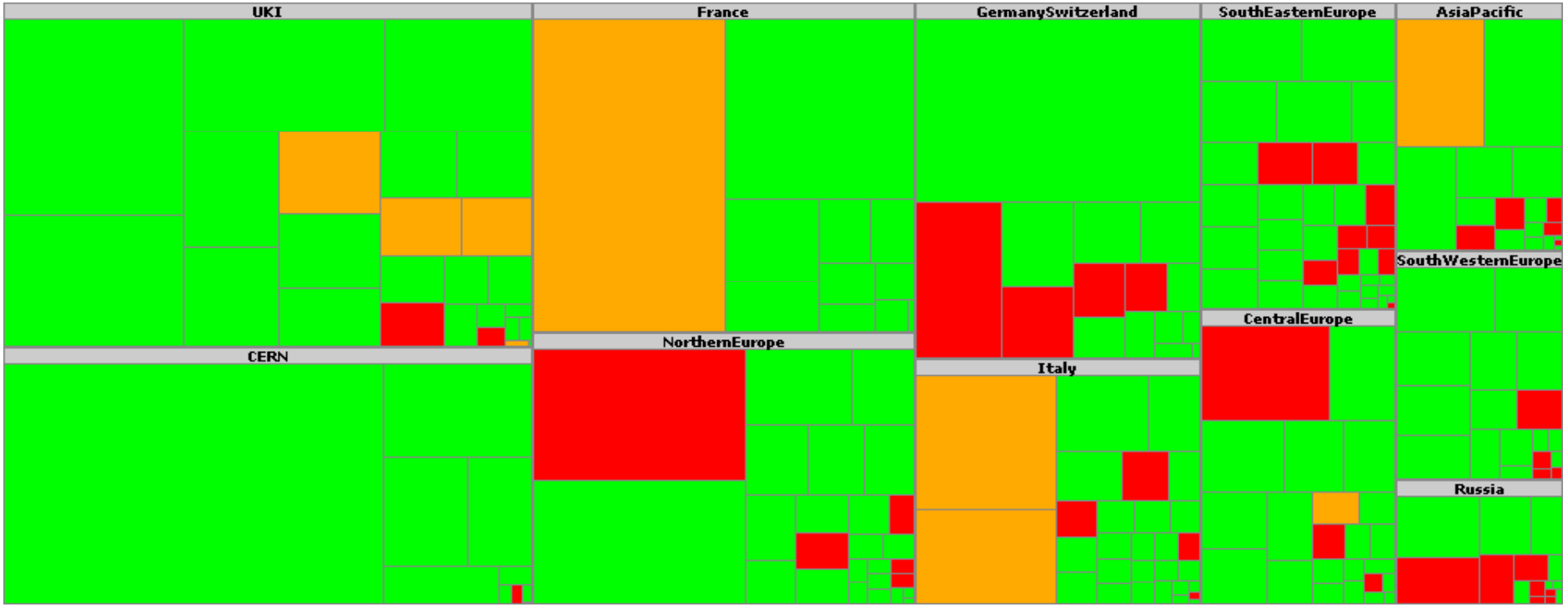


Visualizing the State of the Grid with *GridMaps*

Max Böhm, Rolf Kubli

CERN openlab / EDS

EGEE'07 Conference, 1-5 Oct 2007

CERN openlab

EDS
EXPERTISE. ANSWERS. RESULTS.

