Building service testbeds on FIRE

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Agenda

- General BonFIRE information
- Building a federated multi-site cloud
- BonFIRE Capacity
- Experiment Workflow
- The BonFIRE Pillars
  - Observability
  - Control
  - Advanced Features
  - Ease of Use
- Open Access to BonFIRE

BonFIRE: In general

- Federated cloud environment
  - Ease of Use driven
  - Infrastructure as a Service
  - Central access point
  - Two types of resources
    - Permanent
    - On-request
  - Experiments cover several domains
    - Controlled network simulation
    - Real world scenarios

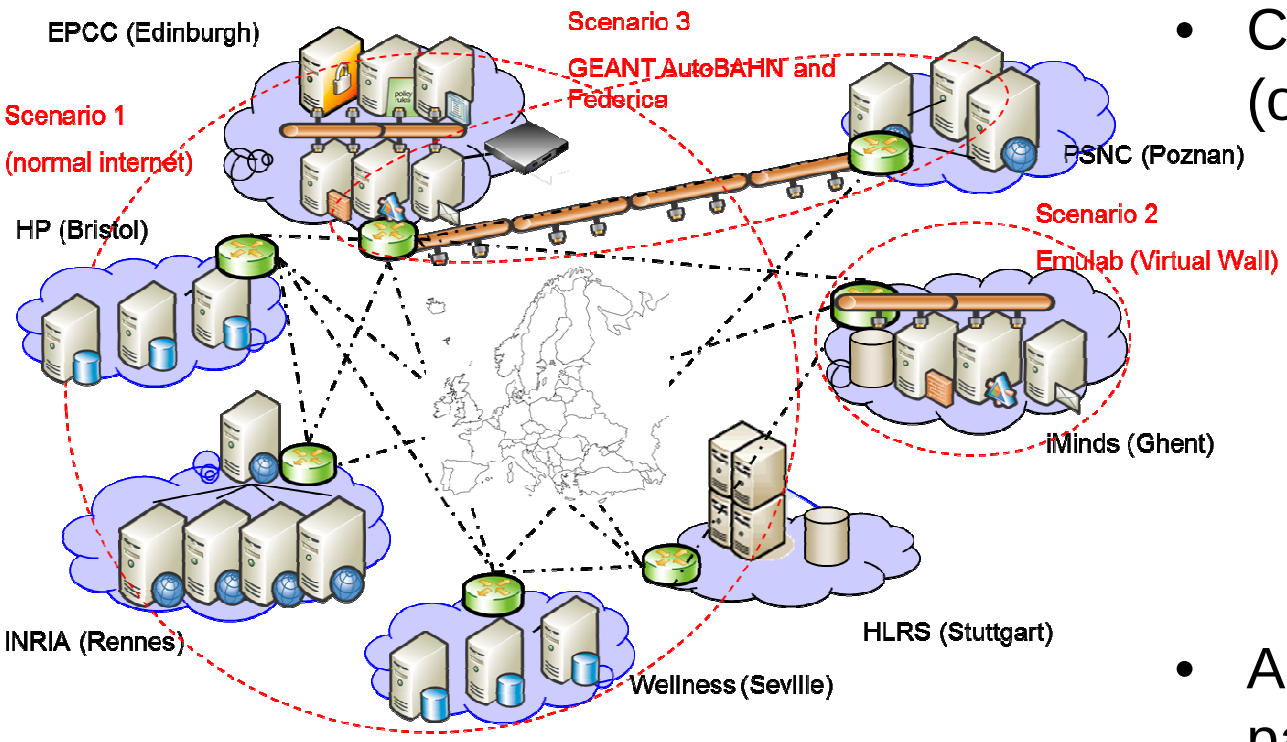
- Current set-up
  - Seven infrastructure providers
  - 12 supported experiments
  - 5 Open Access experiments
  - In total 26 partners

BonFIRE

http://www.bonfire-project.eu

Building a multi cloud testbed

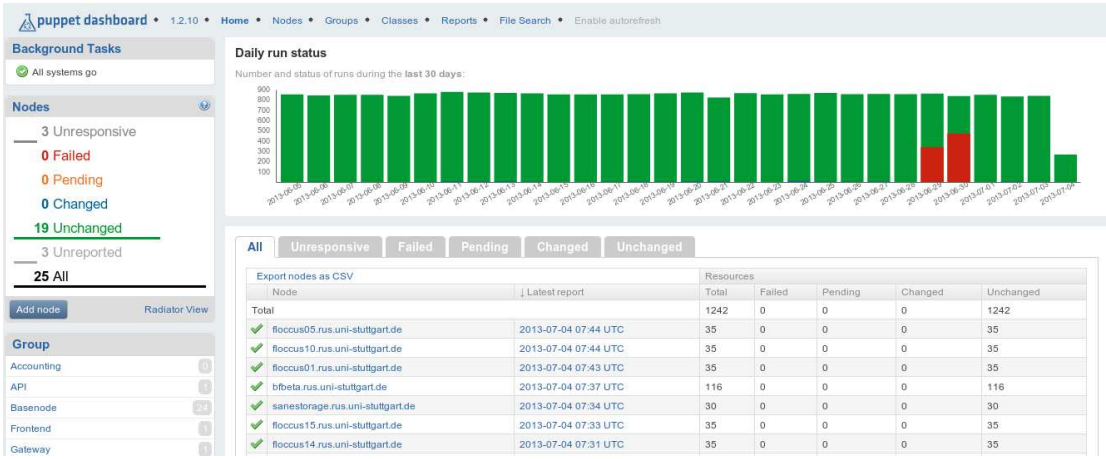
- Building a usable multi-cloud environment over Europe
  - Construction and management of the **global** infrastructure
  - Construction and management of the **local** infrastructure



- Concentrate on free (open source) software
  - OpenNebula
  - OpenStack
  - OCCI
  - RESTful
  - Tinc
  - Xen / KVM
  - Zabbix
- Also allow proprietary packages
  - VMware

