GridView - metrics calculation and visualisation

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Outline of the Presentation

- Target Users
- Goals
- Service Monitoring and Visualization Architecture
- Computation of Availability Metrics
- Visualization Components
- On-going Work

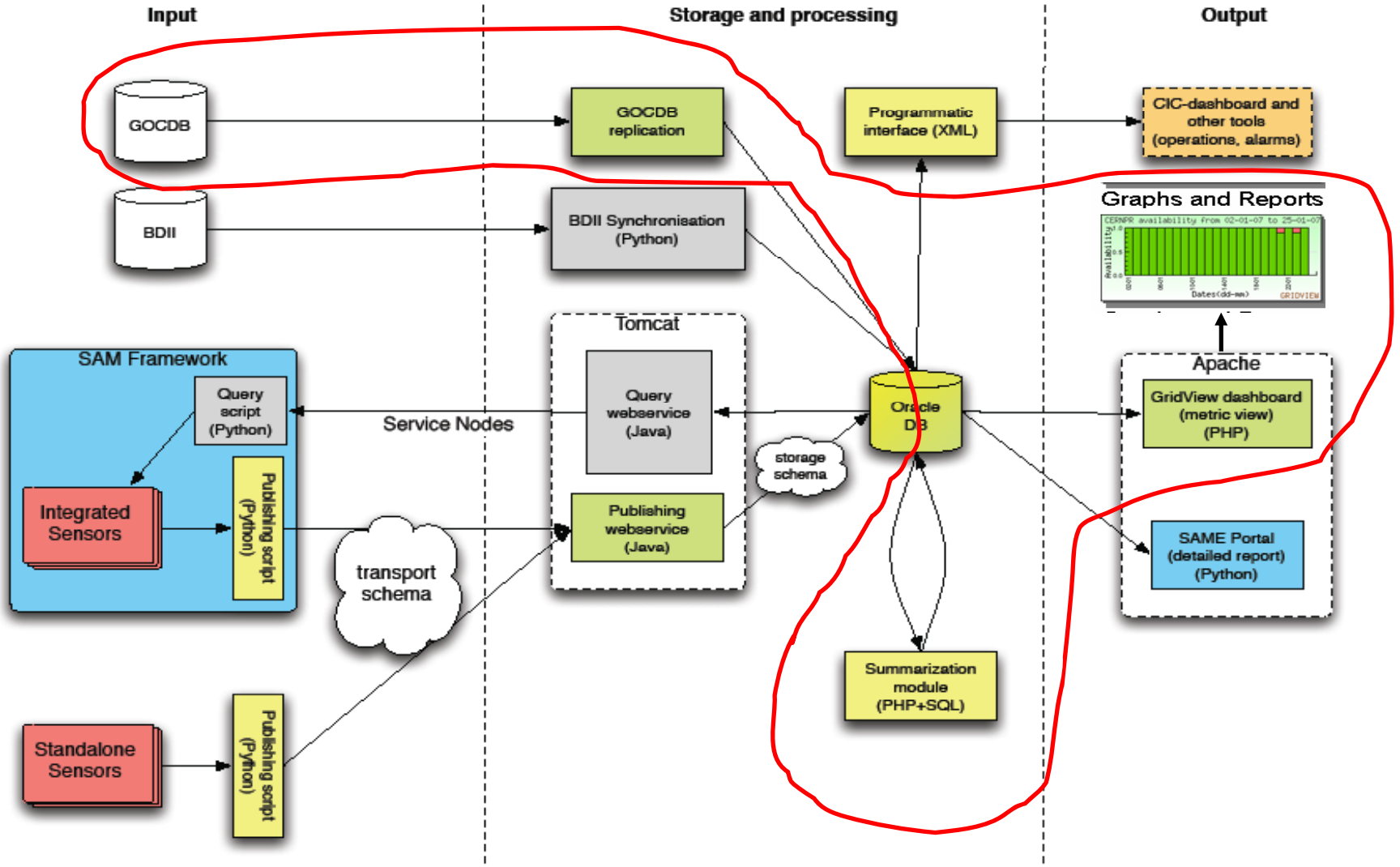
Target Users

- Site Administrators
- VO Administrators
- WLCG Management
- Grid Operations - ROCs/CIC on Duty (COD)
- Experiments

Goals

- To provide a service level view, a snapshot of the current operational status of the Entire Grid
- To help the operations team locate and troubleshoot the problems
- To monitor the Availability and Reliability of various services and sites in the Grid Infrastructure
- To provide VO specific view of the service, enable each VO to look at the service in its own perspective

Service Monitoring and Visualization Architecture



Metric Generation and Visualization

- GridView's Metric Generation Module analyzes the test results and Generates Service Status and Availability Metrics
- GridView's Visualization Module displays test results as well as Service Availability Metrics in graphical form
  - It displays multiple views with various levels of details and provision to drill down

Computation of Availability Metrics

- Gridview computes Service Availability per VO based on Critical Tests
- Service Availability is computed
  - per Service Instance
  - per Service Type (eg. CE) for a site
  - Per Site
  - Aggregate of all Tier-1/0 sites in WLCG
  - over various periodicities like Hourly, Daily, Weekly and Monthly
- Computation of Aggregate Metrics
  - Redundant services are ORed
  - Critical services are ANDed

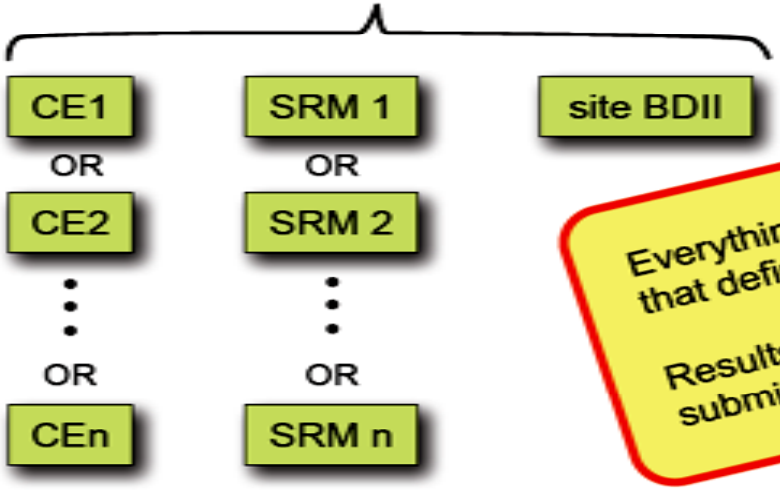
Availability metrics - algorithm I

$\wedge$ = boolean AND
$\vee$ = boolean OR

Status of node N = $\bigwedge_{t \in \text{CriticalTests}}$ TestResult (N,t)

Status of central service C = $\bigvee_{N \in \text{instances}(C)}$ Status (N)

Status of site S = AND



Everything is calculated for each VO that defined critical tests in FCR

Results make sense only if VO submits tests!!!