Outline

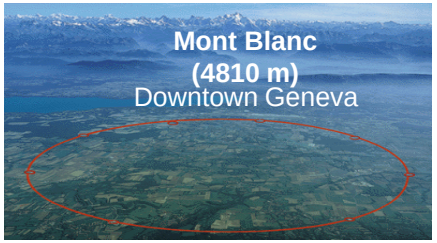
- Collaboration CERN openlab / EDS
- Motivation
- *GridMap* Visualization
- Prototype
- Conclusions

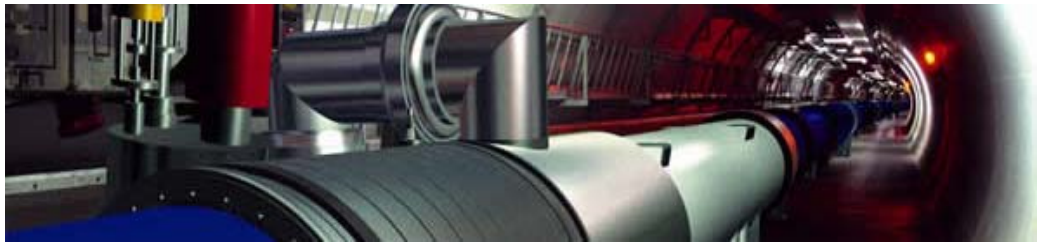
Collaboration CERN openlab / EDS

EDS is a contributor member of the CERN openlab

The purpose of the joint project between CERN and EDS is to carry out research and development in the field of *monitoring, management and operation of Grid services.*

The CERN openlab is a framework for evaluating and integrating cutting-edge IT technologies or services in partnership with industry





Motivation

Better understanding the *state of the Grid* helps improve the *reliability* of Grid services

"You can't manage what you don't measure"

Many Grid monitoring tools are in use

- Service Availability Monitoring (SAM)
- GridView
- GStat
- Experiment Dashboard
- GridICE
- ...

Motivation

But...

The Grid is a large distributed infrastructure

Grid monitoring data are complex!

Current tools visualize data by sorted tables, bar charts, etc.

Difficult to present an easy to understand ***top-level view*** which provides

- quick, action oriented oversight and insight
- help understand job failures and availability patterns

Can new visualizations help?