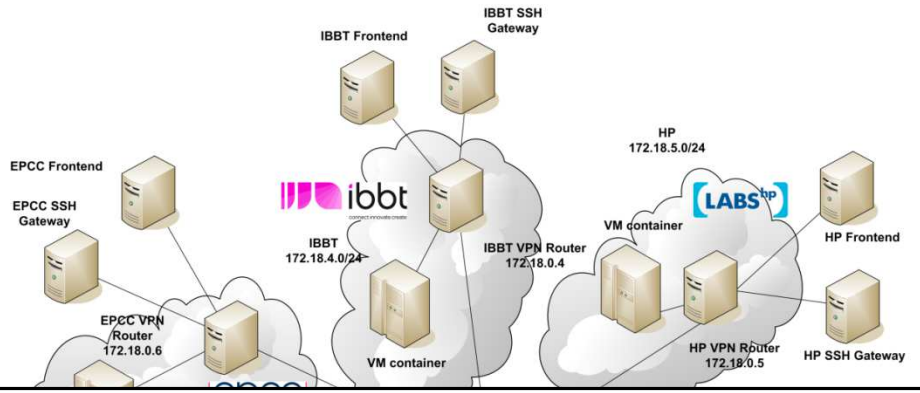
Software Stack

- General BonFIRE Management
  - BonFIRE API
  - BonFIRE Portal as simplified access point
  - BonFIRE Accounting Service
- Site Management
  - OpenNebula, OpenStack, HPCells, VMware vCloud Director, …
  - Xen, KVM, …
- VPN gateways
  - Tinc
  - Inter-site communication
- Software management
  - Puppet
  - Minimal homogeneity
- Observability
  - Zabbix



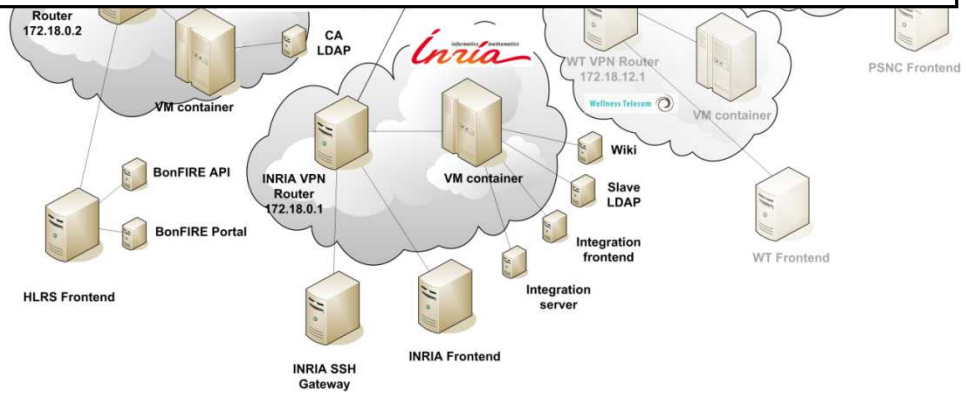
Capactity

Perm.	Cores	Memory	Storage	Nodes
HP	128	136 GB	5 TB	32
iMinds	64	64 GB	5 TB	16
HLRS	154	452 GB	12 TB	17
EPCC	96	256 GB	6 TB	2
INRIA	48	256 GB	2.4 TB	4