Availability metrics - algorithm II

- Service and site status values are recorded every hour (24 snapshots per day)
- Daily, weekly, monthly availability is calculated using integration (averaging) over the given period
- Aggregate Tier1/0 availability is calculated using integration (averaging) of all Tire1/0 sites.

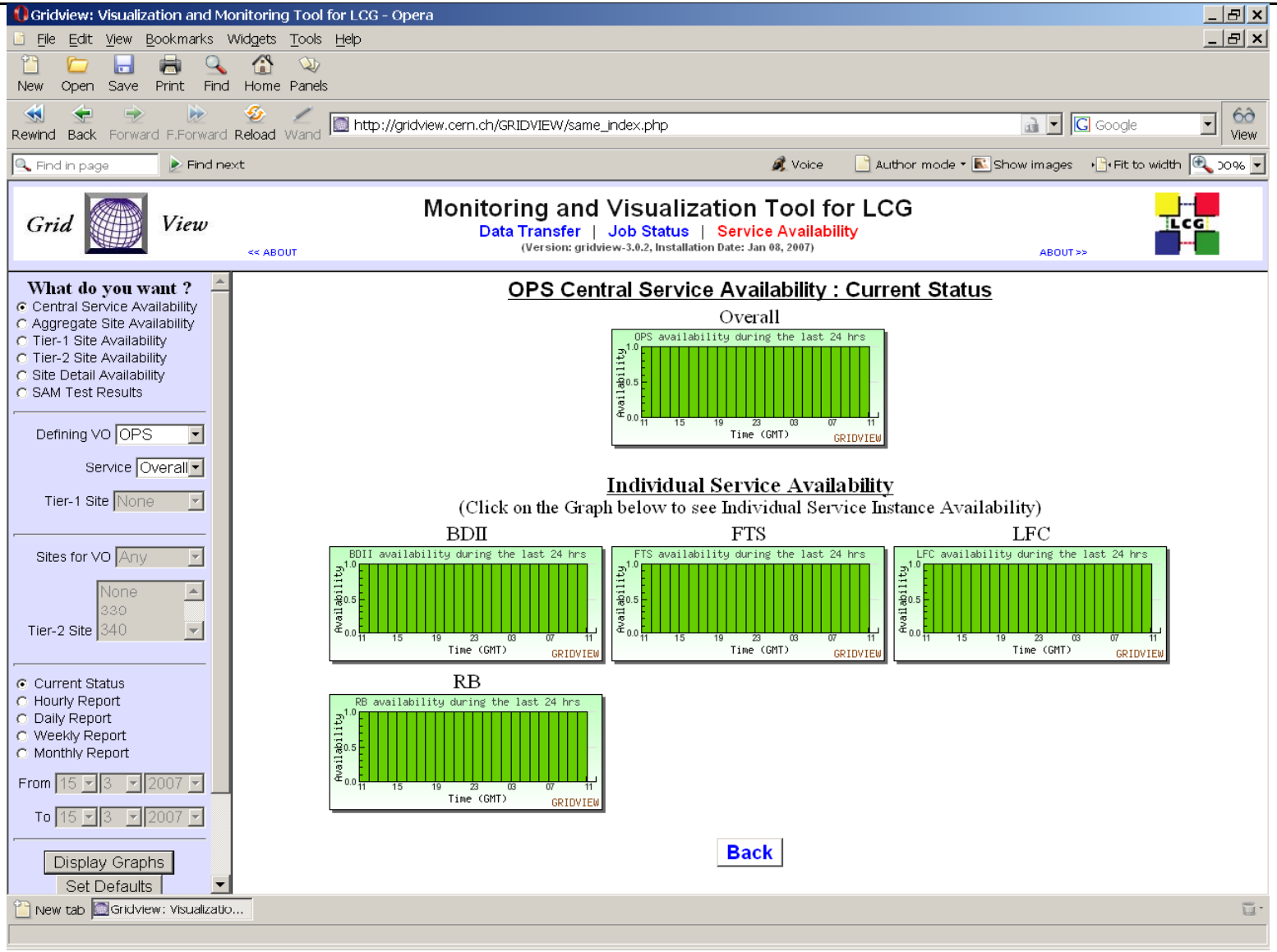
Visualization Components

- Visualization of SAM Test Results in Gridview
  - Bar Graphs indicating status
  - Summary tables displaying result summaries
  - Detailed results displaying output of the tests (useful for troubleshooting purposes)
- Visualization of Service Availability Metrics in Gridview
- All Visualization components display metrics for the specified VO
- This enables VOs to have their own perspective of the service

