WP7: Adaptive Grid Components

month 24 status report

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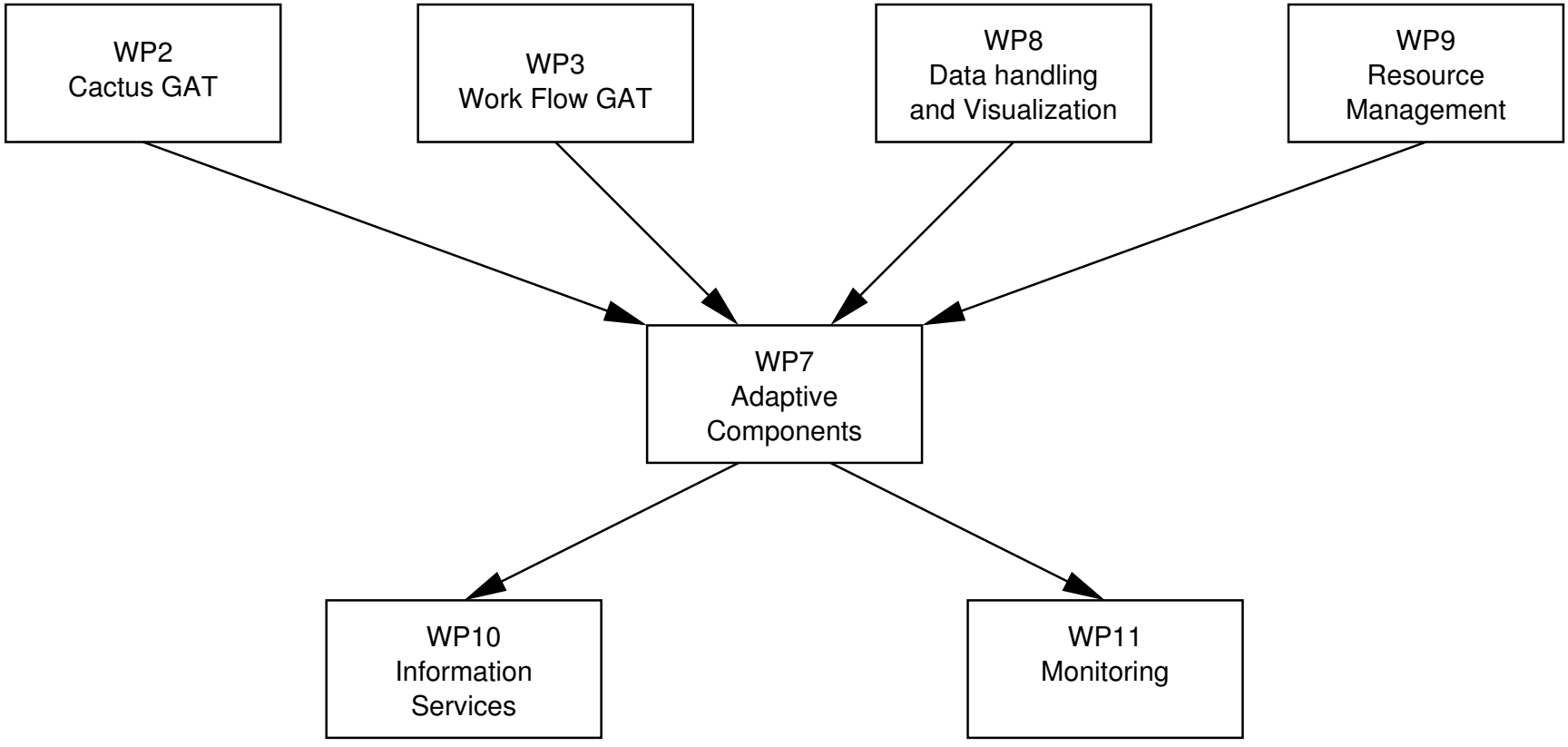
Role of WP7 in GridLab