100% pure heterogeneity

HP	384	144 GB	32 TB	96
iMinds	368	368 GB	32 TB	92
HLRS				
EPCC				
INRIA	1672	2.7 TB	42 TB	160
PSNC				
WT				



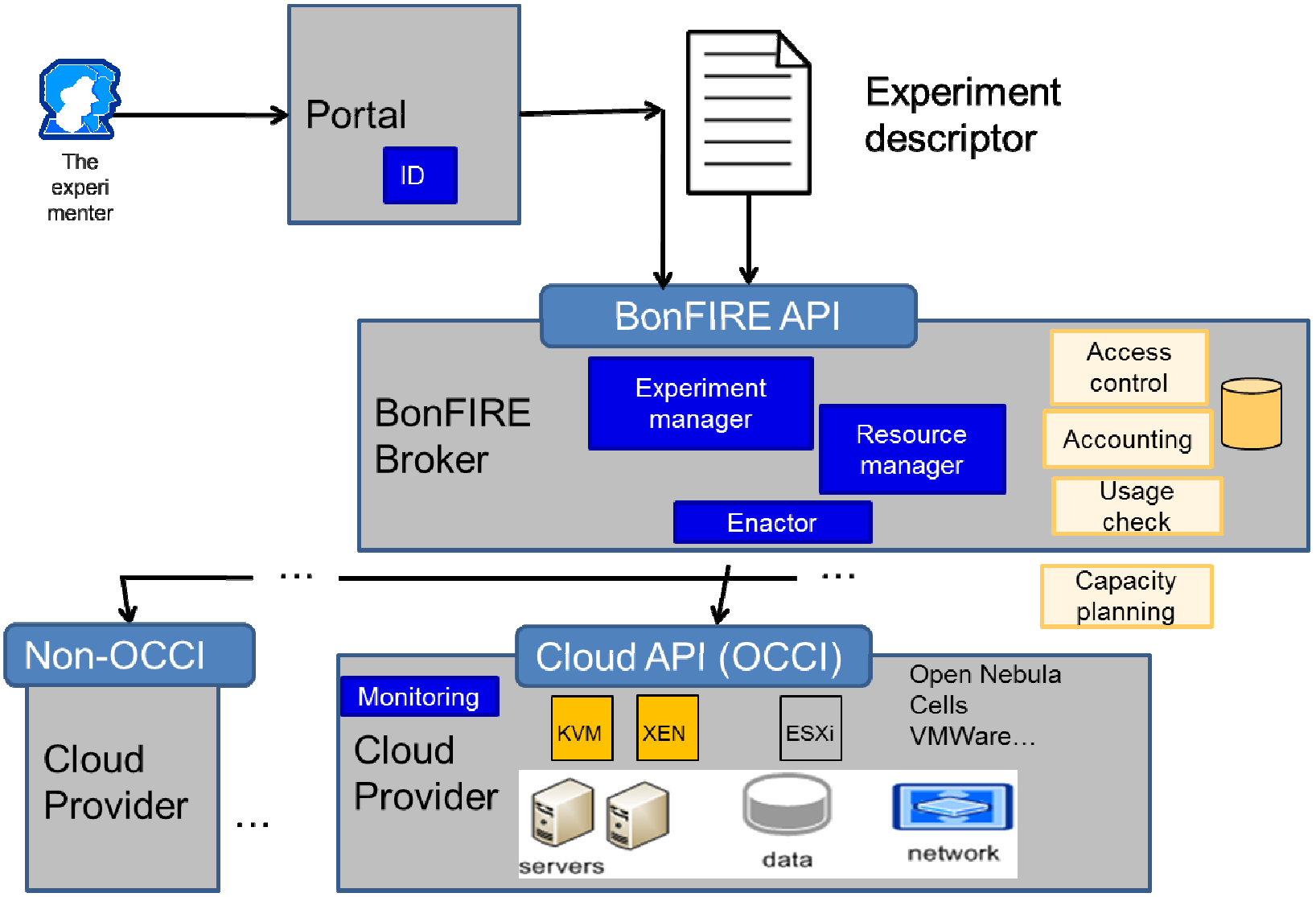
Experiment

- BonFIRE is user driven
  - Analysis of requirements
  - Only those functionalities are realized which are directly requested

Experiment definition:
A series of deployments and executions of a (possibly dynamically changing) collection of resources that produces data for analysis either at runtime or subsequently.

- Experiment lifecycle
  - Design
  - Request of necessary cloud infrastructure
  - Execution
  - (Analysis)