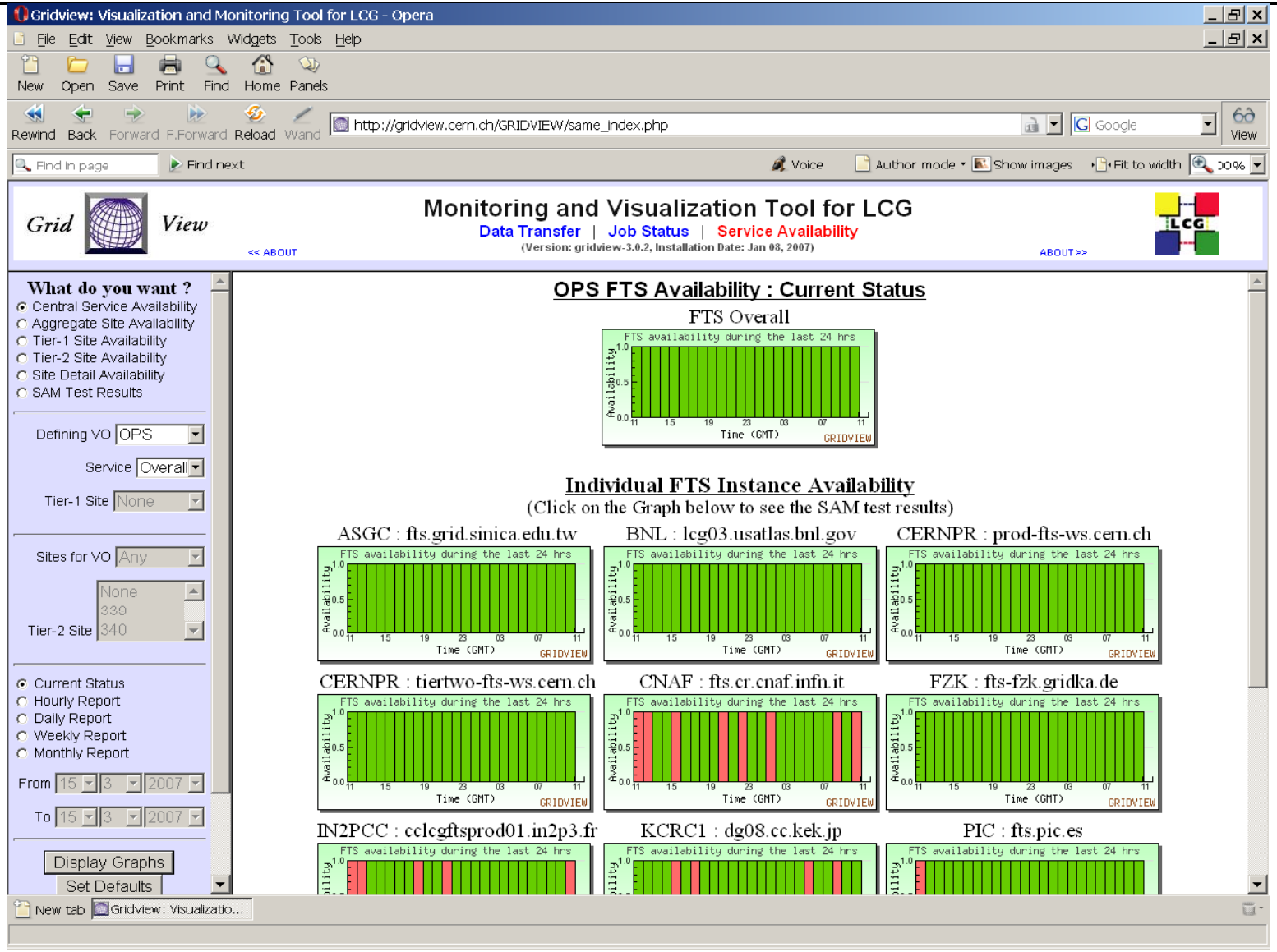
Visualization of Availability Metrics

- Gridview displays graphs for various availability metrics
  - GREEN portion on Graph indicates Availability
  - RED indicated Non-Availability
- GridView displays include Graphs and Reports for
  - Central Service Availability (FTS, LFC, RB)
  - Aggregate tier-1 site Availability
  - Site-wise availability for individual tier-1 sites
  - Site-wise service availability of tier-2 sites (grouped by associated VOs)
  - Detailed availability of various services (CE, SE, SRM) and their individual instances running at a particular site
- Full traceability from aggregate Availability to detailed SAM test results
- Provision for saving user preferences based on certificates

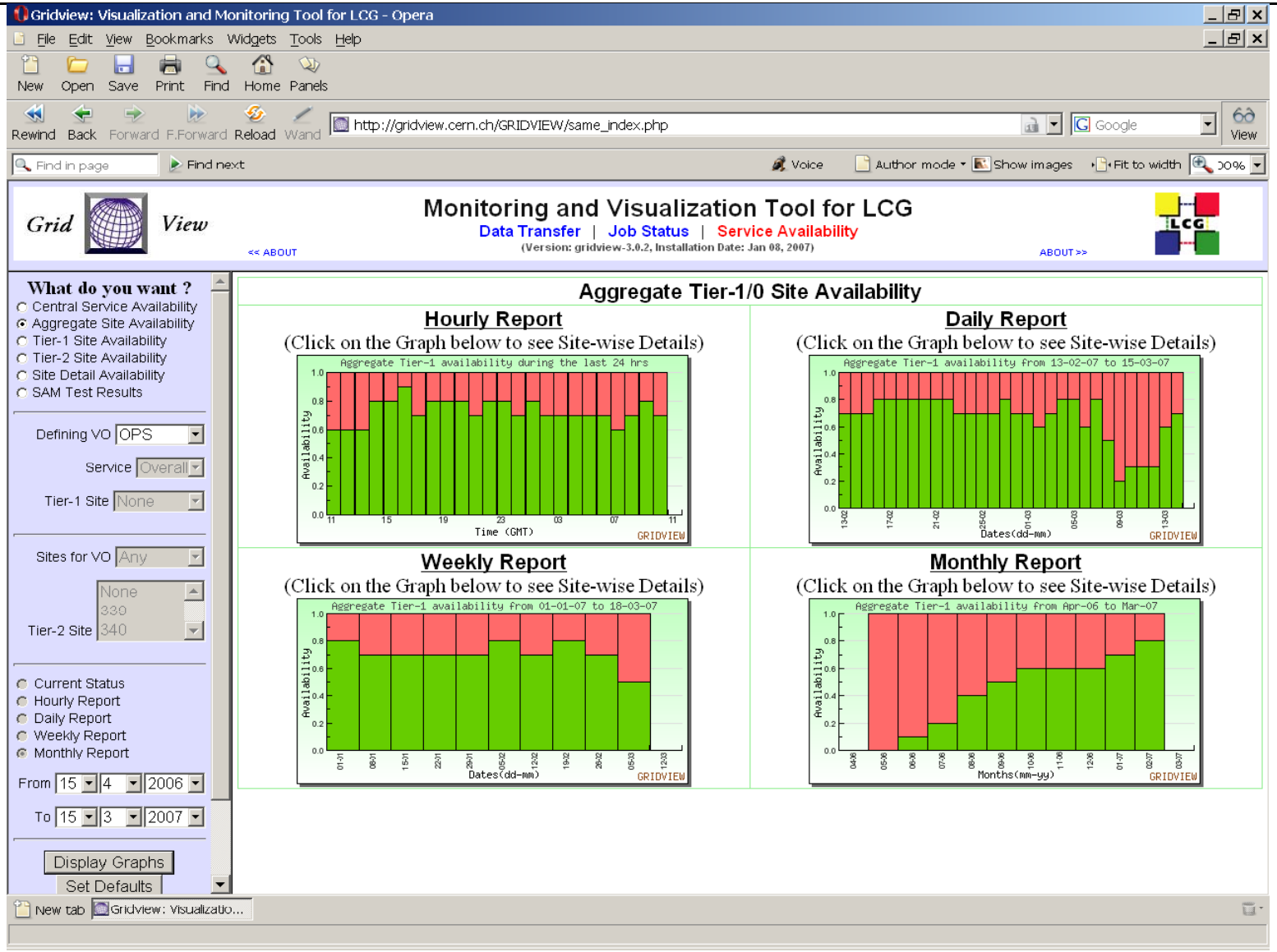
Service Availability Monitoring : Central Service Availability



