GIN-Data : SRM Island
Inter-Op Testing
With SRM-TESTER

Alex Sim, Vijaya Natarajan
Computational Research Division
Lawrence Berkeley National Laboratory

Goals

- **Demonstrate data access to independent data grids managed by SRMs**
  - Read access to a file in a remote data grid
  - Write access to a registered user account in a remote data grid
  - A file replication for a registered user between two independent data grids
  - Space reservation and write access to the reserved space for a registered user in a remote data grid (for SRM V2.1)

Why do we need inter-op testing for SRMs?

- **Storage Resource Managers (SRMs) are based on a common interface specification.**
  - SRMs can have different implementations for the underlying storage systems.
  - Compatibility and interoperability need to be tested according to the specification.
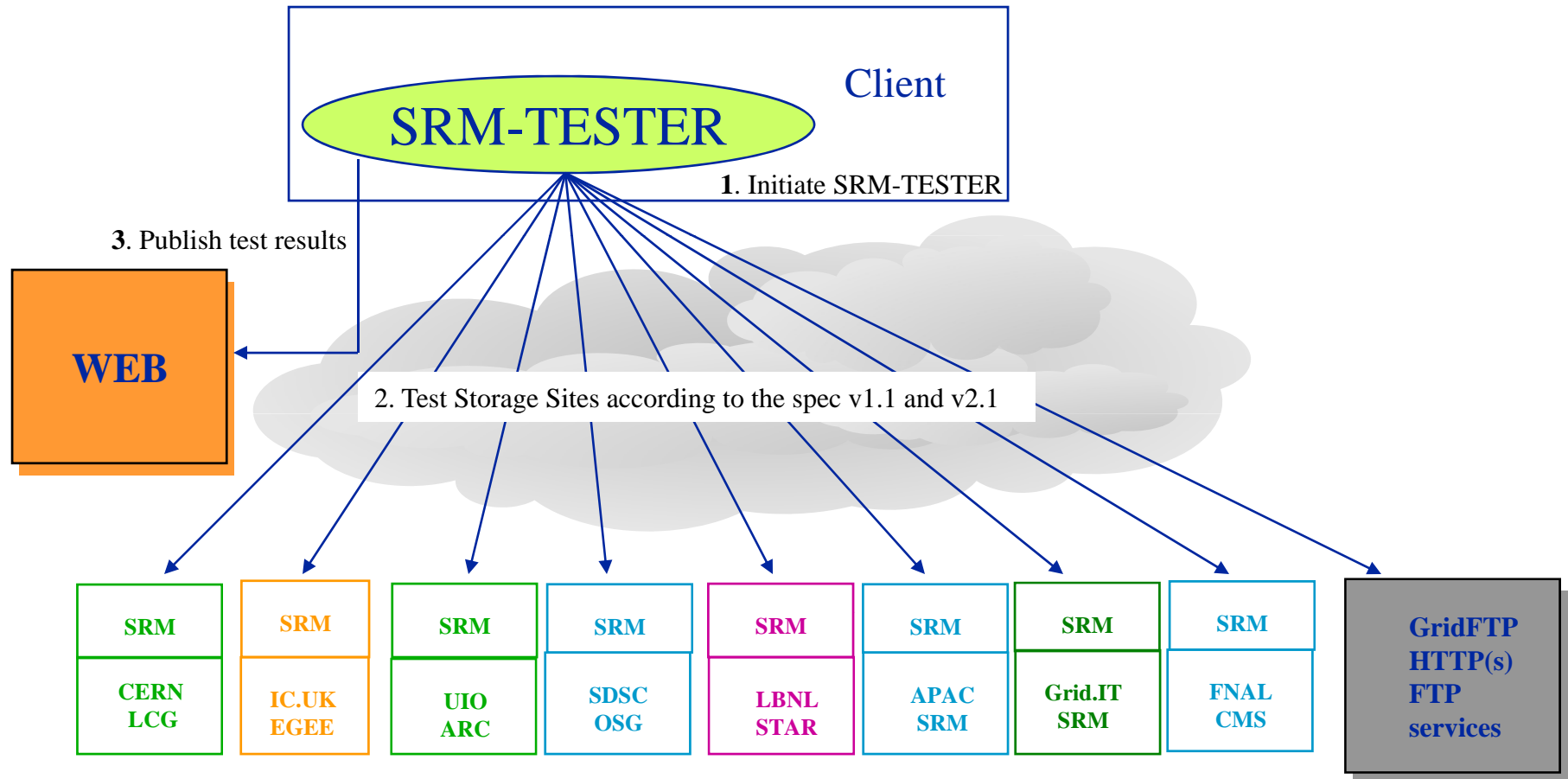
What is SRM-TESTER?