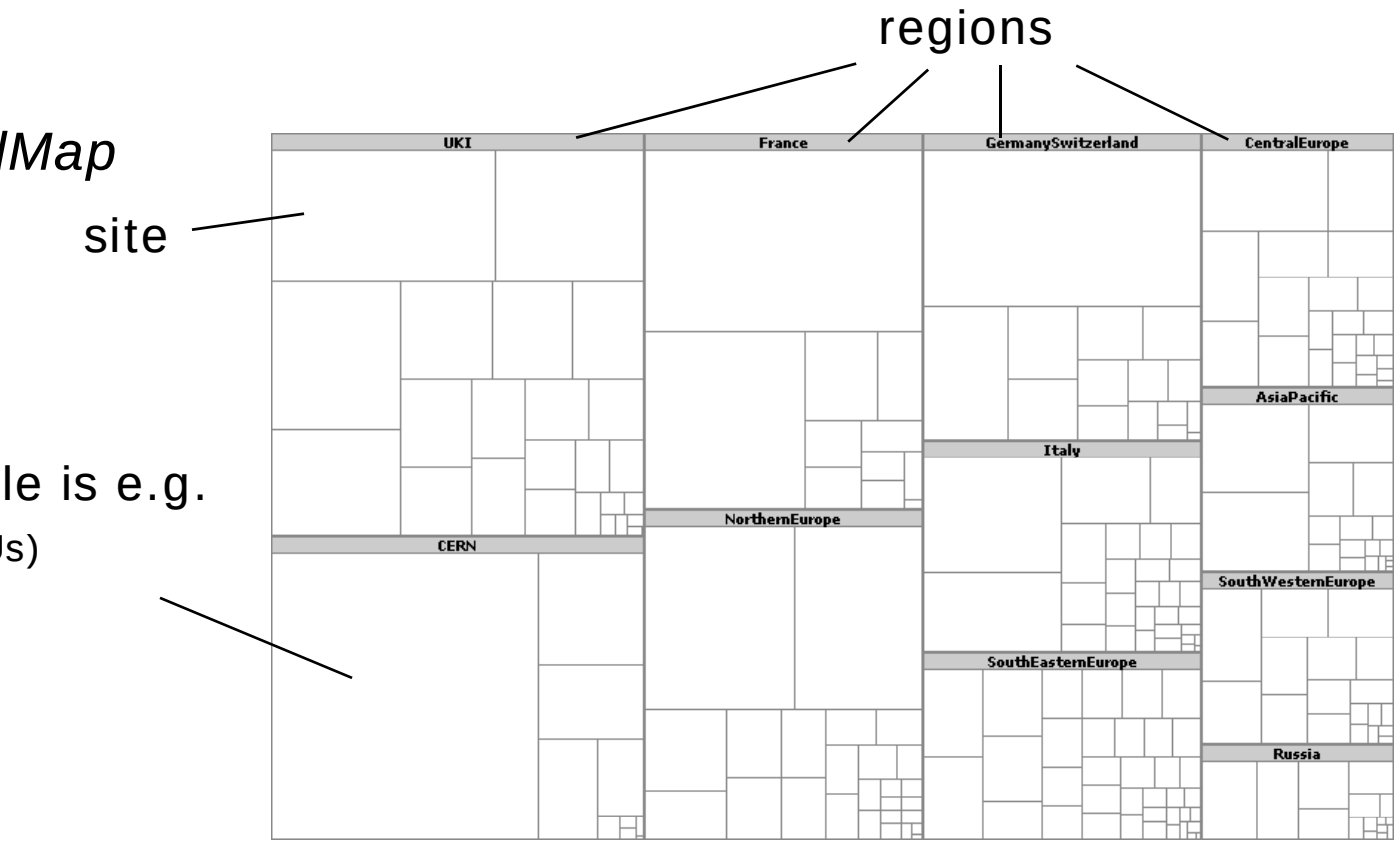
GridMap Visualization

GridMap Visualization

Idea

- visualize the Grid by using *Treemaps*
  (Grid + Treemap = *GridMap*)