General Workflow



The BonFIRE Pillars

Observability

Control

Advanced Features

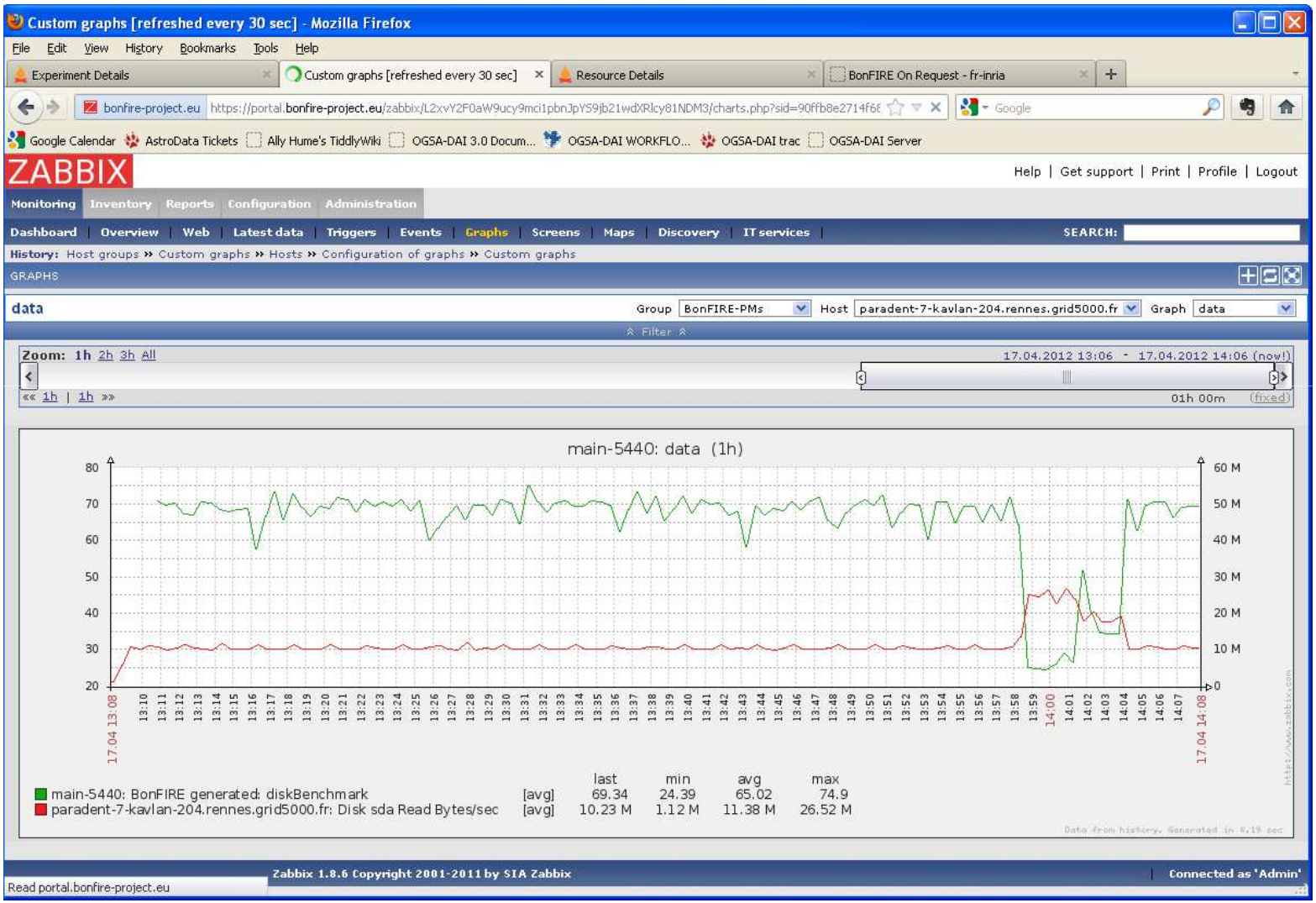
Ease of Use

BonFIRE

Observability

Observability

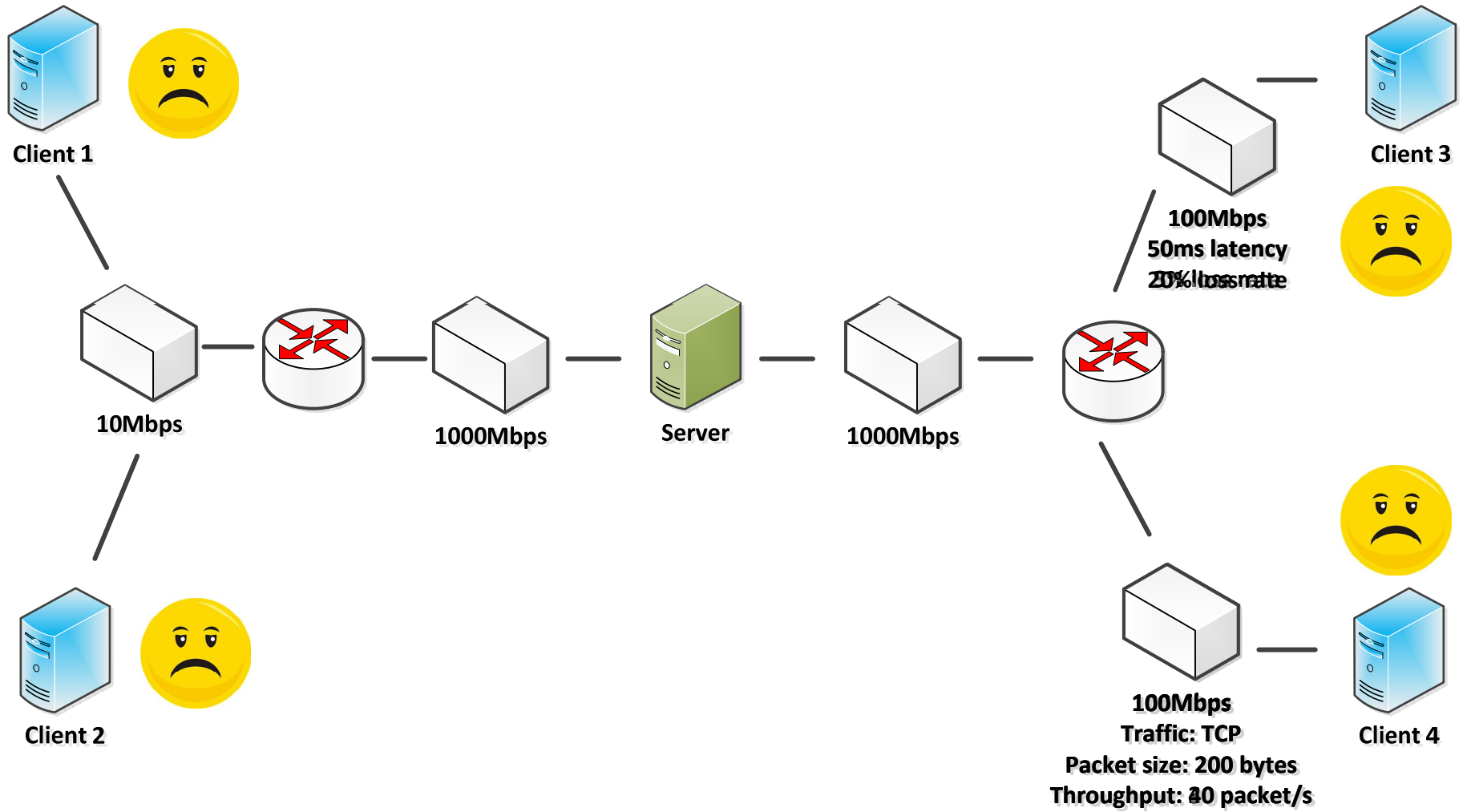
Monitoring


Custom graphs [refreshed every 30 sec] - Mozilla Firefox
ZABBIX
Monitoring
Inventory
Reports
Configuration
Administration
Dashboard
Overview
Web
Latest data
Triggers
Events
Graphs
Screens
Maps
Discovery
IT services
SEARCH:
History: Host groups » Custom graphs » Hosts » Configuration of graphs » Custom graphs
GRAPHS
data
Group BonFIRE-PMs
Host paradent-7-kavlan-204.rennes.grid5000.fr
Graph data
Zoom: 1h 2h 3h All
17.04.2012 13:06 - 17.04.2012 14:06 (now!)
main-5440: data (1h)
main-5440: BonFIRE generated: diskBenchmark [avg] 69.34 24.39 65.02 74.9
paradent-7-kavlan-204.rennes.grid5000.fr: Disk sda Read Bytes/sec [avg] 10.23 M 1.12 M 11.38 M 26.52 M
Zabbix 1.8.6 Copyright 2001-2011 by SIA Zabbix
Connected as 'Admin'

