The EDG Testbed

The European DataGrid Project Team

http://www.eu-datagrid.org

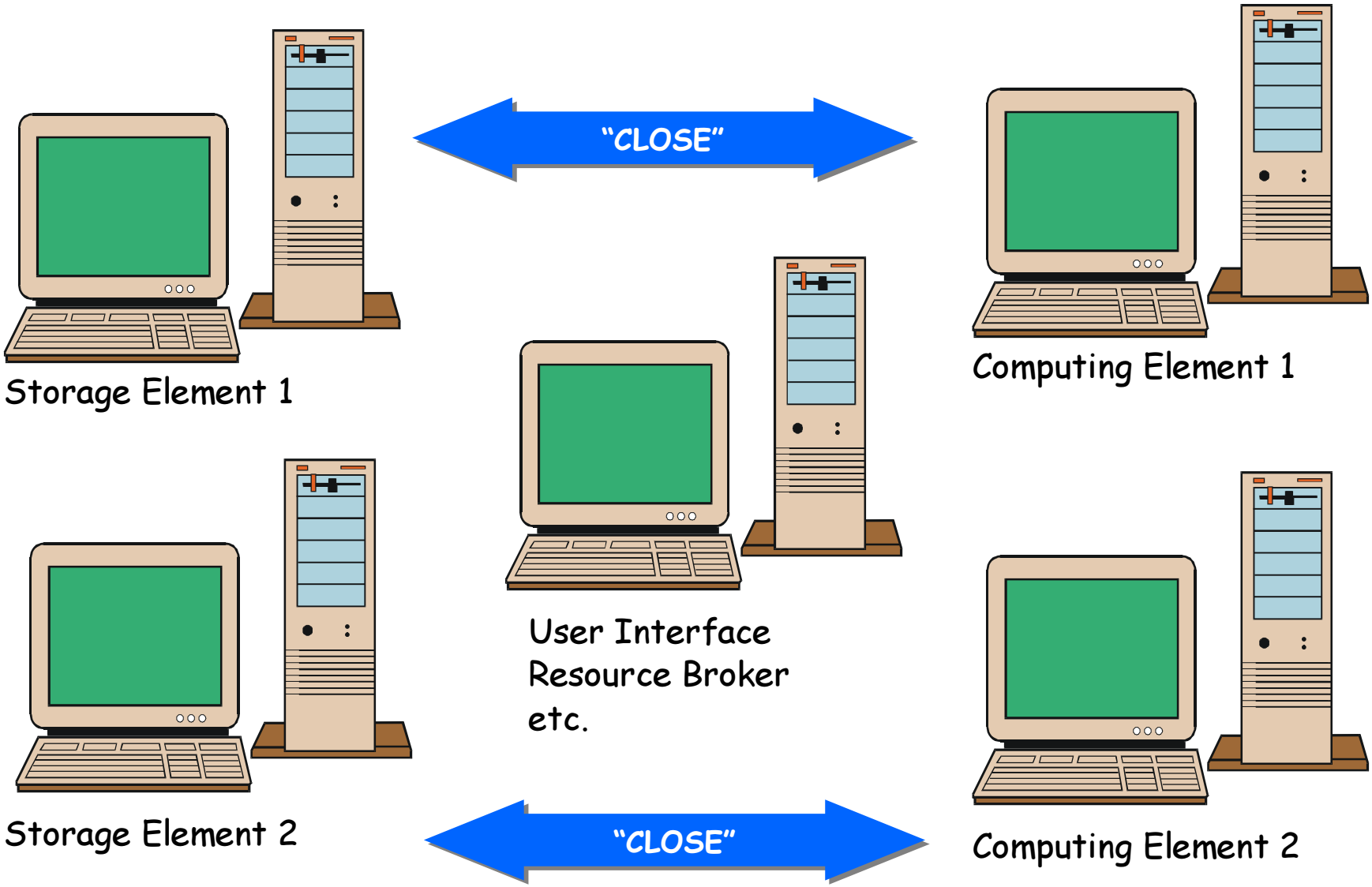
Contents

- Hardware Components of an EDG Testbed
- The EDG Testbed Configuration
- How to set up an EDG Testbed
  - Obtaining code
  - Configuring different machines

Some EDG Logical Machine Types

- User Interface (UI)
- Resource Broker (RB)
- Computing Element (CE)
  - Frontend Node
  - Worker Nodes (WN)
- Storage Element (SE)
- Information Catalog (IC)
- Monitoring (MON)