Example *GridMap*



Size of rectangle is e.g.

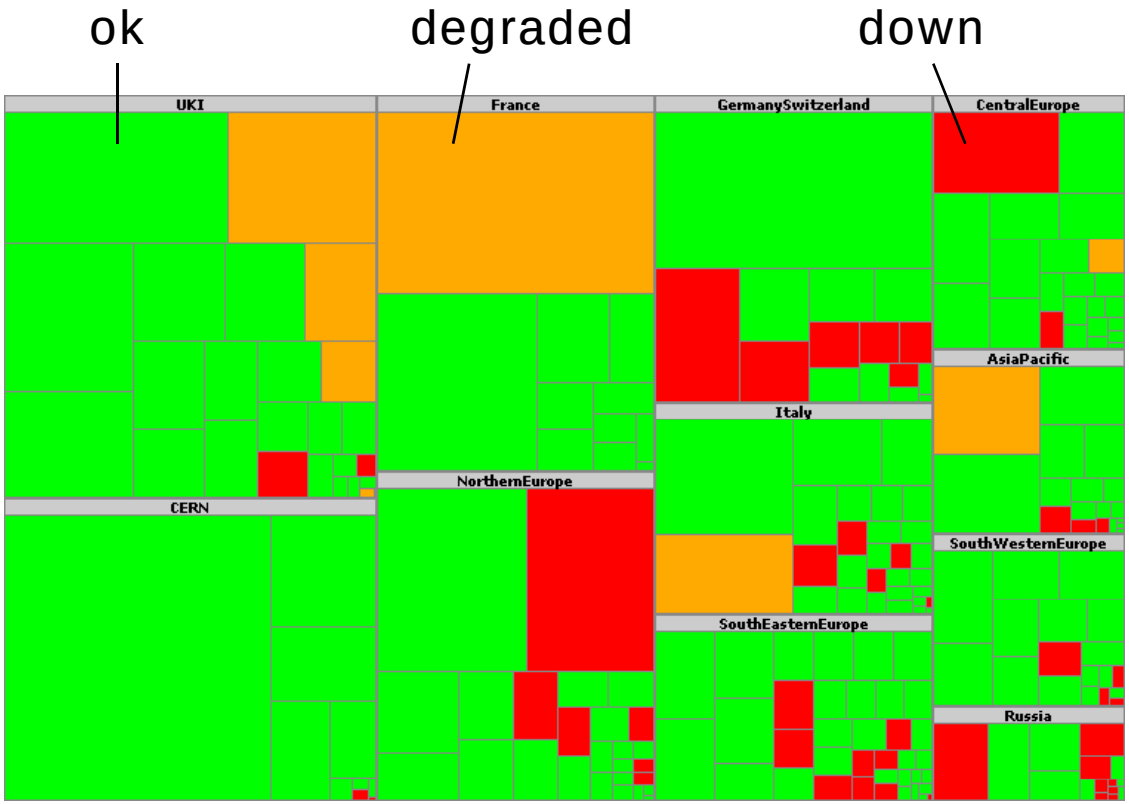
- size of site (#CPUs)
- #running jobs
- ...