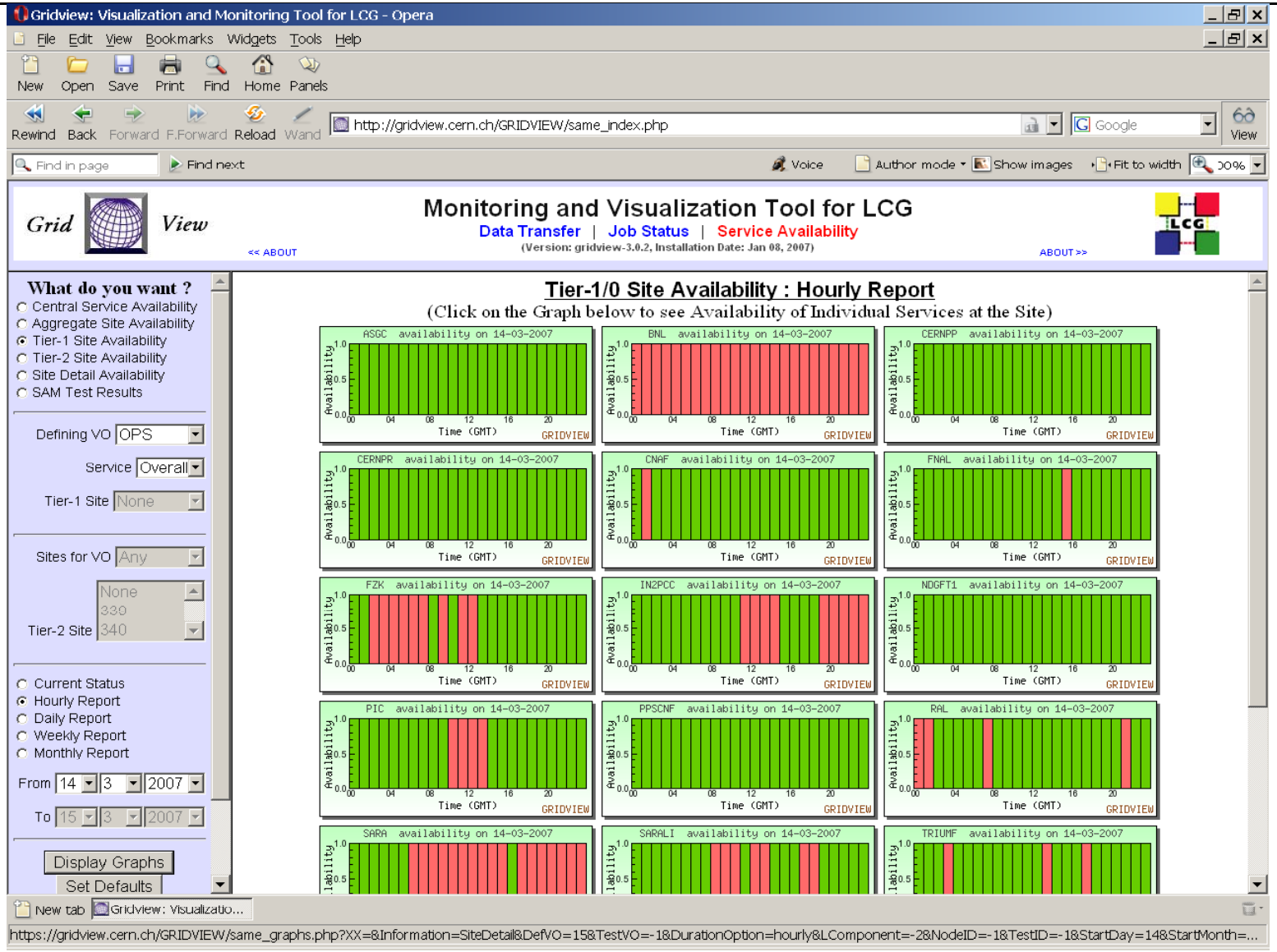
Service Availability Monitoring : FTS Instance Availability



