



Enabling Grids for E-science

Grid Site Monitoring with Nagios

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www.eu-egee.org



Information Society
and Media

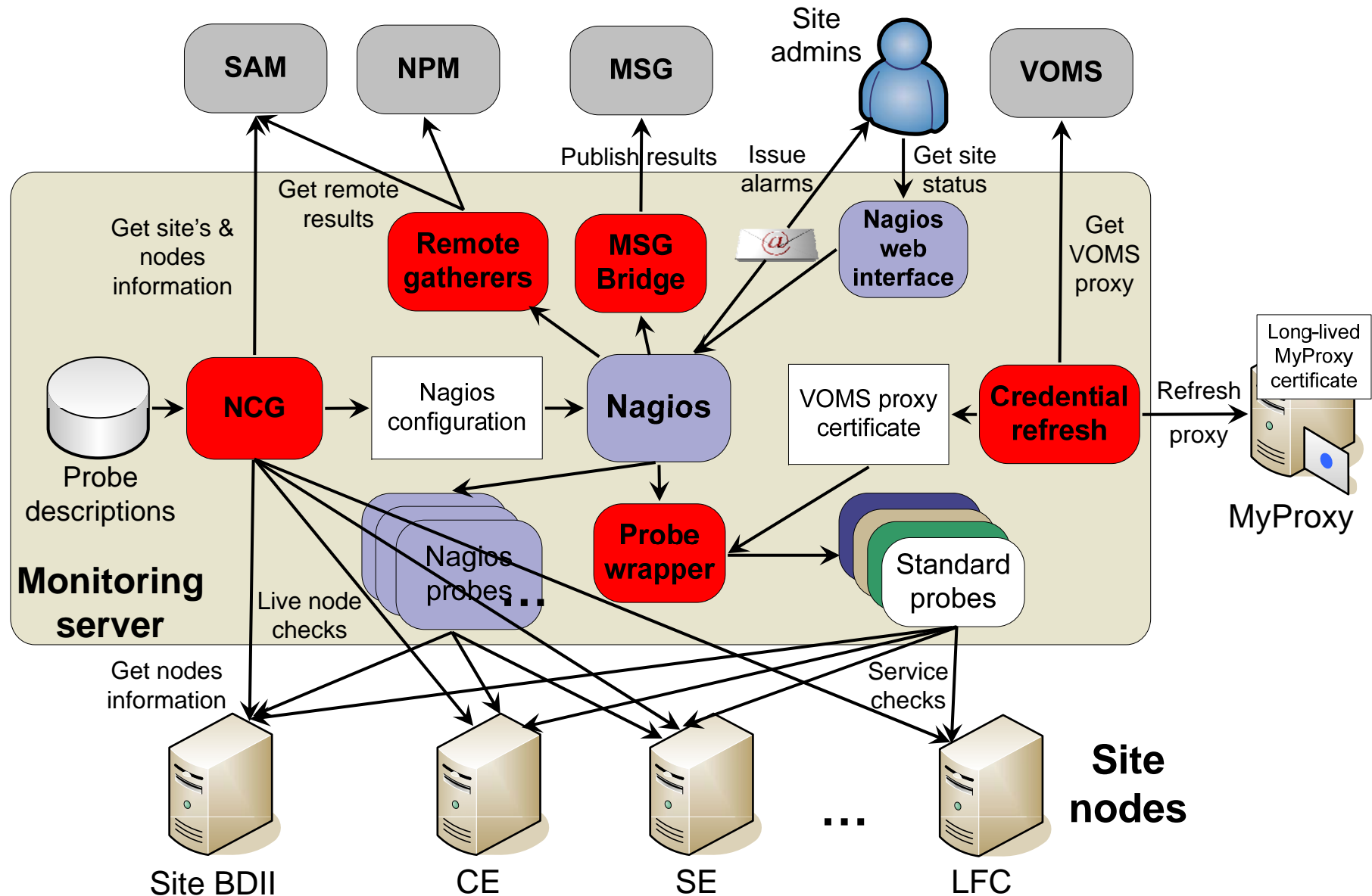


- **Introduction**
- **Architecture**
- **Standard grid probes**
- **Credential management**
- **Remote gatherers**
- **MSG bridge**
- **Nagios Config Generator**
- **Remote gLite UI**
- **Future work**
- **Conclusions**

- **Provide site admin-centric monitoring**
 - simplify grid resources operations
- **Enable better resource availability & reliability**
 - issue notifications as soon as problem appears
- **Achieve sensor's dependencies**
 - only relevant notifications are issued
 - enables problem isolation
- **Report generation**
 - availability, problem history
- **Use well known, widely accepted system**

- **Monitoring CRO-GRID Infrastructure (2004-2006)**
 - Globus Toolkit Pre-WS & WS, UNICORE, other services
 - active recovery of services
 - <http://www.cro-ngi.hr>
- **Monitoring EGEE resources in Central Europe (CE)**
 - core services since mid 2006
 - all CE sites for 1st line support since September 2006
 - <http://nagios.ce-egee.org>