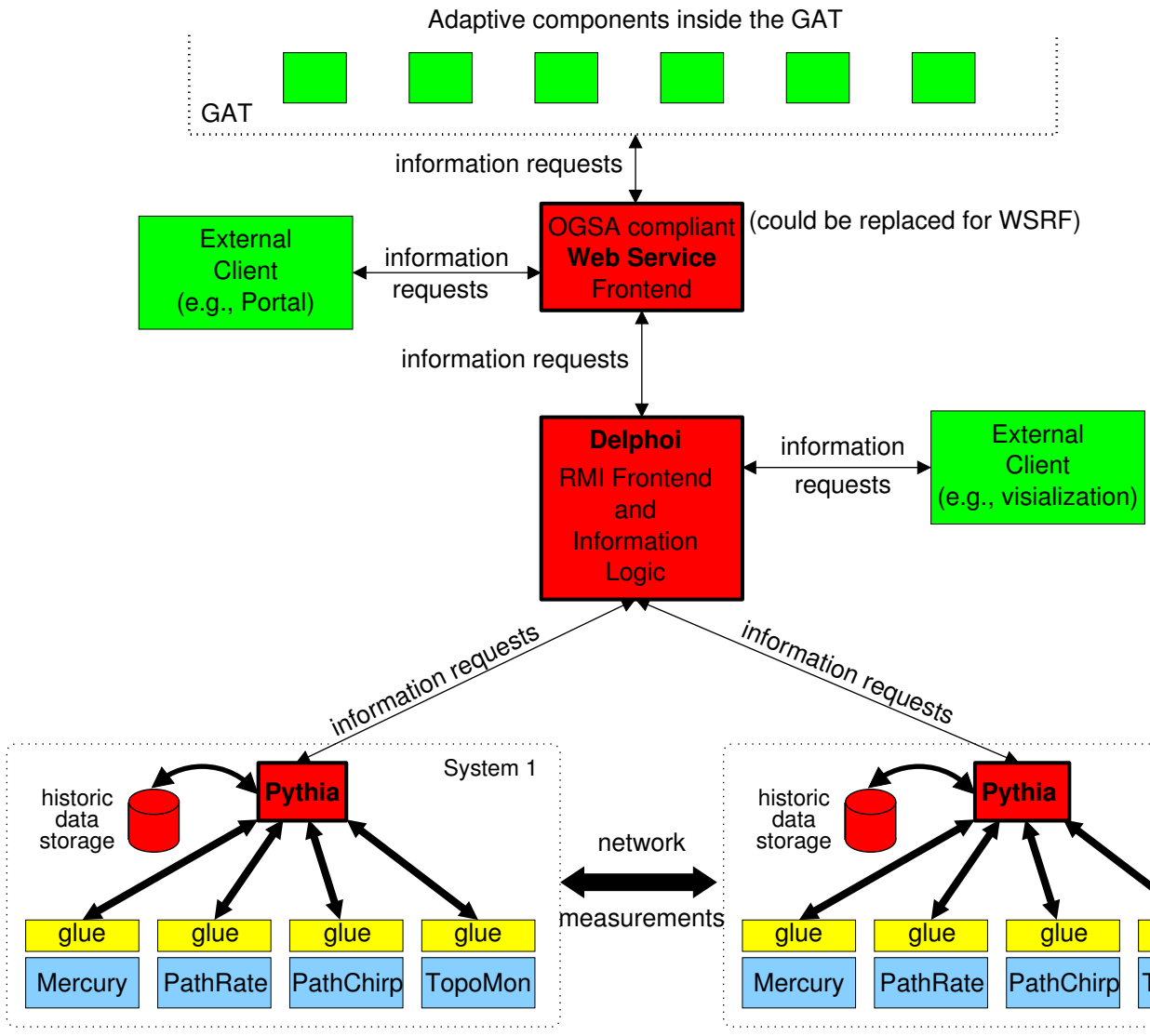
- Provide adaptive application components to GAT modules
- Focus core adaptation mechanisms inside one re-usable implementation:
  - retrieving monitoring information
  - forecasting
- Translate monitoring data to application performance

WP7 Position in GridLab



WP7-components interface the GAT to resource information

WP7 Architecture



Main Features

- Components (inside GAT) adapt application behavior
- **Delphoi** service provides access to distributed performance information
  - Web service interface
    (can be replaced e.g. for WSRF)
  - forecasting
- **Pythia** services collect information per site
  - control network measurements
  - use Mercury
  - maintain measurement history (disk space)
- Fault tolerance, intrusion resilience, diagnostics

Novelty

- Integrated system for retrieving various kinds of performance data
  - unified interface to adaptive GAT components
  - can easily be extended to additional characteristics
- Hierarchy of useful network performance characteristics has been developed as contribution to GGF's NM-WG
- Minimized intrusiveness
- Fault tolerance, intrusion resilience
- Extensive diagnostics
- Platform independence for heterogeneous grid environments