- **SRM-Tester tests Storage Sites managed by SRMs**
  - **Independent implementation of SRM specification for the purpose of testing**
    - **Tests conformity of the SRM server interface according to the SRM spec v1.1 and v2.1**
    - **Tests compatibility and interoperability of the SRM servers according to the SRM spec**
  - **Supported operations for v1.1**
    - **ping, put, get, advisory delete, copy**
  - **Supported operations for v2.1**
    - **ping, put, get, copy, reserve space, release, remove, etc.**
- **SRM-Tester tests file transfer protocols**
  - **Supported protocols**
    - **gsiftp, ftp, http and https**
- **SRM-Tester can publish the testing results to a web site**
- **Supports from**
  - **Open Science Grid**
  - **PPDG common project**

GIN-Data SRM inter-op testing

Client

SRM-TESTER

1. Initiate SRM-TESTER

3. Publish test results

WEB

2. Test Storage Sites according to the spec v1.1 and v2.1

| SRM | SRM | SRM | SRM | SRM | SRM | SRM | SRM | GridFTP |
| CERN LCG | IC.UK EGEE | UIO ARC | SDSC OSG | LBNL STAR | APAC SRM | Grid.IT SRM | FNAL CMS | HTTP(s) FTP services |

GIN-Data SRM island testing

- **Which operations have been tested?**
  - **SRM v1.1**
    - ping, put, get, advisory delete, copy
  - **SRM v2.1**
    - ping, put, release file, get, get status, reserve space, release space, browsing (ls), copy
- **Test results are published**
  - **http://sdm.lbl.gov/srm-tester/ggf17.html**

Participating Sites

- **7 Sites participated**
  - 5 SRM V1.1 were tested
  - 2 SRM V2.1 were tested
  - SRMs at 2 sites were not ready at the time of the testing

- **APAC**
  - SRM is not ready due to undergoing SFT tests
- **ARC**
  - srm://grid.uio.no:58000
- **EGEE**
  - srm://gfe02.hep.ph.ic.ac.uk:8443
- **Grid.IT**
  - SRM is not installed publicly and not ready for testing
- **LCG/EGEE**
  - srm://lxdpm01.cern.ch:8443
  - srm://lxdpm01.cern.ch:8444 (SRM v2.1)
- **OSG**
  - srm://t2data2.sdsc.edu:8443
- **STAR**
  - srm://dmx09.lbl.gov:8443
  - srm://dmx09.lbl.gov:8445 (SRM v2.1)

Testing Operations (SRM V1.1) Description

- **Ping**
  - Tester checks to see if SRM server responds properly
  - GSI security may or may not be enforced

- **Put**
  - Tester writes a file into the SRM managed, VO specific directory from client's local disk
  - Tester checks the transfer protocol during the file transfers

- **Get**
  - Tester requests a file from the SRM managed, VO specific directory
  - When the file is ready, SRM returns TURL (Transfer URL) with transfer protocol.
  - Tester makes file transfers from the TURL to the client's local disk

- **Advisory Delete**
  - Tester requests to "remove" a file in the SRM managed, VO specific directory. This is advisory only.

- **Copy**
  - Tester requests to "replicate" a file from one SRM to another SRM
  - Tester requests to "replicate" a file from a remote gsiftp server to an SRM
  - Tester checks inter-operability between SRMs
  - In this test, SRMs are in separate independent data grids

Testing Operations (SRM V1.1) Results

	ping	put	get	Advisory delete	Copy (SRMs)	Copy (gsiftp)
EGEE (IC.UK)	pass	pass	pass	pass	pass	pass
LCG/EGEE (CERN)	pass	pass	pass	pass	N.A.	N.A.
OSG (SDSC)	pass	pass	pass	pass	pass	fail
STAR (LBNL)	pass	pass	pass	pass	pass	pass
ARC (UIO.NO)	pass	fail	fail	fail	fail	fail

- ## COPY (SRM) operation

  - ### SRM-Tester sends a request to the target SRM to "pull" a file from the source SRM.

    - After a copy request is submitted to the target SRM, communication thereafter is between the two SRMs. SRM-Tester checks the status of the copy request.

    - In this test, SRM at SDSC (OSG) and IC.UK (EGEE) were the source SRMs to copy a file to other SRMs

    - When the first copy test failed, SRM at FNAL was used as the source and target SRM for additional testing, and testing with srmcp client tool was performed.