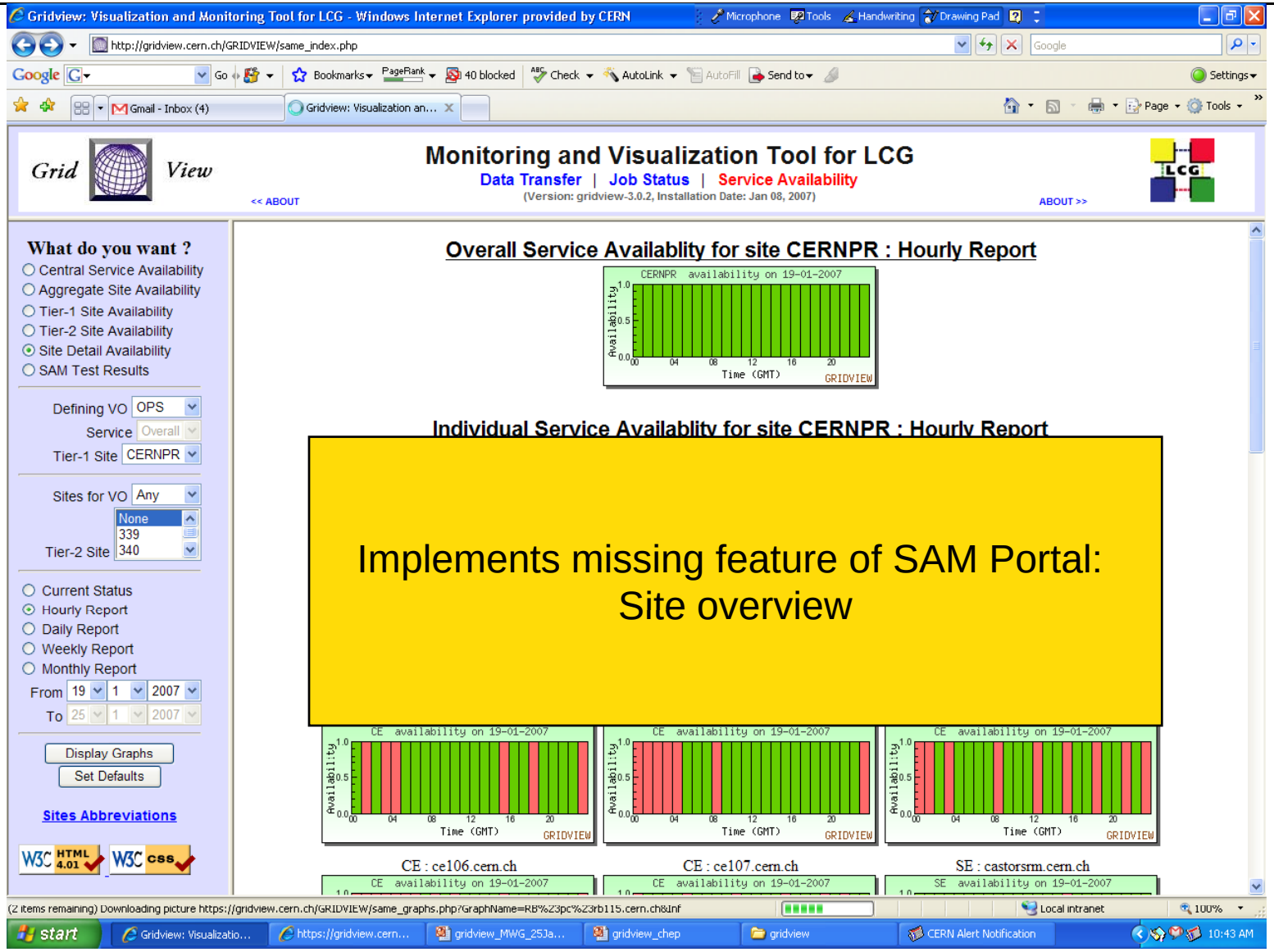
Service Availability Monitoring : Aggregate T1 Site Availability



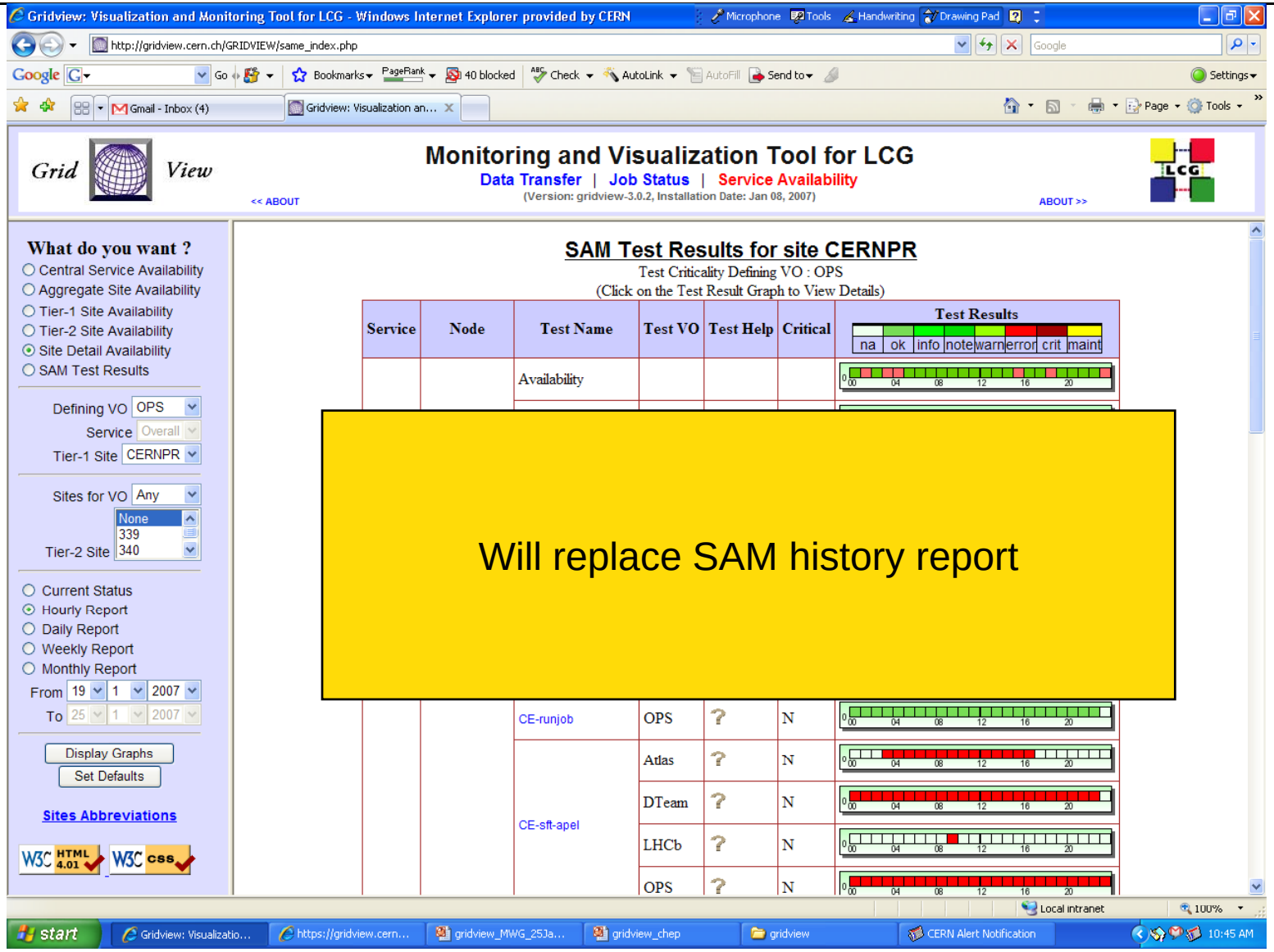
Service Availability Monitoring : Tier-1 Site Availability