GridMap Visualization

Idea

- visualize the Grid by using *Treemaps*
  (Grid + Treemap = *GridMap*)

Example *GridMap*

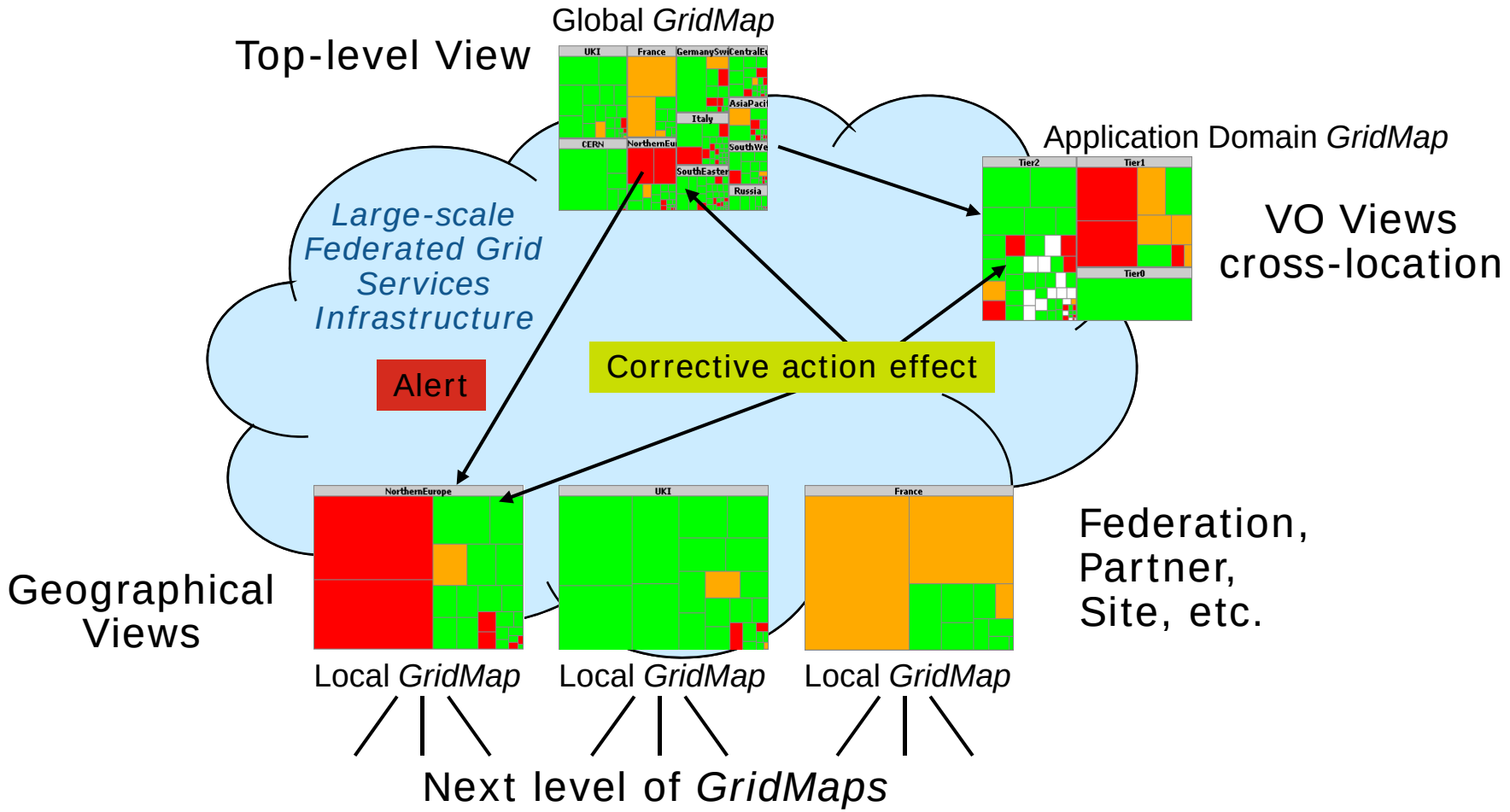


Colour of rectangle is e.g.

- SAM status of site / service
- Availability of site / service
- ...

Multiple Views

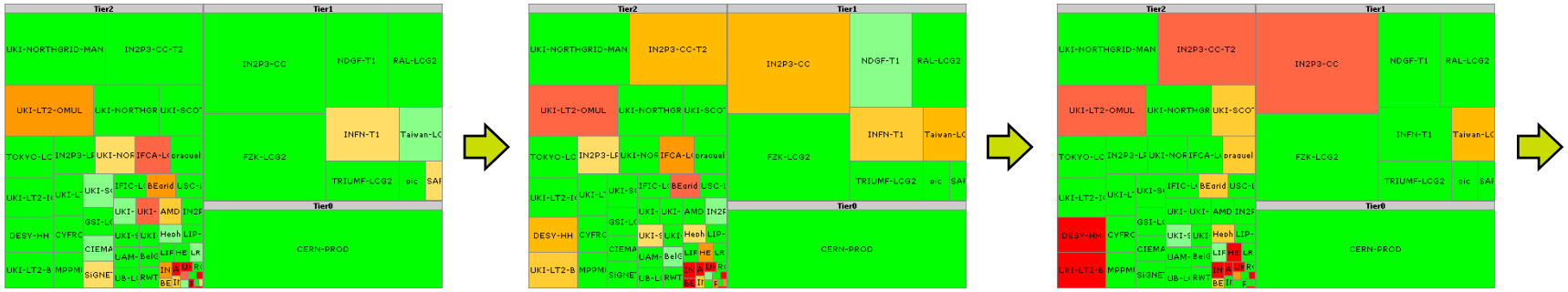
GridMaps can be used for *top-level*, *geographical* and *VO* views



Trends

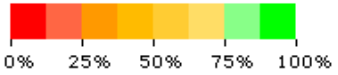
Trends can be understood by looking at a sequence of *GridMaps*

Site Availability over time:



20 Sep 2007 | 21 Sep 2007 | 22 Sep 2007

23 Sep 2007 | 24 Sep 2007 | 25 Sep 2007

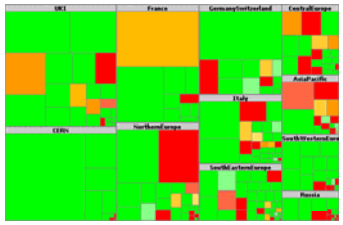


More Views

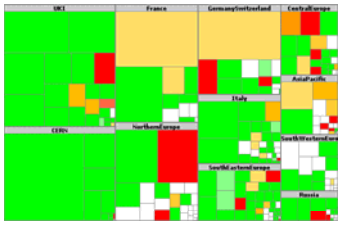
Correlations of metrics can be discovered by switching between different views