Related Work

- Network Weather Service (NWS)
  - limited/static set of performance characteristics
  - no good integration into GridLab's service architecture
  - we derived forecasting library from NWS forecaster
- Network performance tools
  - many isolated tools (island solutions)
  - we integrated Pathrate and pathChirp
- GrADS project
  - similar aims, but focused on program development and compilation
  - GAT components provide (black box) runtime services

New since June 2003

- Software (Delphoi + Pythia) is operative (deliverable of month 24)
- Deployment on the testbed
- Delphoi diagnostics WWW page

Pathrate test matrix.

machines	n0.hpcc.sztaki.hu	fs0.das2.cs.vu.nl	packcs-e0.scai.fraunhofer.de	gridentry.uni-paderborn.de	hitcross.lrz-muenchen.de	peyote.aei.mpg.de
n0.hpcc.sztaki.hu		OK	ERROR	OK	OK	OK
fs0.das2.cs.vu.nl	OK		OK	OK	OK	OK
packcs-e0.scai.fraunhofer.de	OK	OK		OK	OK	OK
gridentry.uni-paderborn.de	OK	ERROR	OK		ERROR	GAVEUP
hitcross.lrz-muenchen.de	OK	OK	OK	OK		OK
peyote.aei.mpg.de	OK	OK	OK	OK	OK	
sierra0.unile.it	OK	GAVEUP	OK	OK	OK	OK
grape.man.poznan.pl	TIMEOUT	OK	OK	OK	OK	OK
skirit.ics.muni.cz	OK	OK	OK	OK	OK	OK
rage1.man.poznan.pl	OK	TIMEOUT	OK	OK	OK	OK
litchi.zib.de	OK	OK	OK	OK	OK	OK

Standardization (GGF)

- GGF NM-WG, contribution to upcoming recommmendation document
  “A Hierarchy of Network Performance Characteristics for Grid Applications and Services”
- GGF APPS-RG (Applications research group)
  Co-chair, collecting application experiences through GGF workshops
- GGF GridCPR-WG (Grid Checkpoint and Recovery)
  Co-chair, developing CPR API and architecture
- Gridstart, TWG on Grid Applications / Grid Application Programming Interfaces

Dissemination (1/2)

- G.Allen, K.Davis, K.Dolkas, N.Doulamis, T.Goodale, T.Kielmann, A.Merzky, J.Nabrzyski, J.Pukacki, T.Radke, M.Russell, E.Seidel, J.Shalf, I.Taylor. **Enabling Applications on the Grid - A GridLab Overview**. *International Journal on High Performance Computing Applications*, Volume 17, No. 4, Winter 2003, pp. 449-466.
- R.van Nieuwpoort, J.Maassen, T.Kielmann, H.Bal. **Satin: Simple and Efficient Java-based Grid Programming**. *AGridM 2003, Workshop on Adaptive Grid Middleware*, New Orleans, Louisiana, USA, September 2003, pp. 38-48.

Dissemination (2/2)

- B.Lowekamp, B.Tierney, L.Cottrell, R.Hughes-Jones, T.Kielmann, M.Swany. **Enabling Network Measurement Portability Through a Hierarchy of Characteristics.** *4th International Workshop on Grid Computing (Grid2003)*, held in conjunction with Supercomputing 2003, Phoenix, USA, pp. 68-75
- G.Allen, D.Angulo, T.Goodale, T.Kielmann, A.Merzky, J.Nabrzyski, J.Pukacki, M.Russell, T.Radke, E.Seidel, J.Shalf, I.Taylor. **GridLab: Enabling Applications on the Grid.** *Grid2002, 3rd International Workshop on Grid Computing*, held in conjunction with Supercomputing 2002. Published as LNCS Vol. 2536, pp. 39-45

Issues

- Use case for demonstration of adaptive components
  - Had been fixed in month 3 (D7.1)
  - Since, client software (Cactus, Triana, . . .) has changed
  - Use cases can not be implemented as originally expected
- Solution: revised set of use cases (in progress)

Plans for Last Year

- Revise set of use cases
- Implement use cases (task T7.4)
- Evaluate use cases (task T7.5)
- Publish results from use cases