------------+
3 rows in set (0.00 sec)
```

StorageElement
Computing Element
CloseStorageElement

Creating Tables:

```
use rgma
create table StorageElementProtocol
(dn VARCHAR(100), seProtocol
VARCHAR(100)
```

test/java/rgma/createTables.sql

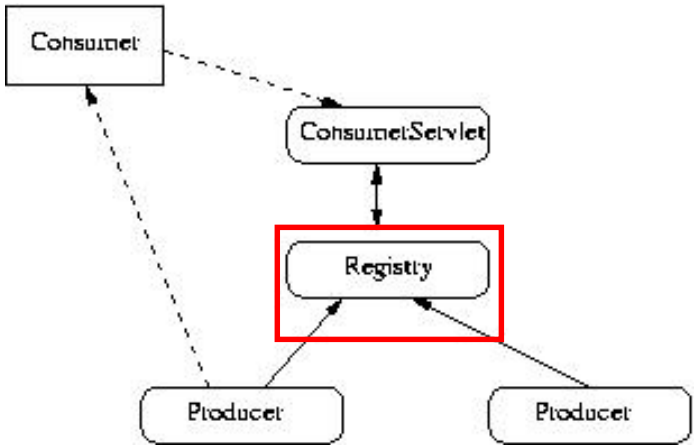
Adding Schema to Producer

- Every new schema item (table) has to be added to:
  - schema database
    - tables producerTable and possible tableColums

```
insert into producerTables (tableId, name, attributes, description,
keyword1, keyword2, keyword3)
values ('32','ReplicaMetadateCatalog','',
'ReplicaMetadateCatalog for Replica Manager','key1','key2','key3');

insert into tableColumns (columnId, tableId, name, type, attributes,
  description)
values ('252','30','URL','VARCHAR(250)','0','Service URL');
```

R-RGMA Registry



- contains information about
  - all registered producers
  - and the producer tables

producerId	tableId	flags	URL	connectionId	clientTimeStamp	terminationTime
469	31	0	http://lxshare0346:8080/R-GMA/DBProducerServlet	16	1044980834208	1044981732500
471	12	0	http://lxshare0346:8080/R-GMA/DBProducerServlet	16	1044980834208	1044981732500
470	32	0	http://lxshare0346:8080/R-GMA/DBProducerServlet	16	1044980834208	1044981732500
468	30	0	http://lxshare0346:8080/R-GMA/DBProducerServlet	16	1044980834208	1044981732500
467	16	0	http://lxshare0346:8080/R-GMA/DBProducerServlet	16	1044980834208	1044981732500
466	18	0	http://lxshare0346:8080/R-GMA/DBProducerServlet	16	1044980834208	1044981732500
465	22	0	http://lxshare0346:8080/R-GMA/DBProducerServlet	16	1044980834208	1044981732500
464	17	0	http://lxshare0346:8080/R-GMA/DBProducerServlet	16	1044980834208	1044981732500

Information Services

R-GMA

Schema - Details

New Schema Items – 1

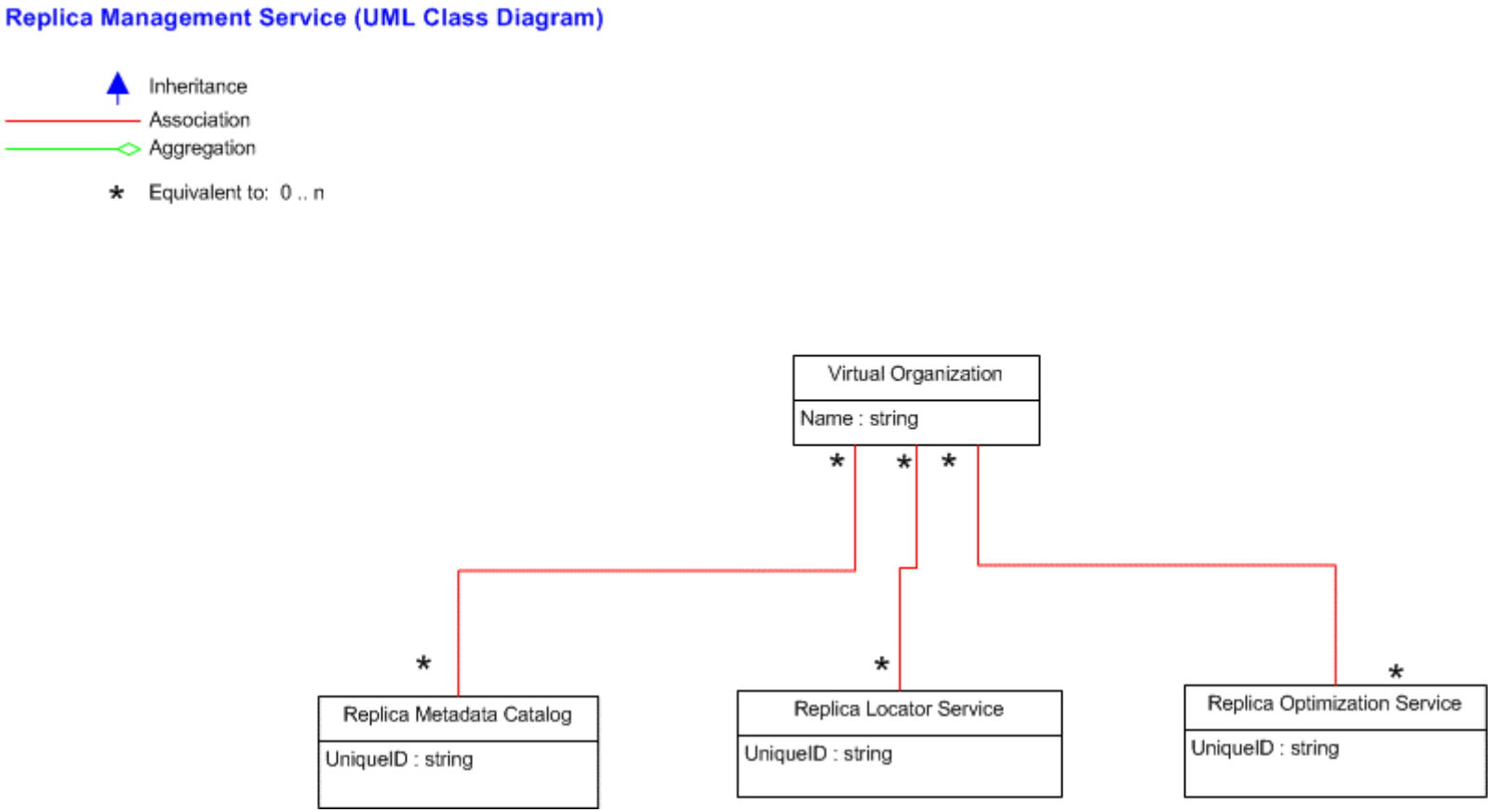
- ReplicaLocationService
- ReplicaOptimizer
- ReplicaMetadataCatalog

- all have the following attributes in common (currently):
  - VO, URL

- Need to get agreement with GLUE + R-GMA

New Schema Items – 2

- UML Diagram from Sergio:



GLUE – What is new ?

- Need to add schema items
- some differences in schema
- new terminology (also SRM is taken into account)
- Sergio's talk will give us all details