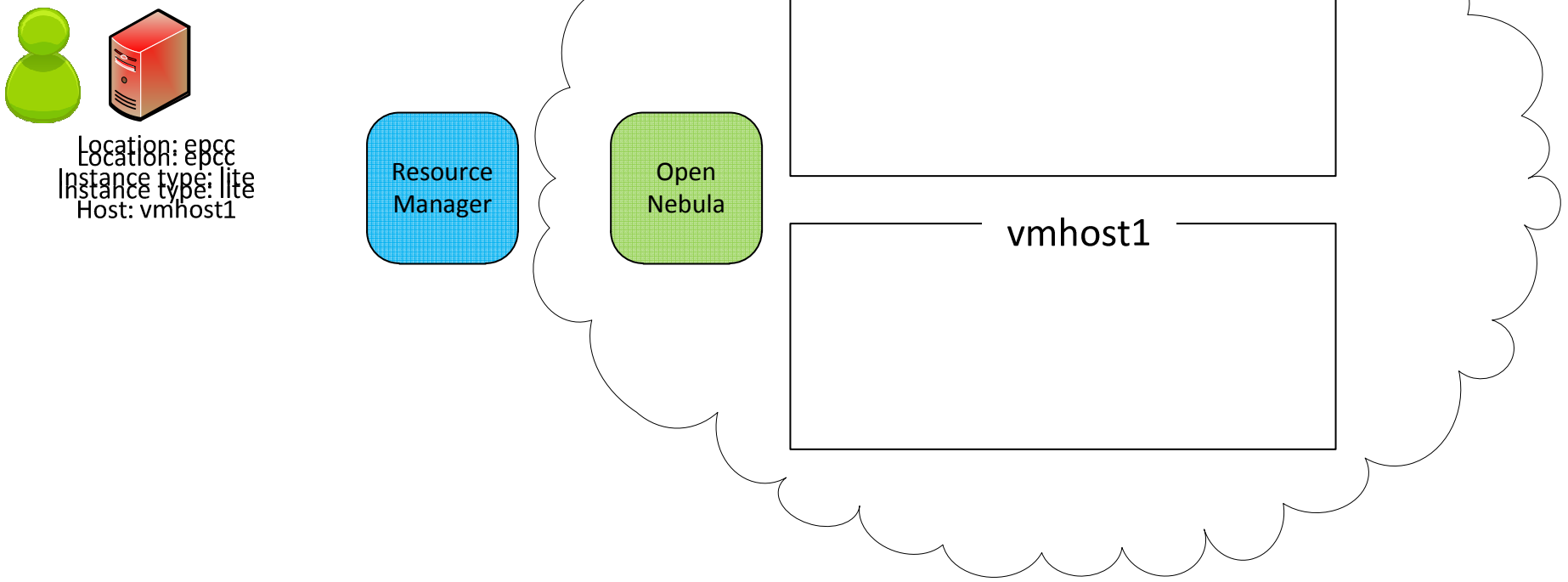
BonFIRE

Control

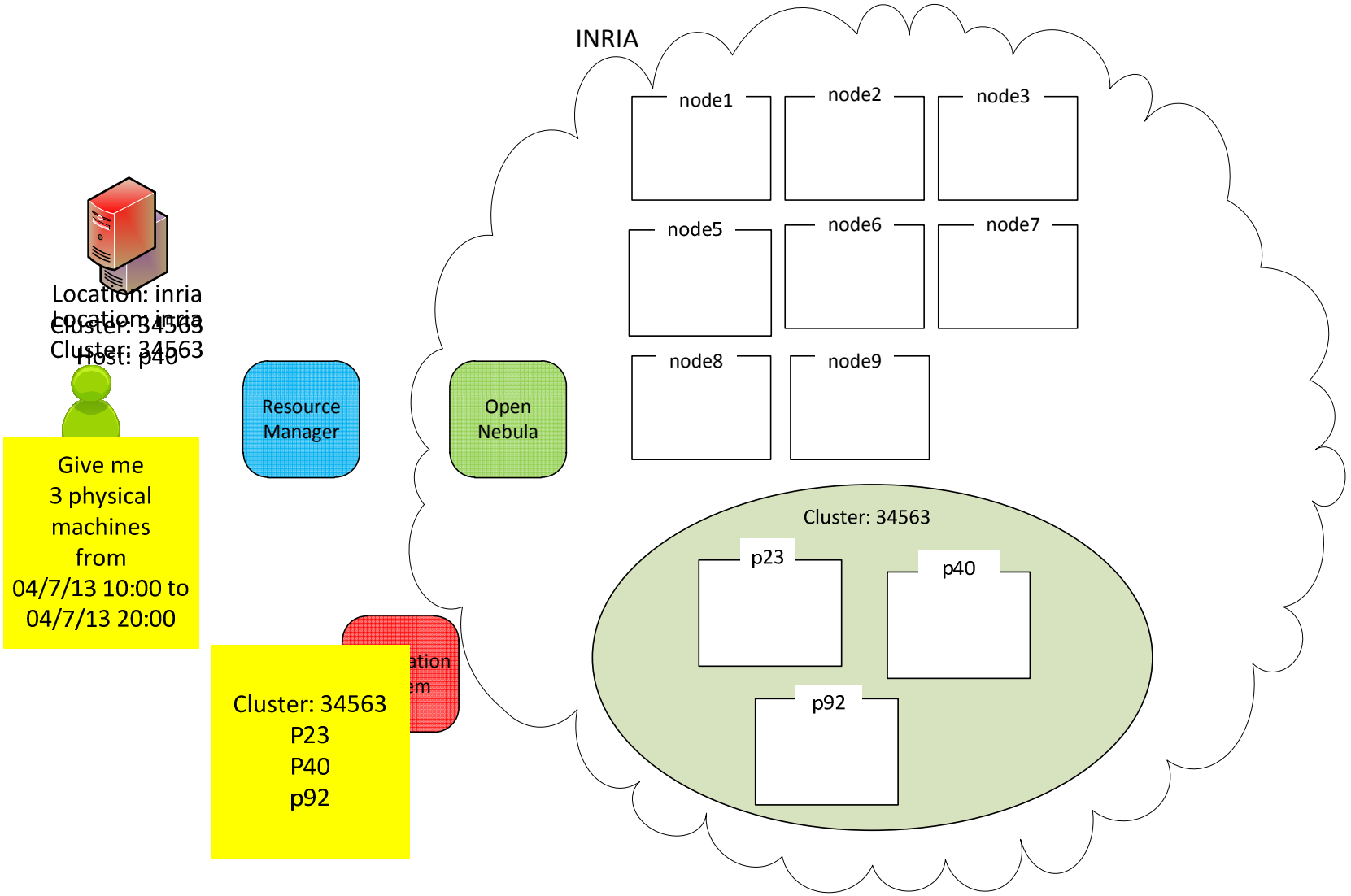
Network Control



Placement Control



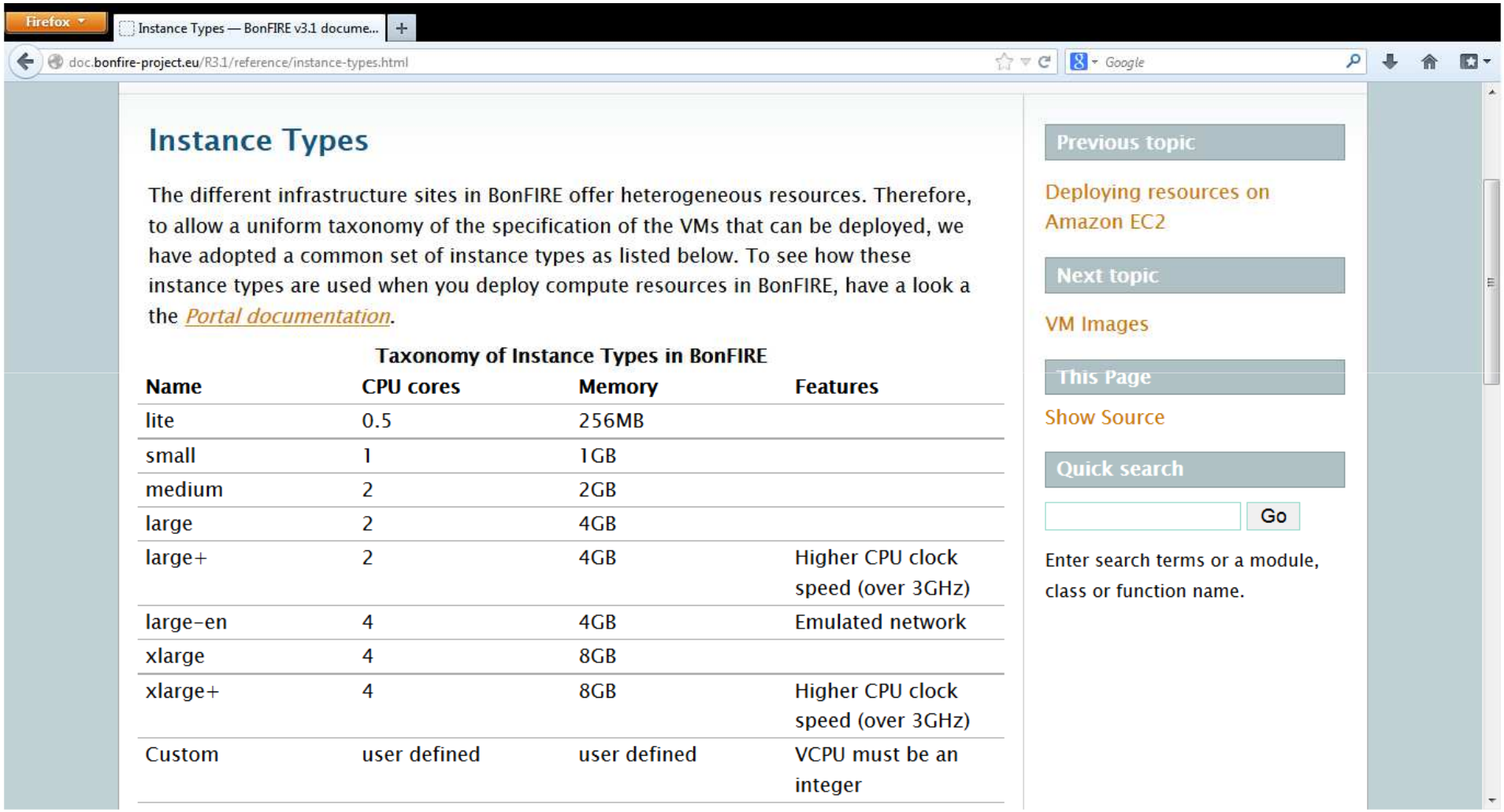
Exclusive Access



BonFIRE

Advanced Features

Instance Types



Instance Types

The different infrastructure sites in BonFIRE offer heterogeneous resources. Therefore, to allow a uniform taxonomy of the specification of the VMs that can be deployed, we have adopted a common set of instance types as listed below. To see how these instance types are used when you deploy compute resources in BonFIRE, have a look a the *Portal documentation*.

Taxonomy of Instance Types in BonFIRE

Name	CPU cores	Memory	Features
lite	0.5	256MB	
small	1	1GB	
medium	2	2GB	
large	2	4GB	
large+	2	4GB	Higher CPU clock speed (over 3GHz)
large-en	4	4GB	Emulated network
xlarge	4	8GB	
xlarge+	4	8GB	Higher CPU clock speed (over 3GHz)
Custom	user defined	user defined	VCPU must be an integer