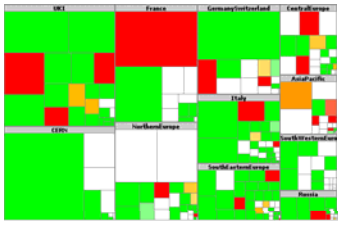
Site Availability from different VO perspectives:

sites without colour do not support the VO

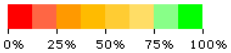

OPS


Alice


Atlas


CMS

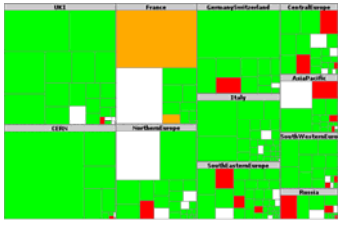

LHCb



Status of different Site Services:


Overall Site


CE

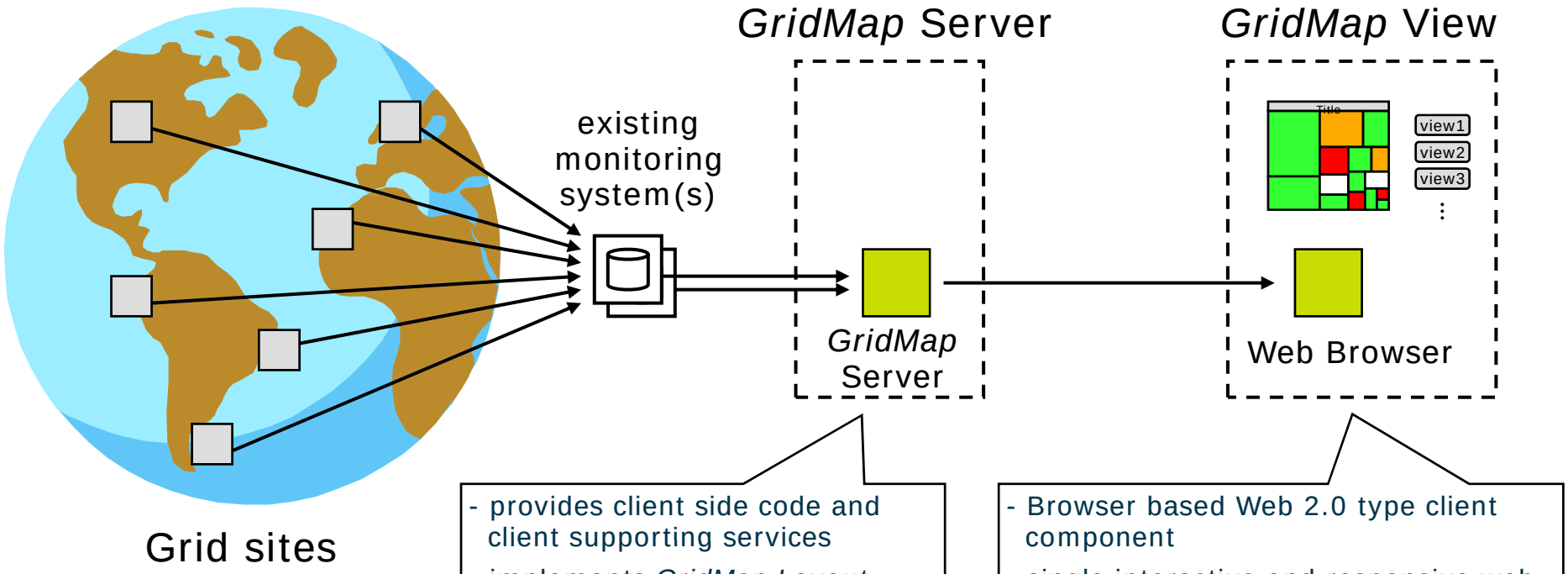