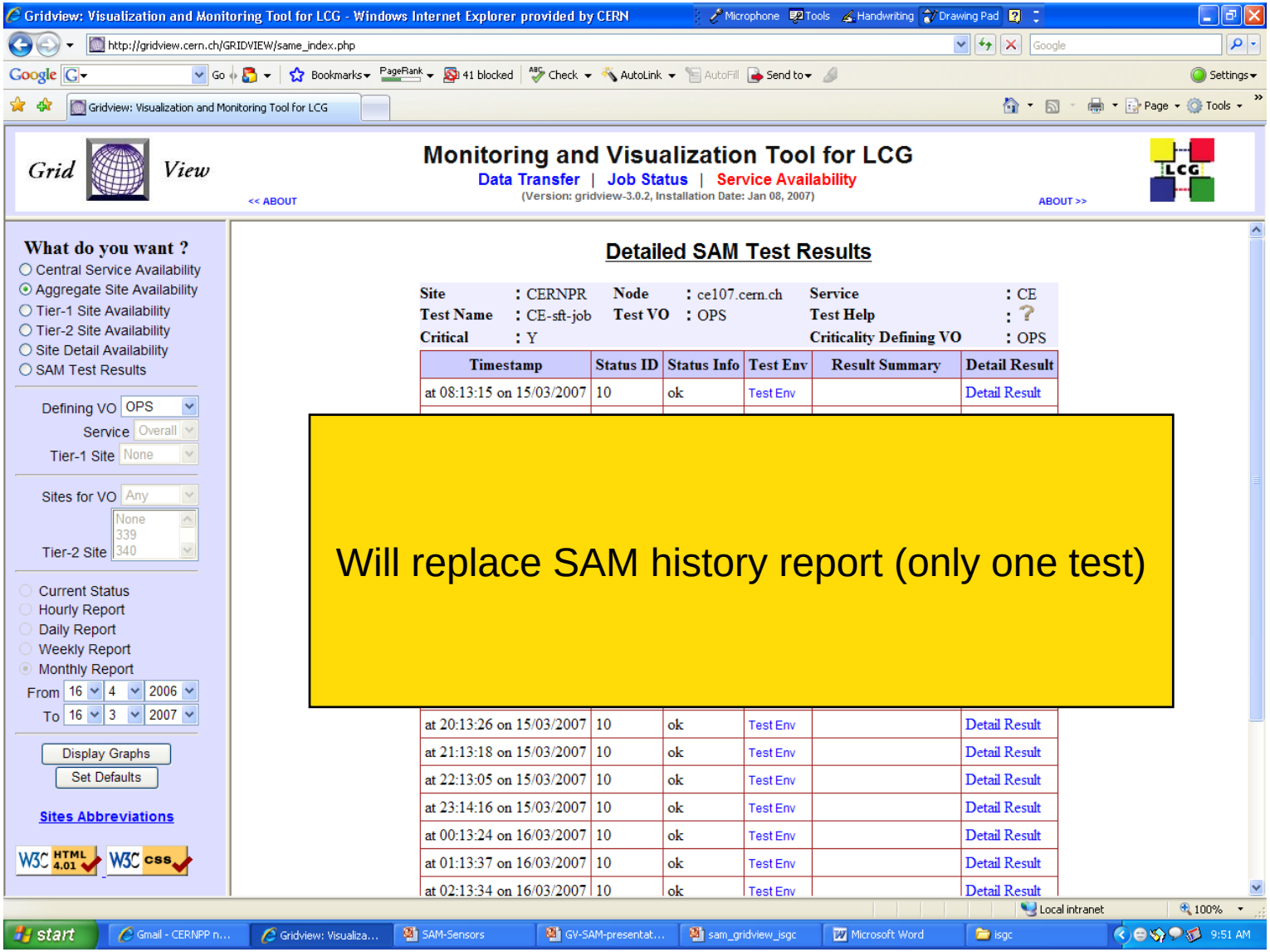
Service Availability Monitoring : Site Detail Availability



