Fostering the adoption of UNICORE Portal

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Outline

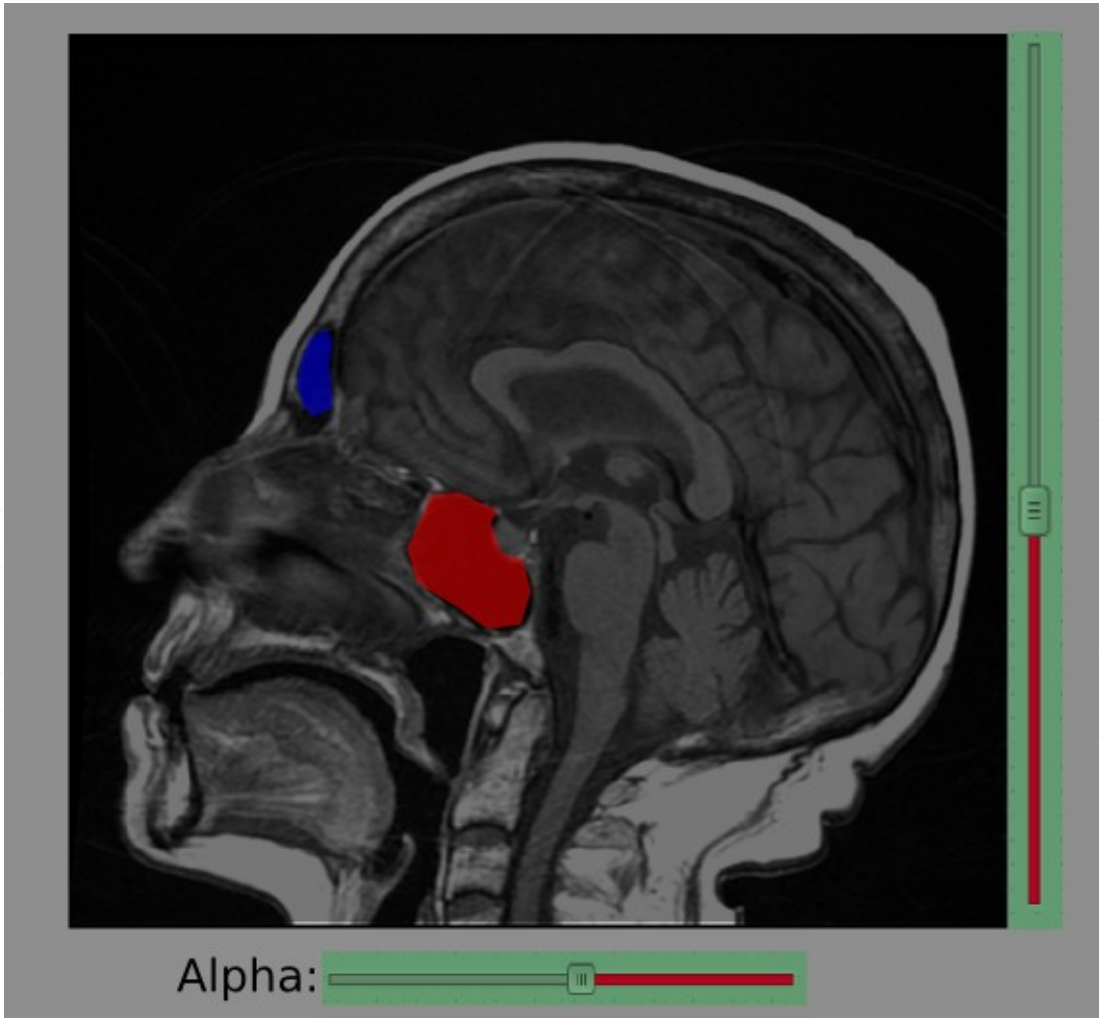
- Portal use cases
- Past experience: GridBeans
- Assumptions
- Current state of the portal
- Proposed roadmap

Approach to the portal

- UNICORE Portal can be considered as an easier to use URC replacement
  - No need to install or update
  - Can be preconfigured by its administrator for a concrete Grid infrastructure
- In this talk we look at the Portal also from a domain perspective
  - *Easy button* (tm) approach
  - Dedicated to a well defined group of users with a concrete, not generic requirements.
  - Sometimes sophisticated features needed.
- We need to support both worlds.