SE


SRM


site BDII

Prototype

GridMap Prototype Architecture



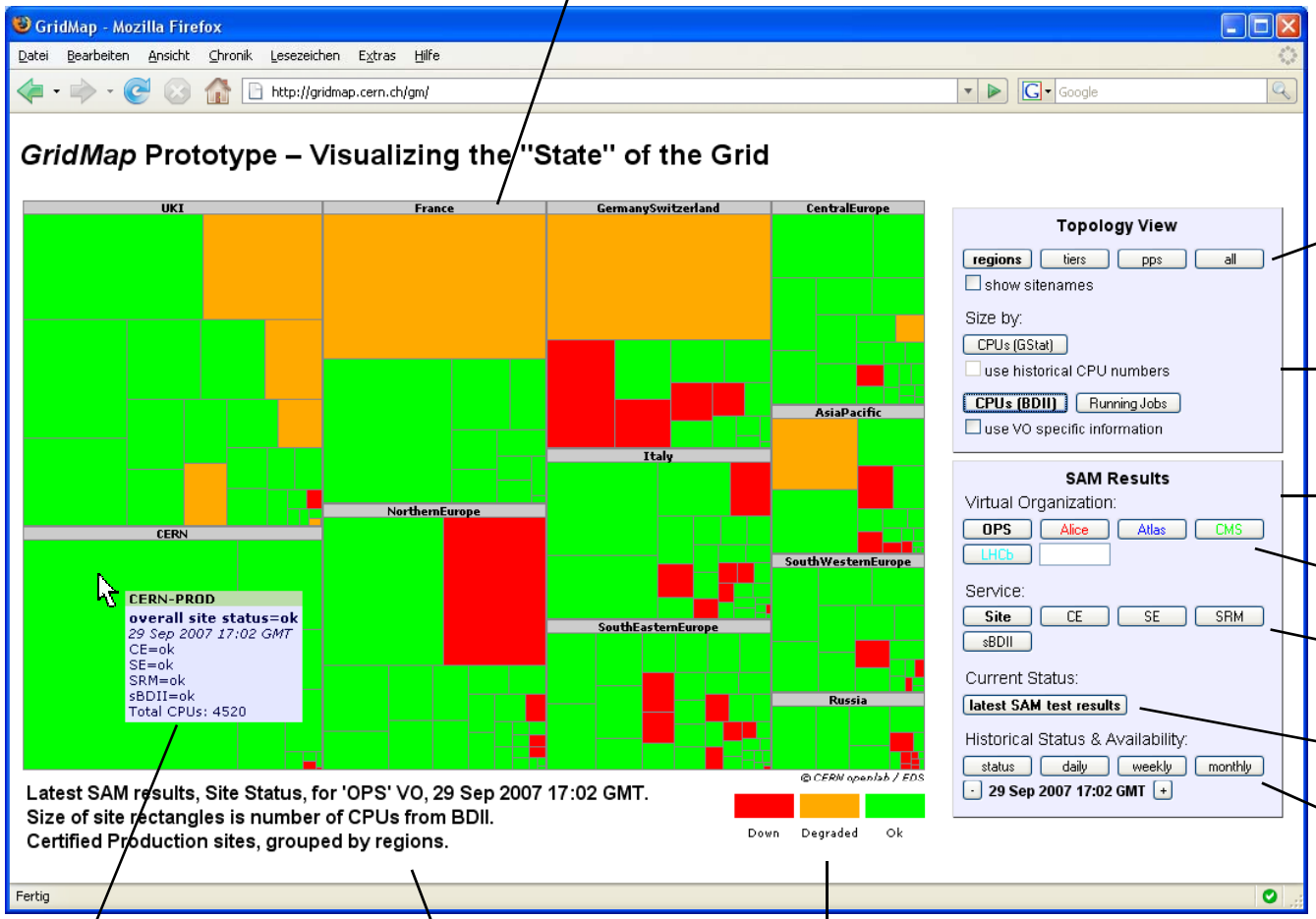
- provides client side code and client supporting services
- implements *GridMap Layout Algorithm*
- retrieves and caches data from existing monitoring systems
- POC implementation is based on Apache / Python