- **Grid Services Monitoring (GSM) WG**
 - site monitoring prototype, mid 2007
 - packaging, standard probe format, ...
 - <http://crnjak.srce.hr/nagios> (egee.srce.hr)
- **Operations Automation Team**
 - part of the high level strategy
 - continued development and integration



- **Probes for monitoring grid services**
 - reusable in any monitoring framework
 - Grid Monitoring Probes Specification
 - <https://twiki.cern.ch/twiki/bin/view/LCG/GridMonitoringProbeSpecification>

```

$ MyProxy-probe -u sel-egge.srce.hr \
                -m hr.srce.MyProxy-CertLifetime
serviceType: MyProxy
metricName: hr.srce.MyProxy-CertLifetime
metricStatus: OK
timestamp: 2008-04-23T22:48:08Z
summaryData: Certificate will expire in 113.87 days (Aug 15 19:34:35
2008 GMT).
serviceURI: sel-egge.srce.hr
gatheredAt: crnjak.srce.hr
EOT

```

- **Run by Nagios server**
 - WLCG probe wrapper (check_wlwg)
- **Atomic checks of grid services**
 - e.g. transfer file via SRM, store MyProxy, check certificate lifetime
- **Three sets of standard probes**
 - SRCE
 - CERN
 - OSG

- **Provides credentials for standard probes**
- **Based on MyProxy certificate**
 - host certificate-based MyProxy certificates
 - must be renewed periodically by site admin
- **Run by cronjob**
 - result reported as passive check
 - `hr.srce.GridProxy-Get`
- **MyProxy certificate lifetime check**
 - sends expiration warning
 - `hr.srce.MyProxy-ProxyLifetime`

- **Gather results from other monitoring systems**
 - Grid Monitoring Data Exchange Standard
 - <https://twiki.cern.ch/twiki/bin/view/LCG/GridMonitoringDataExchangeStandard>

```

<Host name="cel-egee.srce.hr">
  <Service endpoint="cel-egee.srce.hr:2119" type="CE">
    <metricGroup>
      <ServiceMetric name="NMAP">
        <measurement>
          <status>OK</status>
          <timestamp>2008-04-24T01:44:03Z</timestamp>
        </measurement>
      </ServiceMetric>
    </metricGroup>
    ...
  </Service>
  ...
</Host>

```

- **Run by Nagios server**
 - check gathers all results and import to Nagios
 - SAM-Gather (check_sam), NPM-Gather (check_npm)
- **Results are imported as passive checks**
- **Two external monitoring systems**
 - SAM
 - ENOC DownCollector

- **Publish results from Nagios**
 - enables integration with external systems
 - e.g. Nagios to Nagios communication
- **A Message System for Grids**
 - Apache ActiveMQ
 - <https://twiki.cern.ch/twiki/bin/view/LCG/MessagingSystemforGrid>

- **Generates Nagios configuration**
- **Uses multiple information sources**
 - SAM, BDII, active heuristic checks, admin's rules
 - special logic for aliases and load balancing nodes
- **Modular approach**
 - plugging in additional information sources
 - integration with other monitoring systems (e.g. LEMON)

- **Probe description database**
 - frequencies, timeouts, arguments needed, dependencies
 - part of NCG
- **Service dependencies**
 - alarm masking
 - hierarchy of probes
 - simple probes more often (e.g. 5 min)
 - heavyweight probes less often (e.g. 30 min)

- **Services**
 - high level Grid services
 - e.g. CE, SE, VOMS, LFC
 - mapped to Nagios **hostgroups**
- **Metric sets**
 - concrete low-level services
 - e.g. BDII, GRAM Gatekeeper, GridFTP, SRMv1, DPNS
 - mapped to Nagios **servicegroups**
- **Metrics**
 - metrics from standard probes, remote results
 - e.g. hr.srce.GRAM-CertLifetime, hr.srce.GridProxy-Get, CE-sft-job-OPS
 - mapped to Nagios **services**

- **Local**
 - standard grid probes (active)
- **Remote**
 - results gathered by remote gatherers (passive)
 - provided links to external interfaces and documentation
- **Native**
 - native Nagios checks (active)
 - provided links to documentation