  - ### A copy to SRM at CERN (LCG/EGEE)

    - The request goes through the interface, and the status shows request queued and in progress.

    - We were told that actual copy is not implemented yet.

- **COPY (GSIFTP) operation**
  - **SRM-Tester sends a request to the target SRM to pull a file from the source gsiftp server**
    - **In this test, gsiftp server based on GT4.0.1 at LBNL (STAR) was the source to copy a file to other SRMs**
    - **When the first copy test failed, gsiftp server based on GT 2.4.3 at LBNL (STAR) was used as the source for additional testing, for possible certificate format handling issues.**
  - **A copy to SRM at CERN (LCG/EGEE)**
    - **The request goes through the interface, and the status shows request queued and in progress.**
    - **We were told that actual copy is not implemented yet.**
  - **A copy to SRM at SDSC (OSG)**
    - **The status returned failure with no further explanation.**
    - **We were told that only "push" mode into the SRM at SDSC works due to the underlying storage inside the private network.**

- **SRM at ARC**
  - **Operations except "ping" failed**
    - **Throws exception**
      - **java.lang.NumberFormatException**
  - **SRMCP (v1.23) has the same error**
  - **NGCP (NorduGrid ARC standalone v0.5.46) works for operations except copy**
    - **ngcp does not handle different formats of certificates yet, such as service certificates**

Testing Operations (SRM V2.1) Description (1)

- **Ping**
- **Put**
  - Tester writes a file into the SRM managed, VO specific directory from client's local disk
  - Tester checks the transfer protocol during the file transfers
  - Tester issues srmPutDone() after file tranfer is completed
- **Get**
  - Tester requests a file from the SRM managed, VO specific directory
  - When the file is ready, SRM returns Transfer URL with transfer protocol.
  - Tester makes file transfers from the Transfer URL to the client's local disk
- **Release File**
  - Tester releases a file after file transfer is completed (following Get operation)
- **Browse (LS)**
  - Tester browses a file or a directory in the SRM managed, VO specific space

Testing Operations (SRM V2.1) Description (2)

- **Copy**
  - **Three different types of copy were tested**
    - **Request to "cp" a file from one space to another space in the same SRM.**
    - **Request to "replicate" a file from one SRM to another SRM.**
    - **Request to "replicate" a file from a remote gsiftp server to an SRM.**
- **Reserve Space**
  - **Tester requests to reserve a volatile or durable space under the SRM for an amount of byte size**
- **Get Status of the space reservation**
  - **Tester checks the status of the space with the space token received from the space reservation**
- **Put a file into the reserved space**
  - **Similar to "put" operation, but a specific space token is used**
- **Release space**
  - **Tester releases the reserved space with the space token.**

Testing Operations (SRM V2.1) Results

	ping	put	Put Done	get	Release File	Browse (LS)
LCG/EGEE (CERN)	pass	pass	pass	pass	pass	pass
STAR (LBNL)	pass	pass	pass	pass	pass	pass

	Copy	Reserve Space	Get status	Put a File In the Reserved Space	Release Space
LCG/EGEE (CERN)	N.A.	pass	pass	pass	pass
STAR (LBNL)	pass	pass	pass	pass	pass

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Testing Operations (SRM V2.1) Explanation on failure

- ## Copy operation
  - ### A Copy to SRM at CERN
    - The request goes through the interface, and the status shows request queued and in progress.
    - We were told that actual copy is not implemented yet.

Lessons learned

- ## Preparation
  - ### Setting up a VO (gin.ggf.org) access to the host and the VO designated account was error-prone
    - Email communication was needed with system people
    - Once it's set up, no problems

- ## SRM v1.1 operations
  - well-understood by most implementations
  - Compatible and interoperable between SRMs

- ## SRM v2.1 operations
  - ### Two participating implementations
    - CERN DPM and LBNL SRM
    - Compatible and interoperable between SRMs

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  - INFN : Vincenzo Ciaschini

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Documents and Support

- **Test results**
  - **http://sdm.lbl.gov/srm-tester/ggf17.html**

- **SRM Collaboration and SRM Specifications**
  - **http://sdm.lbl.gov/srm-wg**

- **SRM-Tester : Distribution/Documentation**
  - **http://sdm.lbl.gov/srm-dist**
  - **VDT pacman as srm-tester**

- **Contact and support : srm@lbl.gov**
  - **Alex Sim, Arie Shoshani**