Use cases: SinusMed

- Image analysis of series of CT images of patient's head.
- Application recognizes and marks air-filled areas (sinuses) in the whole series allowing for obtaining 3D image.
- Useful for further processing: measuring air volume, air flow etc.



Use cases: SinusMed

- A single, *atomic* application.
  - Rather big input and output (couple of hundreds of Mbs)
- Requires:
  - Output visualization, including the output of early stages of processing, to recognize malformed input parameters.
  - Intuitive management of previous simulations, input and output sets.
  - Very simple management of resource requirements.
    - Actually should be fully automated: *the fastest track to results*.
- Future: part of multistep processing (not a workflow!)
- Very good example of a simple application that should be done right.

Use cases: fighting cancer with genomic research

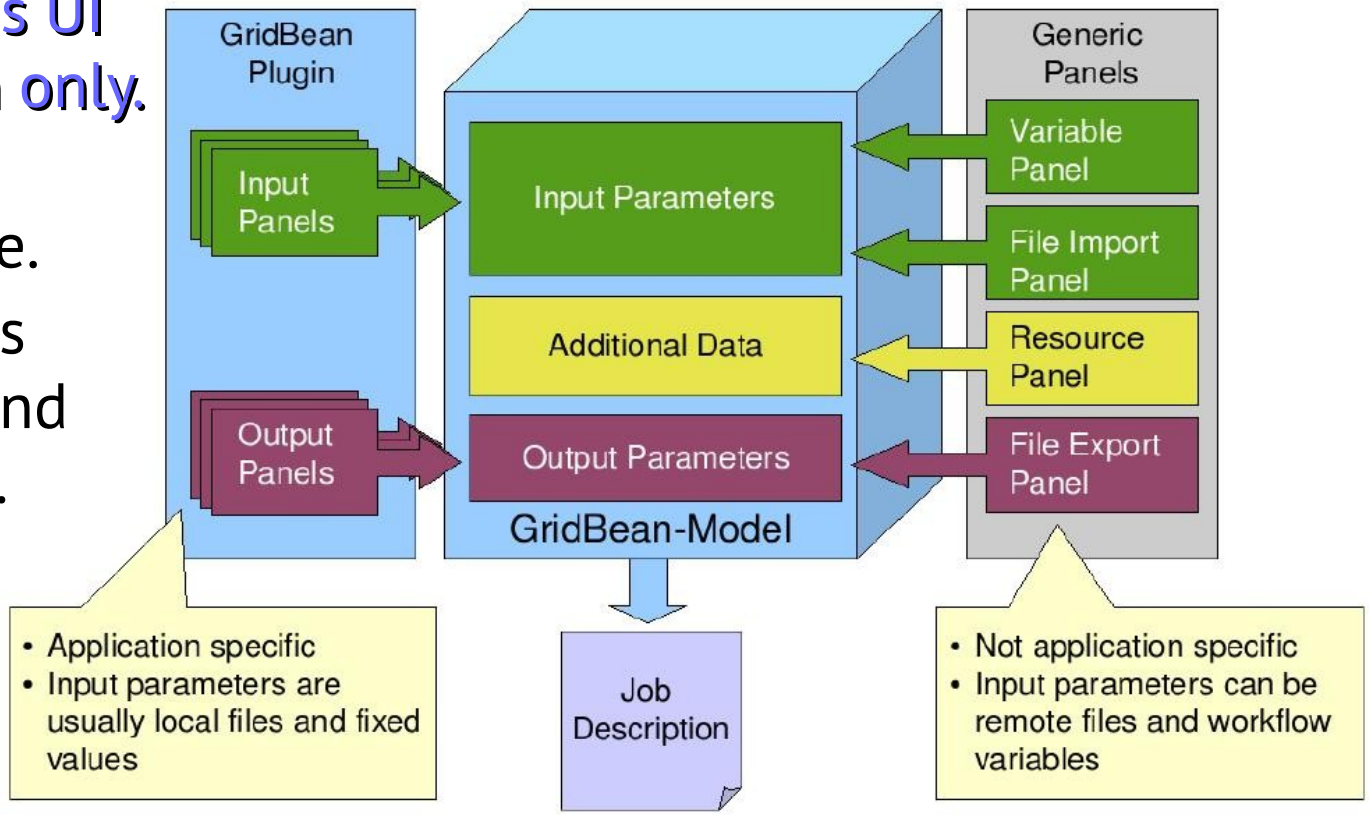
- Determination of differences between tumor and non-tumor genome sequences of tissues obtained from patients diagnosed with colorectal cancer.
- Internally: execution of a complex workflow, with structure dependent on particular simulation requirements.
- Requirements:
  - API-based preparation of a workflow and its submission.
  - Simulations management: coherent view, rebuild of input of submitted simulations. Simulation = complete workflow.
  - Simple control of selected resource requirements.
  - Sneak peek of output being generated.