A Simple Testbed Configuration



Testbeds

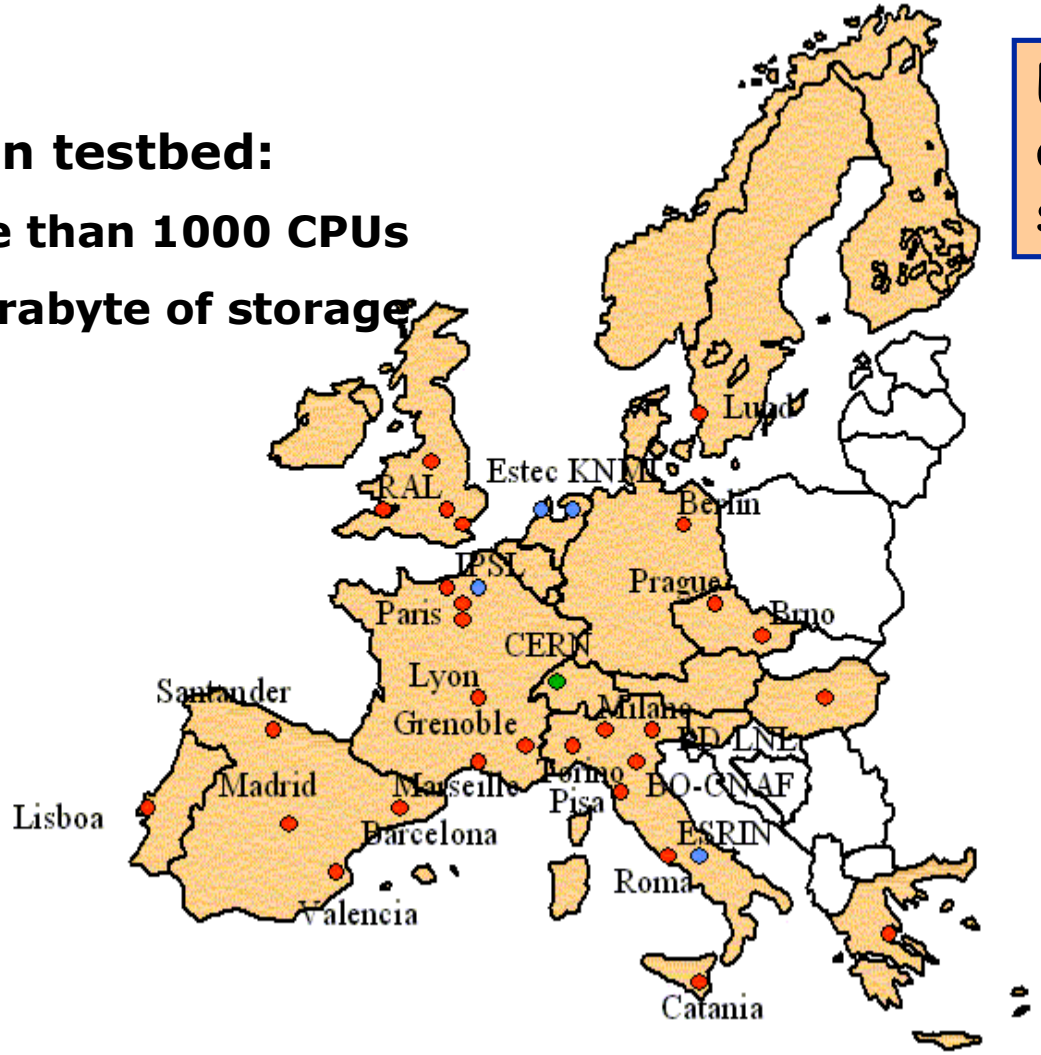
- Work Package Testbeds and development machines
  - Development versions
- Development Testbed: Integration & Evaluation of SW
  - Current tagged release + new pkg. → New tagged release.
- Certification Testbed: Extended, Detailed Testing
  - Tagged release
- Application Testbed: End-user Applications
  - Stable, certified release

DataGrid testbeds

Application testbed:

More than 1000 CPUs

5 Terabyte of storage



EDG sw installed at more than 40 sites

- Dubna
- Moscow

- HEP sites
- ESA sites

Application Testbed Resources

- All numbers are always out of date
- Hidden Infrastructure
  - Information and Monitoring
  - Resource Brokers
  - User Interfaces
  - VO Membership Servers
  - Certification Authorities

Site	Country	CPUs	Storage
CC-IN2P3*	FR	620	192 GB
CERN*	CH	138	1321 GB
CNAF*	IT	48	1300 GB
Ecole Poly.	FR	6	220 GB
Imperial Coll.	UK	92	450 GB
Liverpool	UK	2	10 GB
Manchester	UK	9	15 GB
NIKHEF*	NL	142	433 GB
Oxford	UK	1	30 GB
Padova	IT	11	666 GB
RAL*	UK	6	332 GB
SARA	NL	0	10000+ GB
TOTAL	5	1075	14969 GB