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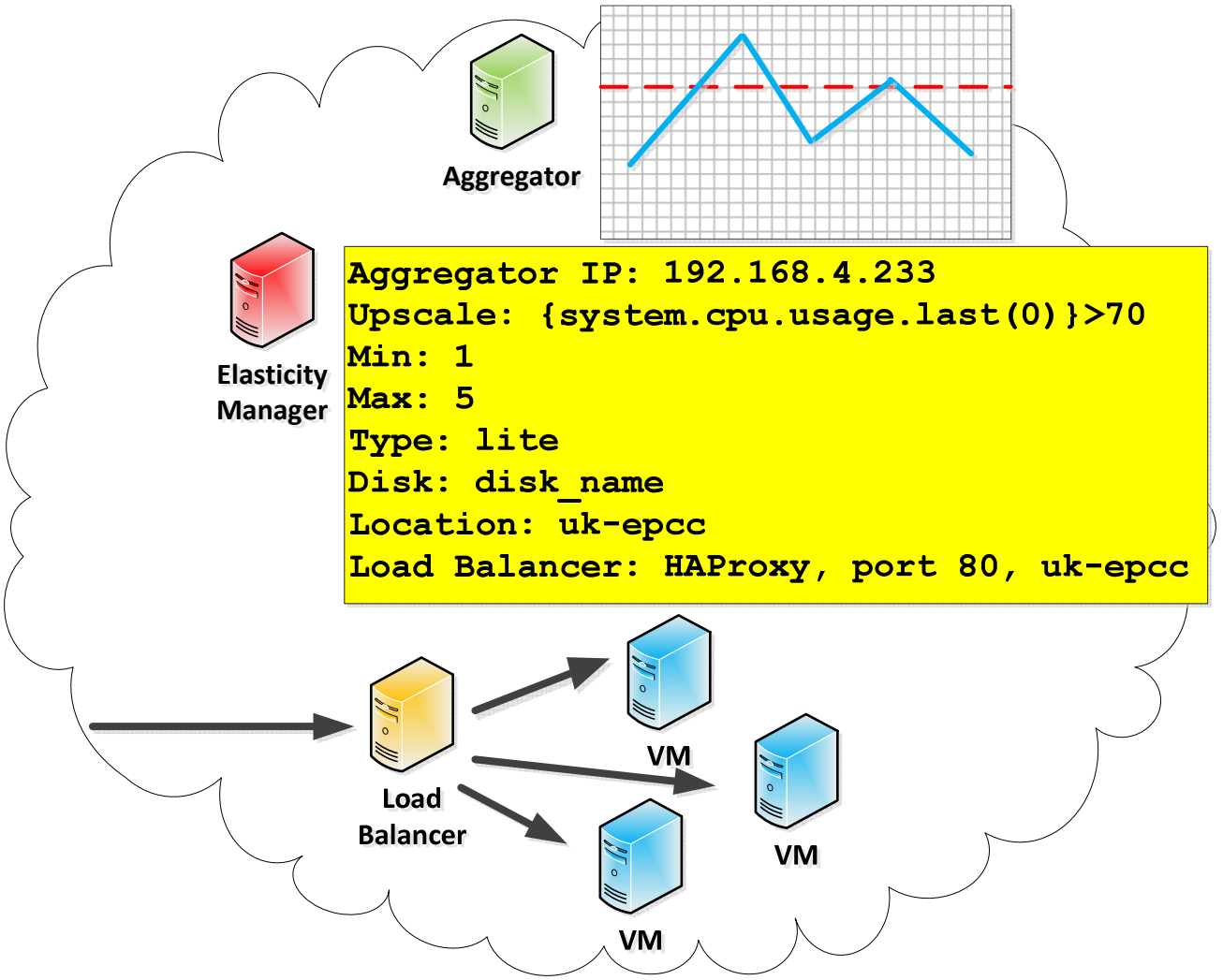
Elasticity Engine