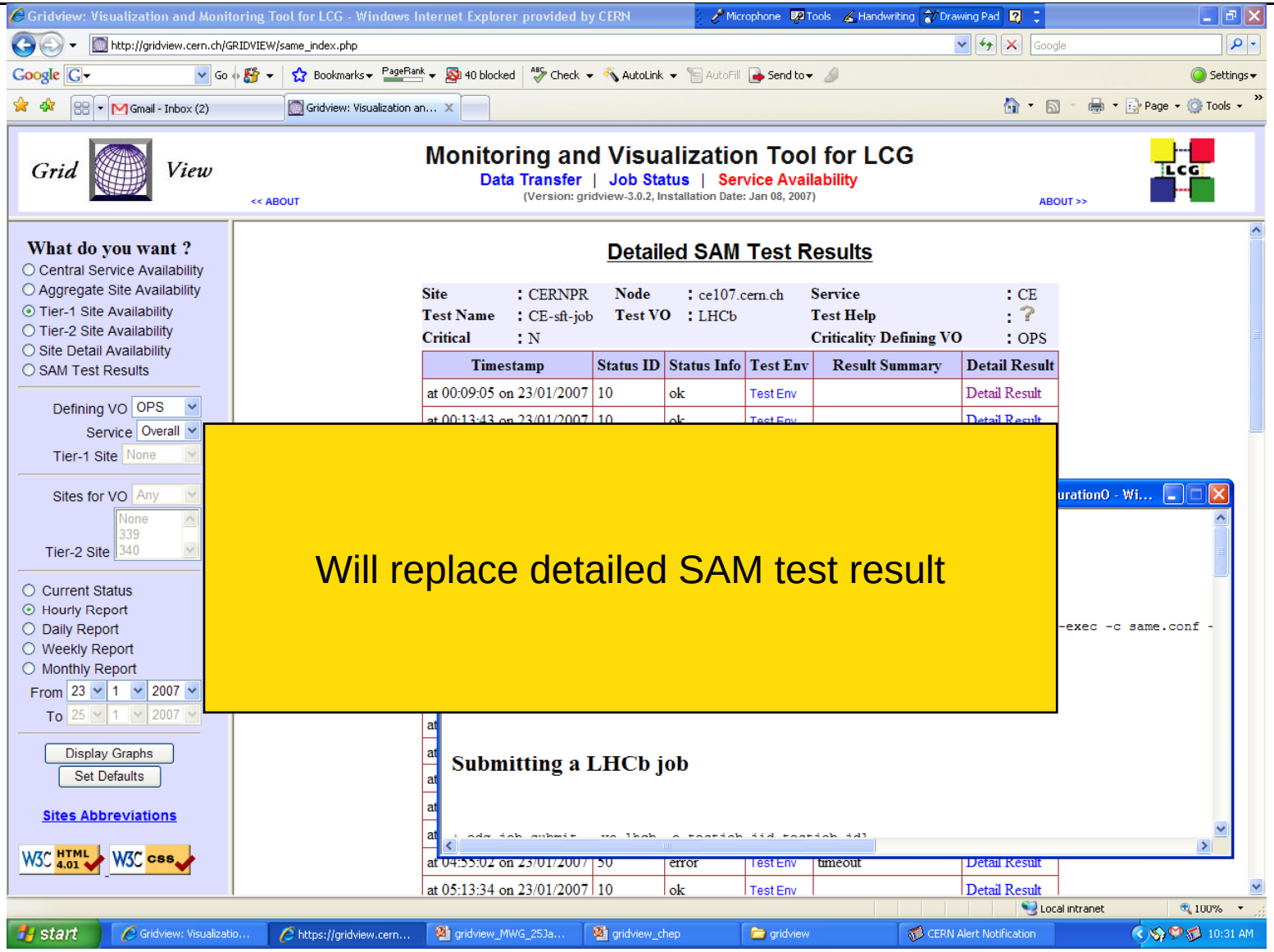
Service Availability Monitoring : SAM Test Results



Service Availability Monitoring : Detailed Test Results



Service Availability Monitoring : Test output for Debugging



On-going Work

- Summarisation
  - Switching to continuous time scale calculation model
  - Generation of New Availability Metrics
- Visualisation
  - Standardization of Visualization Components according to Monitoring WG recommendation
  - Enhancement of Service Availability views/displays
  - Visualization of New Metrics
  - Generation of Site Availability and Reliability Report for WLCG MB

Summarisation Continuous timescale

- No Loss of Information

  - In discrete timescale status is sampled hourly

- Less amount of data

  - The new record is added only when the status is changed

- Scheduled Downtime

Generation of New Availability Metrics

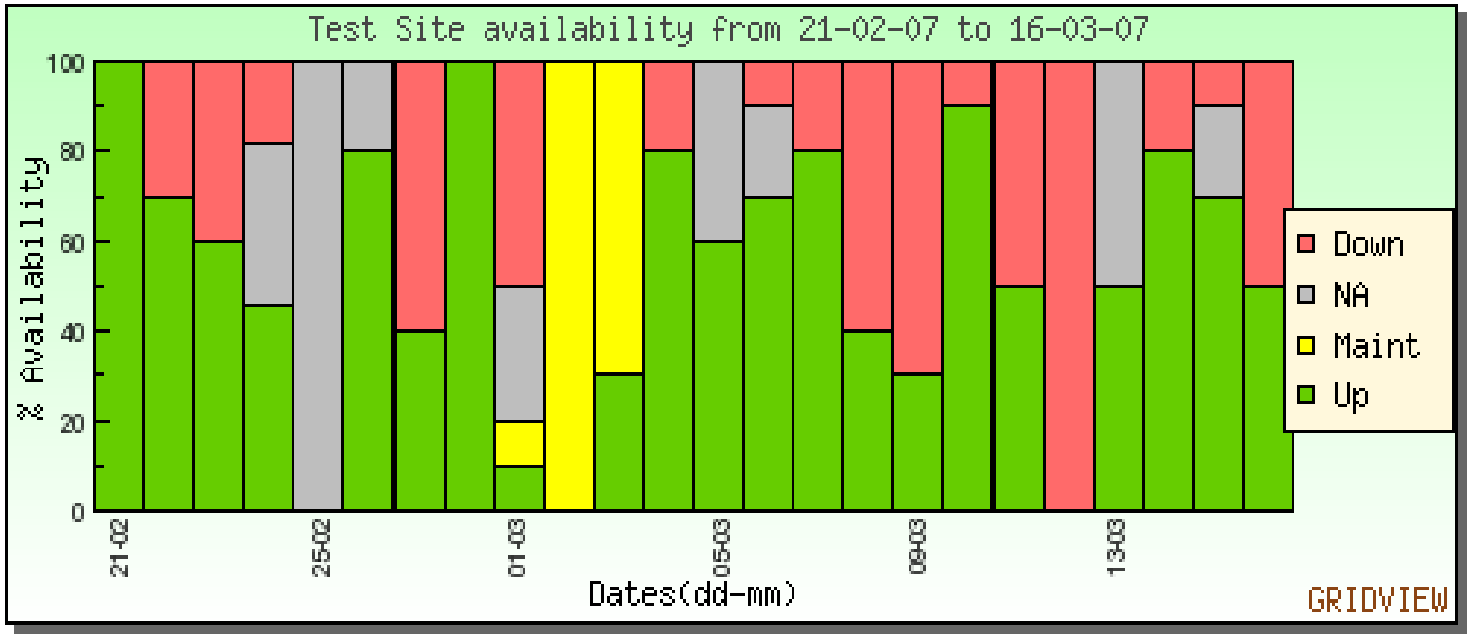
- Following new Metrics will be Generated
  - Service Reliability
    - Availability excluding scheduled Downtimes
  - Test Result Summaries
    - Status over a time interval
  - Service Status (Over Continuous Time Scale) with values like
    - UP (GREEN)
    - DEGRADED below 80 % (BLUE)
    - DEGRADED below 50 % (VIOLET)
    - Scheduled Down (YELLOW)
    - DOWN (RED)
    - UNKNOWN (GREY)