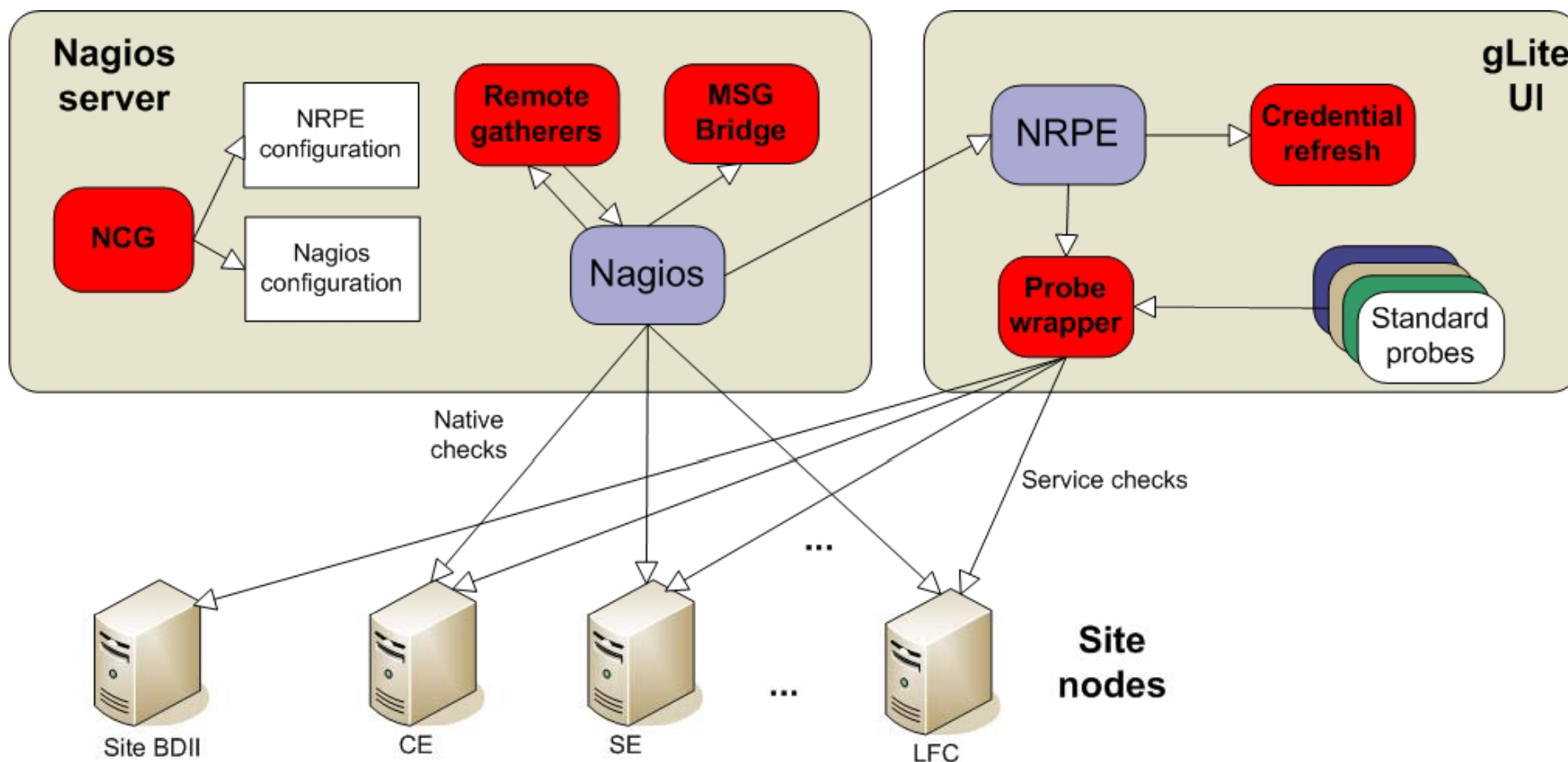
- **Mapped to Nagios servicegroups**
 - local, remote (sam, npm), native
- **Service dependencies**
 - e.g. service from standard grid probes depend on `hr.srce.GridProxy-Valid`,
remote probes depend on gatherers SAM-Gather, NPM-Gather

- Apache HTTP structure
- Detailed configuration for each module
- Modules' documentation is provided in modules
 - perldoc

```
# global variable, loads env variable
SITENAME = ${SITE_NAME}

<NCG::ConfigGen>
  <Nagios>
    MYPROXY_SERVER=${MYPROXY_SERVER}
    GLITE_VERSION=${GLITE_VERSION}
    PROBES_TYPE=all
    # NRPE_UI=nrpe.srce.hr
  </Nagios>
</NCG::ConfigGen>
```

- Avoid installation of grid middleware on Nagios server



- **NCG cache**
 - keep old info when nodes are down
- **GOCDB integration**
 - region, site and services information
 - site personnel information
 - scheduled downtimes
- **NRPE on service nodes**
 - monitoring local components (logs, processes, etc.)
- **Bidirectional MSG bridge**
 - receive information from external systems

- **Nagios**
 - highly configurable monitoring framework with notifications, service dependencies, ...
 - widely used by site admins
- **Grid extensions**
 - integration with existing infrastructure (user certificates, VOMS, GOCDB, SAM)
 - probes for key grid services
 - GSM WG specifications key for integration
- **Nagios @ grid**
 - enables sites' better availability
 - admins get only relevant notifications

Thank You!

Questions?

<https://twiki.cern.ch/twiki/bin/view/LCG/GridServiceMonitoringInfo>