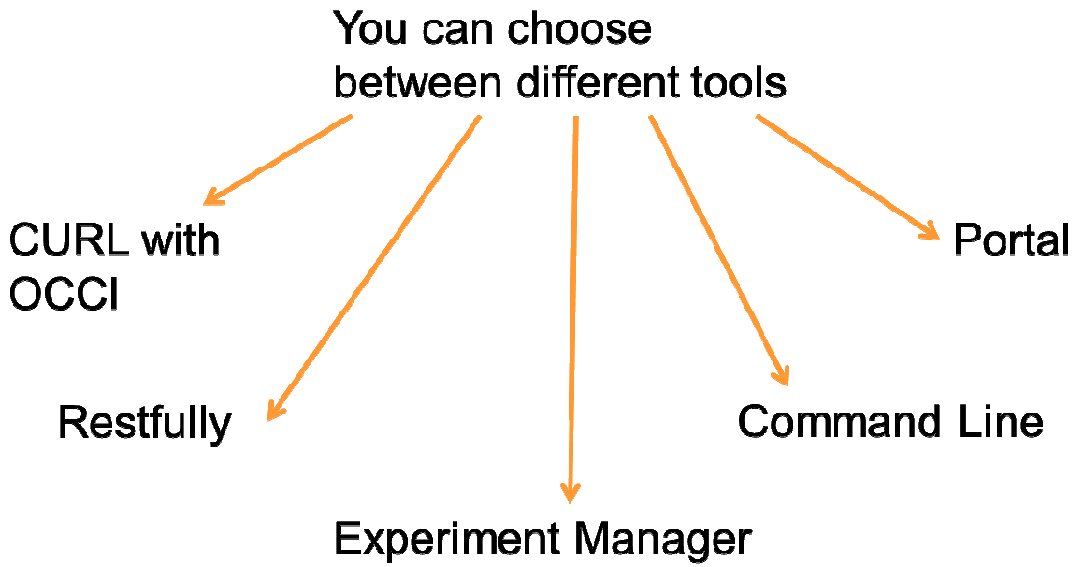


BonFIRE

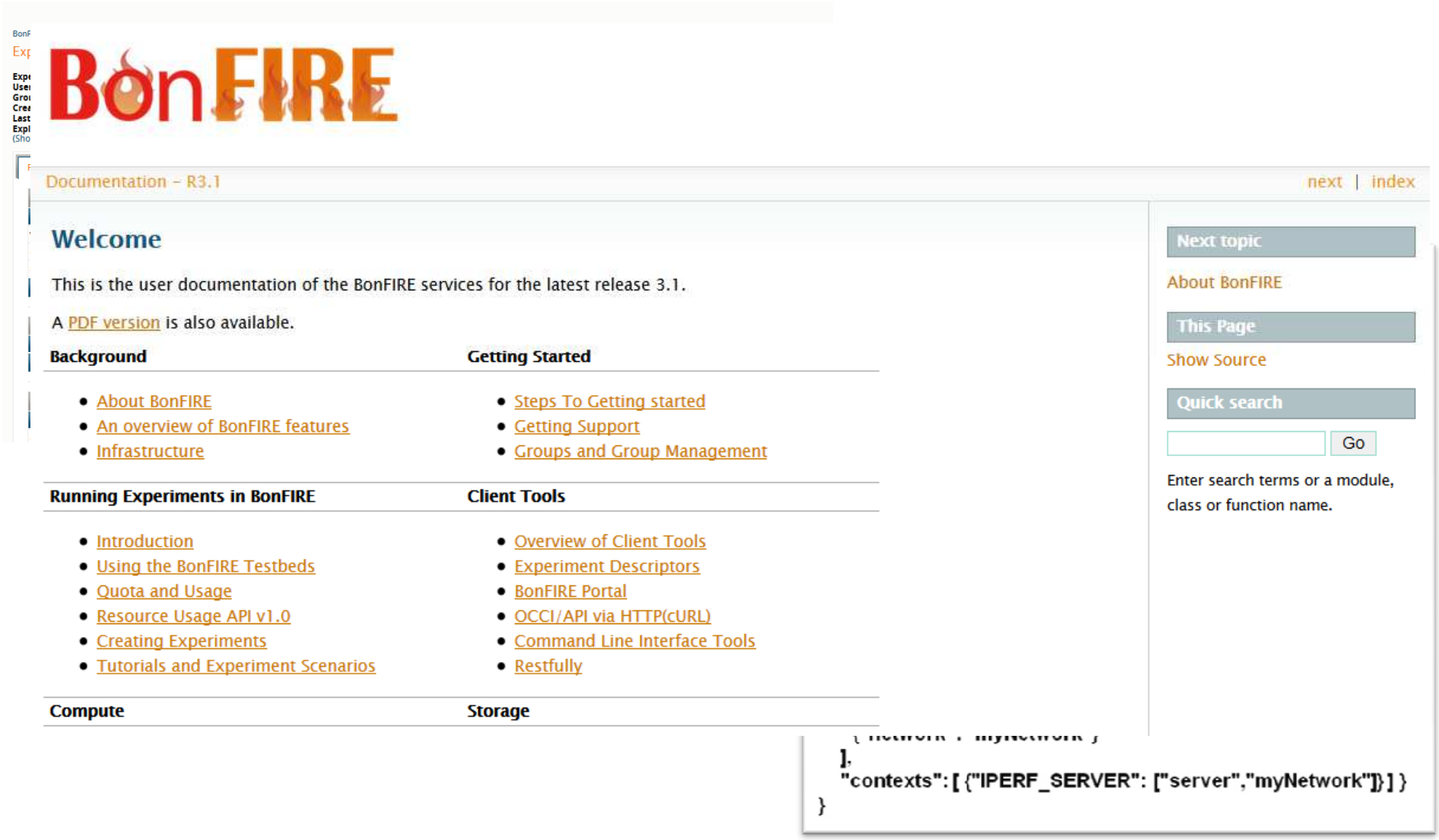
Ease of Use

Ease of Use

- **If it's not easy, it won't be used**
- But what is easy?
- BonFIRE interpretations:

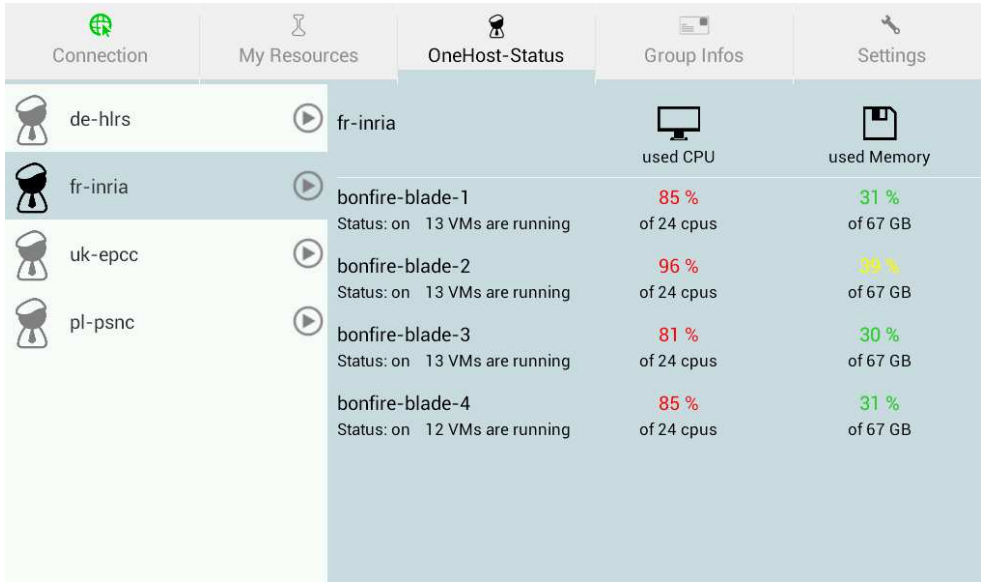


Ease of Use Examples



Mobile Application

- Mobile Android Application
  - Based on the OCCI interface and the BonFIRE API
  - Android 3.2+ required
- Manage your executions
  - Access VMs
  - Redeploy executions
  - Control and adjust parameters
  - Host information



Open Access to BonFIRE

- Open Access for non-consortium partners
  https://portal.bonfire-project.eu/en/propose-experiment/
- Propose an experiment
  - Control the resources
  - Reproduce your results
  - Emulate networks
- Offer
  - 50 Cores in peak
  - 250 GB storage
  - Duration: 4 months
- User groups
  - Share your images

Outcomes

- Technological
  - Possible to build a federated cloud environment on standardized software
  - BonFIRE capacity
    - 586 cores permanently available
    - 2424 cores available on-request
  - Different network infrastructures
    - iMinds Virtual Wall
    - Personalized and isolated networks

- General
  - Stable and full operational federated multi-cloud facility
    - **Easy to use**
    - **Enriched cloud services**
  - Sustainability
    - Will run until the end of 2014!

Building service testbeds on FIRE

Thank you for your attention