Standardization of Visualization Components

- WLCG Service Monitoring WG has drafted a standard for request of service metrics and visual components
- Standard URL based access to all visualization components
  - Full pages
  - Individual graphs
- Facilitates easy integration of visual components into other monitoring tools
- Primarily needed to integrate GridView components into COD Dashboard used by CIC/ROCs and other operational tools

Enhancement of Availability Views

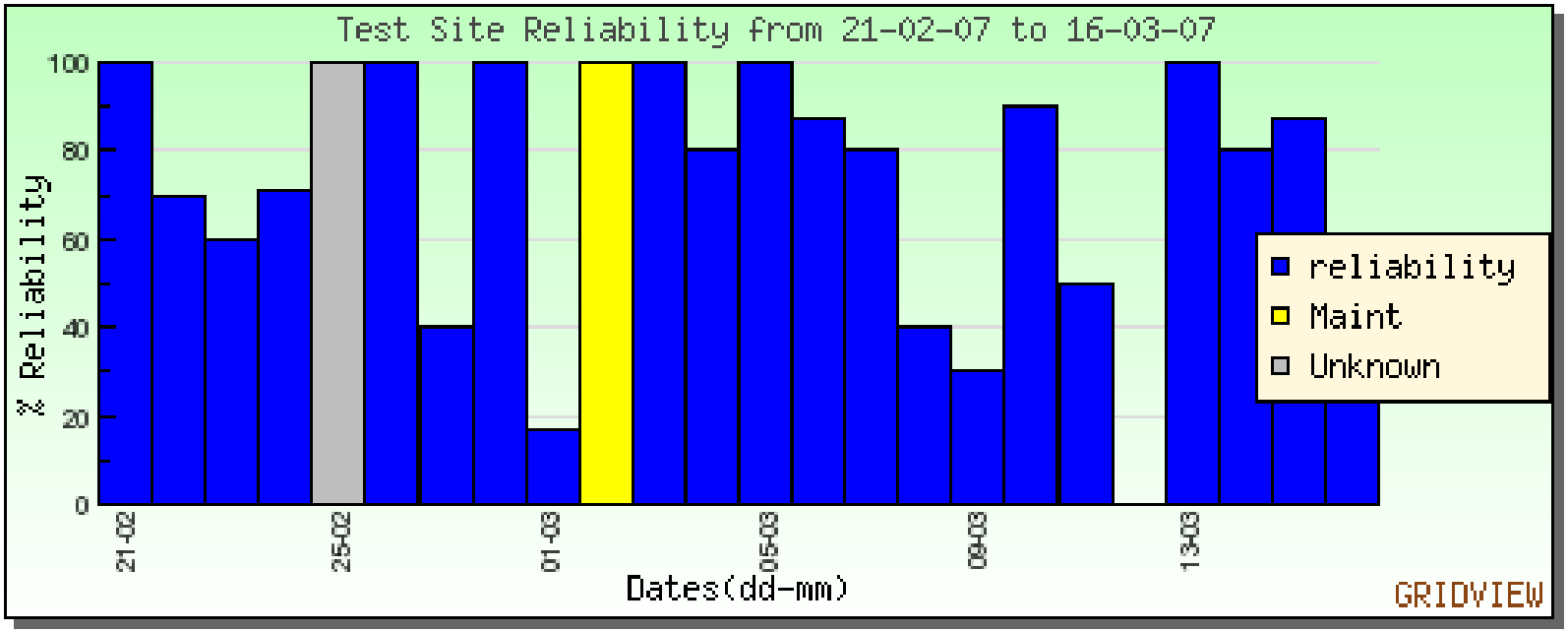
- All service Availability Graphs displayed by Gridview are to be enhanced to include
  - Maintenance Interval (Scheduled Downtime, YELLOW)
  - Interval for which Availability is N/A (Unknown Status, GREY)



Visualization of New Metrics

- Following new metrics need to be visualized
  - Service Reliability
  - Test Result Summaries
  - Service Status
- We have planned two types of views for Test Result Summaries and Service Status
  - Instantaneous View (Snapshot at a given point in time)
  - Continuous View (Follow-up over a period of time)

Service Reliability (Sample View)



Thank You

Your comments and suggestions please

GOCDB3 Synchronization Module

- Grid Resource Information
- GOCDB2 was Used
- Exiting schema will be used first
- Redesign of schema according to Monitoring WG recommendation