Use cases: VASP

- The Vienna Ab initio Simulation Package (VASP)
  - Used for atomic scale materials modeling.
  - Computes an approximate solution to the many-body Schrödinger equation.
- GridBean-like use case:
  - Input preparation (simple),
  - Output visualization (Jmol-like).
  - Coherent presentation of all submitted simulations.
  - Automatic submission via broker.
  - Simple control of selected resource requirements.

Learning from the past: GridBeans

- GridBenas model was introduced in Grid Programming Environment, at the beginning of SOA as a universal application integration layer.
- Supports mostly atomic jobs.
- Developer programs UI and job description only.
- Fixed (prepare, run, see results) lifecycle.
- Framework provides resource, variable and files control panels.



By Sandra Bergmann (?) from GB developer guide

What was wrong with GBs?

- Exchangeable UIs (Swing or SWT or...) didn't work.
- Too complicated (extra layer) for simple applications.
- Generic in theory while UNICORE specific in practice.
- What counts:

CLOSED FRAMEWORK

  - *How to make a workflow job?*
  - *How to organize simulations in a customized way?*
  - *How to provide a simpler implementation of resource/file/variables control?*
  - *Change the overall app UI?*
  - *Interact with a job at its runtime?*

Design assumptions

- KISS & YAGNI
  - We are a small developer group, we can't afford overengineered code.
- Flexibility
  - We shouldn't produce a closed API as we can't foresee all the use cases.
  - Instead an open API is needed:

You can do whatever you want, but certain things are easier with our API

Current status of the portal

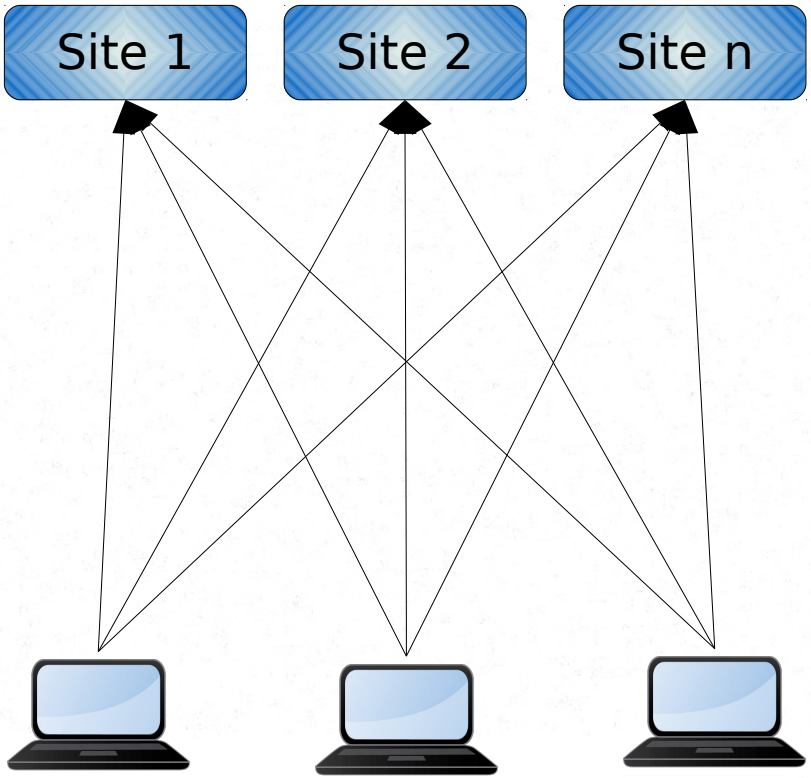
- Custom solution for shared objects – registry type.
  - Controlled in XML, tightly coupled with UI assembly.
- Grid model is imported from URC code
  - Hierarchical *nodes* structure, high use of inheritance and events.
  - Part of code not used (import).
  - Files access abstracted via Apache VFS, per user.
  - Grid status is polled.
- Couple of UI components:
  - Grid (tree), Sites (table), Jobs (table), Data (file browser).
  - Generic job component (similar to Generic GridBean).
- No portal API.