*also Dev. TB; +200 TB including tape

EDG Software Distribution

- All software available as source & binary RPMs
- Binaries for RedHat 7.3 with gcc 2.95.2 and 3.2.2
- Packages include
  - Complete Globus distribution (via VDT)
  - EDG packages (~50 packages)
  - Support tools (perl, ant, jdk, …)
- RPM lists for different machine types

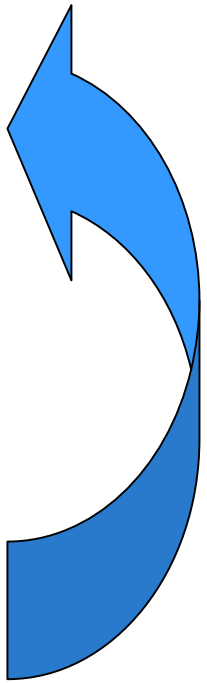
Automatic EDG Fabric Management

Setup Tasks

- Node Installation & Management
- Configuration Management

Runtime Tasks

- Monitoring & Fault Tolerance
- Resource Management

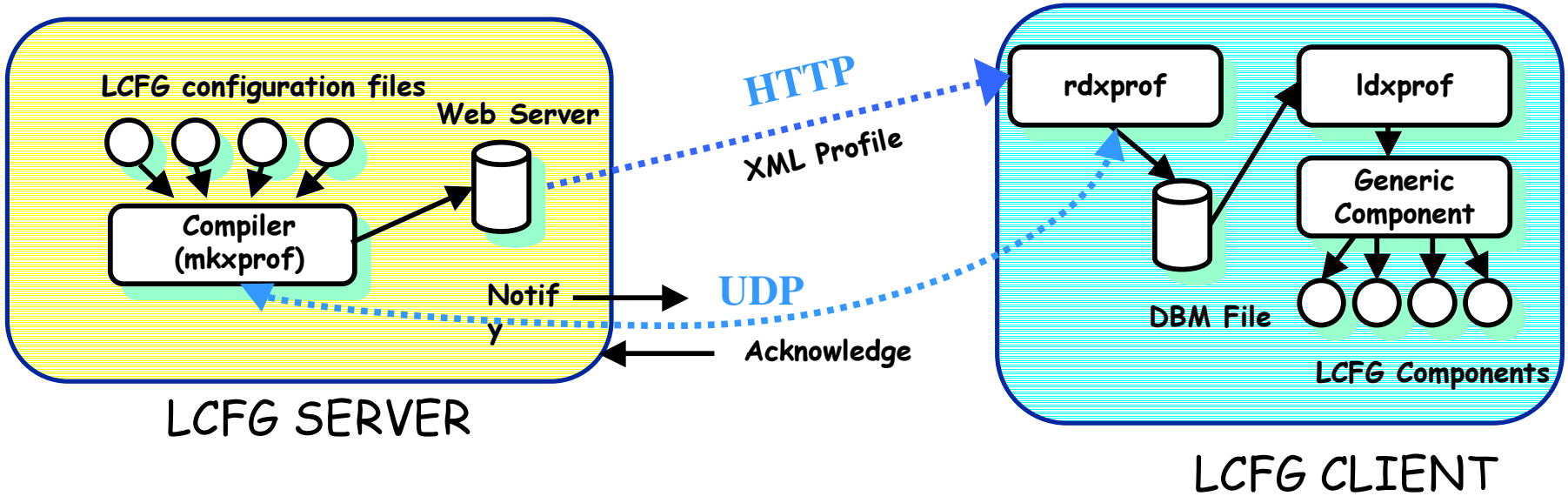


Runtime tasks may automatically trigger setup tasks

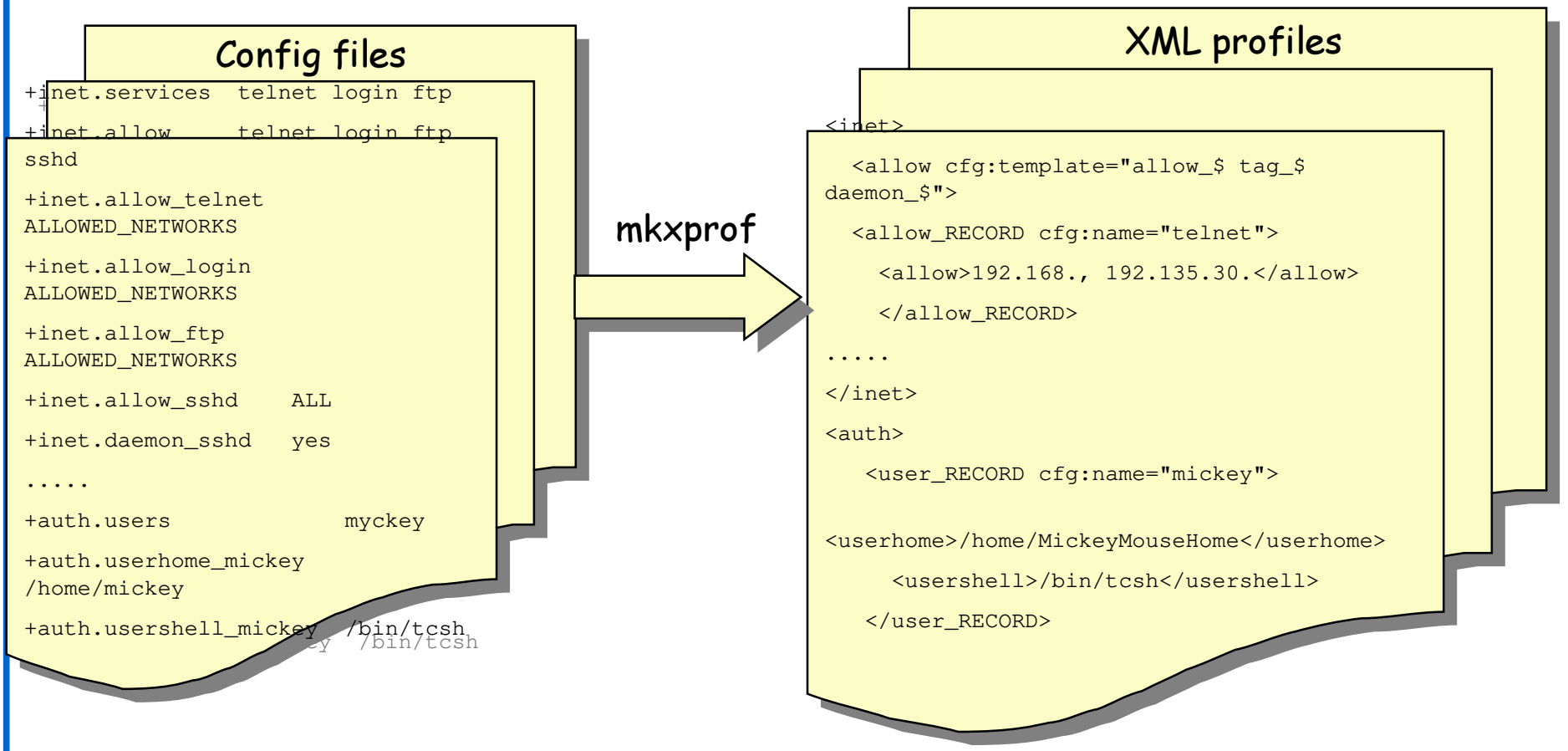
- New machines join the grid
- Failure detection/repair (e.g. restarting daemons)

LCFG (Local ConFiGuration system)