- Browser based Web 2.0 type client component
- single interactive and responsive web page (no page reloads required, data is retrieved in the background)
- fast switching between views possible
- details of the site/service statuses are shown as a context sensitive Tooltip
- POC implementation is based on HTML, lightweight JavaScript libraries, AJAX type communication pattern

GridMap Prototype View Component

Link: http://gridmap.cern.ch

Drilldown into region by clicking on the title



Grid topology view (grouping)

Metric selection for **size** of rectangles

Metric selection for **colour** of rectangles

VO selection

Overall Site or *Site Service* selection

Show SAM status

Show GridView availability data

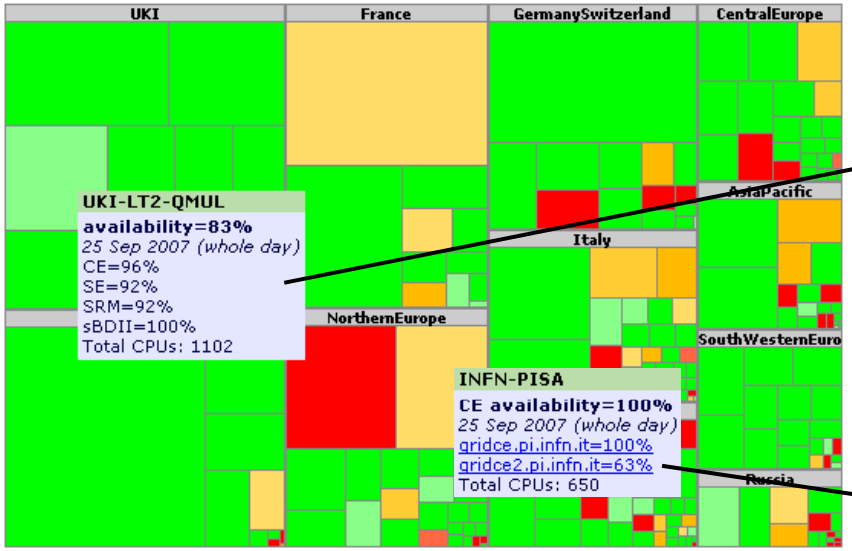
Context sensitive information

Description of current view

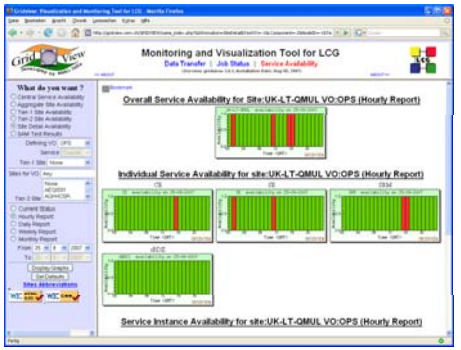
Colour Key

GridMap Prototype: Link to Existing Tools

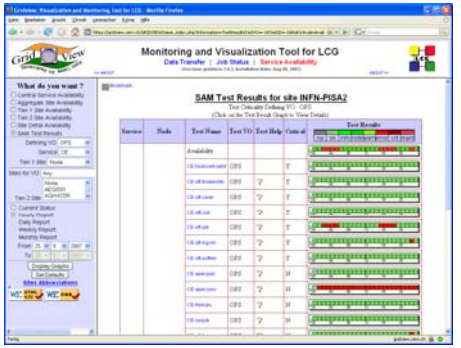
Clicking on a site opens a page with details in GridView/SAM



Site Detail Availability



SAM Test Results



Conclusions

Conclusions

- *GridMaps* are a new approach to visualizing complex monitoring data of the Grid
- The same type of visualization can be used for *top-level*, *regional*, and *VO* specific views
- *GridMaps* can identify correlations and availability patterns
- A prototype for visualizing SAM data has been implemented
- Can be used for visualizing other data, e.g. of experiments, alarms
- *GridMap* web component can be embedded into other tools, e.g. Dashboards (if you are interested, please contact us)
- *GridMaps* are a result of the *CERN openlab* / *EDS* collaboration which takes place within the *CERN-IT Grid Deployment* group

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