Portal code stats

Module	NCSS	% of total code	
Applet integration	1316	3%	
Authentication	2382	6%	
UI	9091	23%	
Workflow	10809	27%	
Core	16347	41%	In this nodes: 13%
TOTAL	**39945**		

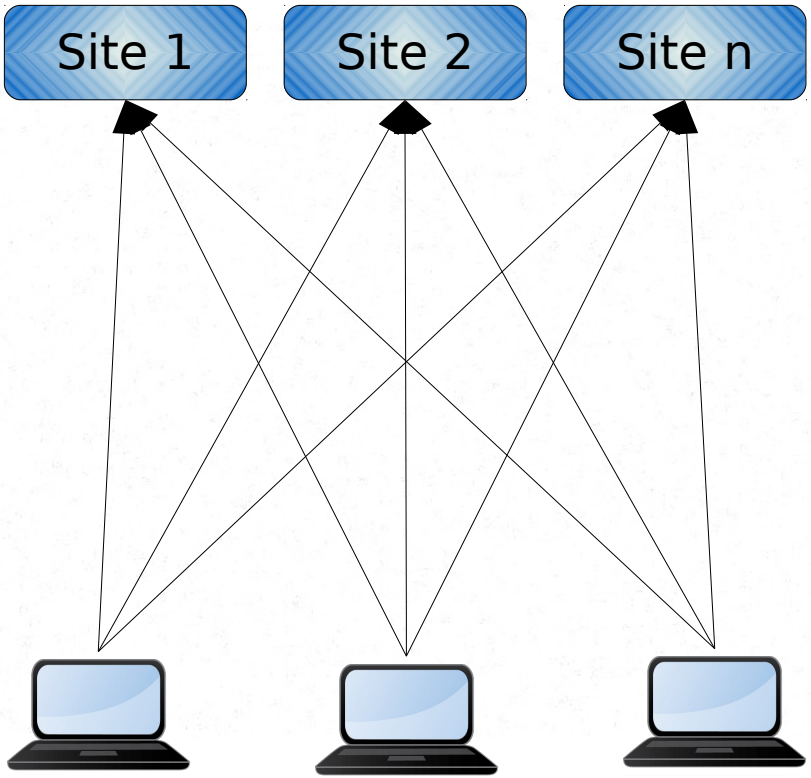
Communication flow

URC case