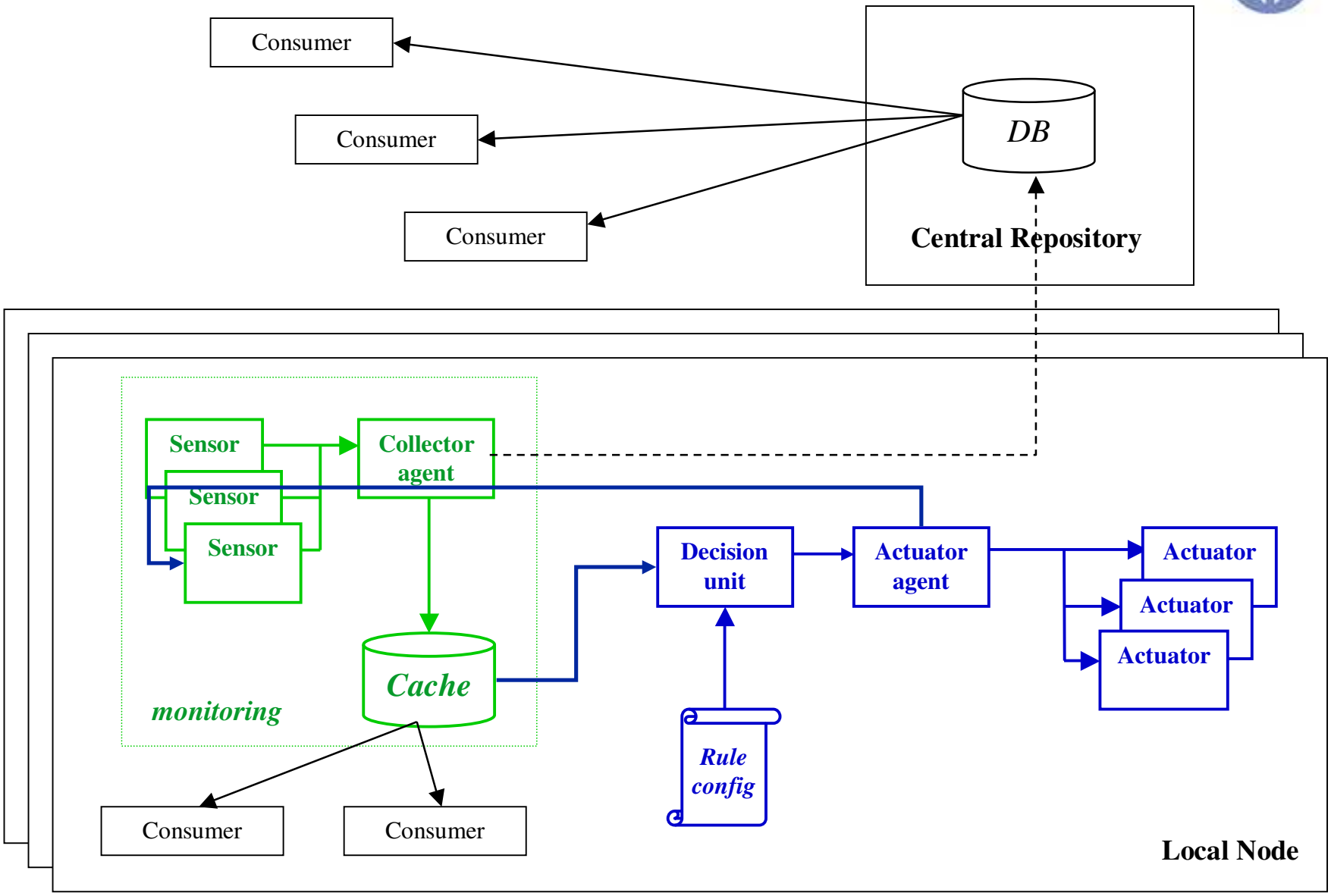
- Developed at University of Edinburgh
- Widely used fabric installation & configuration tool
- Automated installation and configuration in a very diverse and evolving environment



Example LCFG Configuration File



Fabric Monitoring & Fault Tolerance



LCFG Installation

Server setup:

- Download rpms (perl + lcfg + apache)
- Install rpms
- Start http server (apache, …)
- Create configuration files
- Run mkxprof on them

Client setup:

- Download rpms (perl + lcfg)
- Install rpms
- Reboot (rdxprof will be started)

Configuration management (server):

- Update config files
- Run mkxprof

EDG Machine Installation

On the LCFG server:

- Create directories for rpms
- Download rpms from central edg repository
- Create LCFG profile for each client machine:
  - Filename = hostname; includes machine type specific config file and site specific config file (needs to be customized!)
  - Example templates + rpm-lists are provided
  - Run mkxprof on each of these files

DONE

On the LCFG clients:

- Setup clients as describe before

Manual Setup (without LCFG)

- Download rpms directly on machine (RPM-lists per machine type exist)
- Install rpms
- Configure individual services (see installation guide)

Issues when Adding new Sites to the Testbed

- EDG is currently setting-up procedures explaining how to add new sites
  - Variations already tested with Taiwan and Romania
  - Step-by-step instructions produced which we expect to become simpler over time
- Need to clarify the "minimum requirements" for a site to become a member of the testbed
  - A number of regular tasks have to be performed by the sites administrators
  - A maximum delay needs to be defined for responding to requests/problems if the testbed is to run efficiently
- Sites from new countries have to identify/create a supporting CA
  - Since CAs need mutual trust this could lead to an explosion of inspection activities
- Some tasks will fall on the people responsible for managing the VOs
  - HEP experiment secretariats already perform some level of authentication of their institutes and members. How an we get some leverage from this?

Further Information

- EDG Testbed homepage:
- http://marianne.in2p3.fr/

- Fabric management:
- http://hep-proj-grid-fabric.web.cern.ch/hep-proj-grid-fabric/

- LCFG on EDG Testbed information:
- http://www.lnl.infn.it/datagrid/wp4-install/
- http://datagrid.in2p3.fr/distribution/datagrid/wp4/installation/doc/