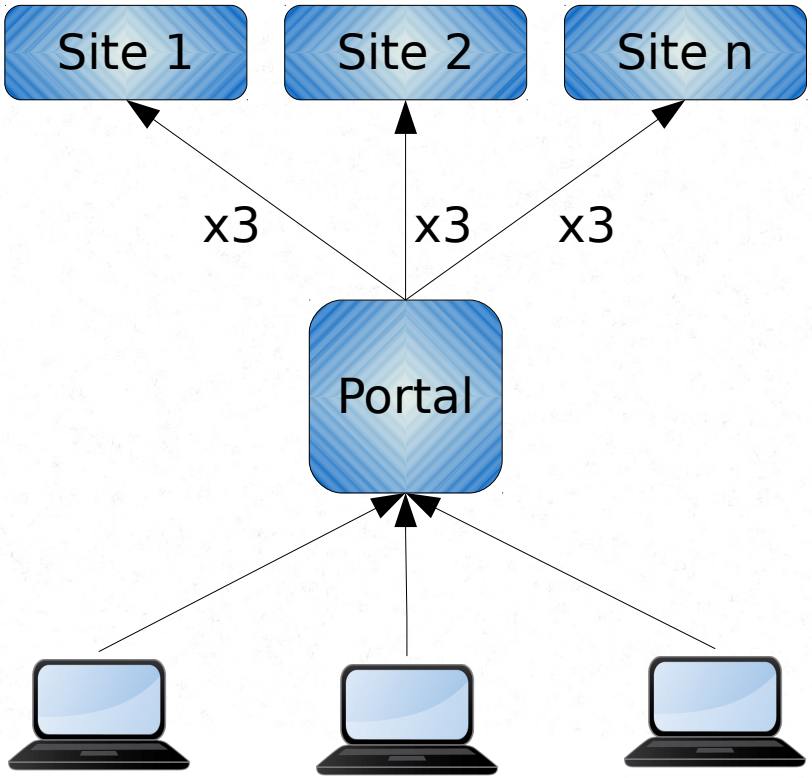


Communication flow

URC case

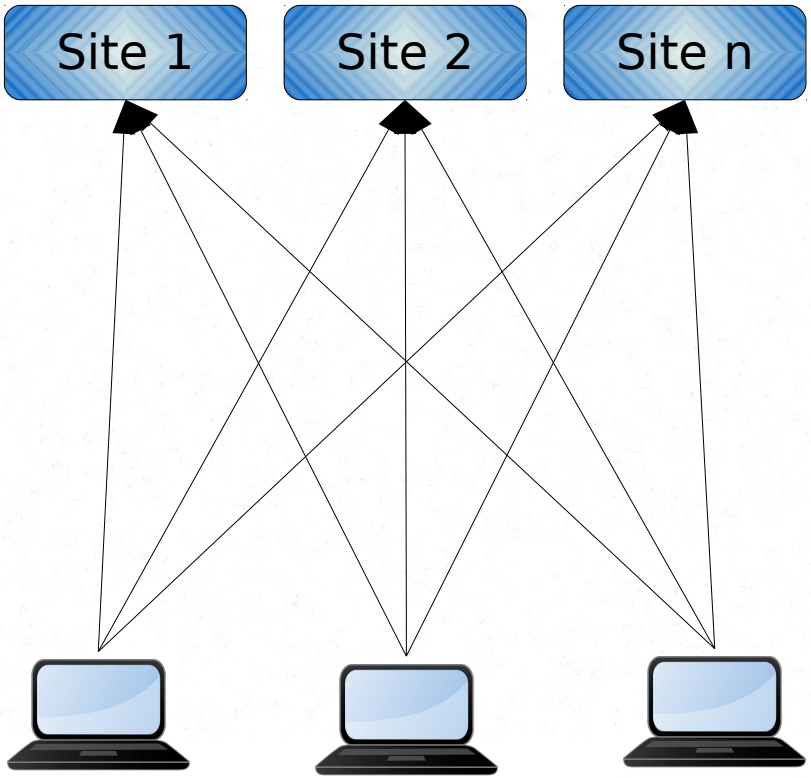


Portal case



Communication flow

URC case



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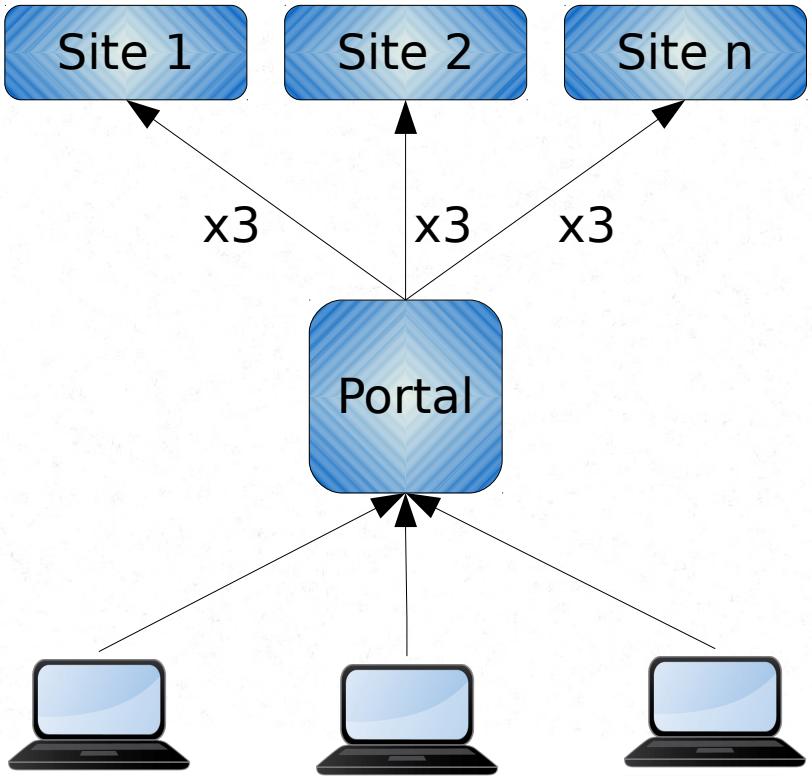


10 users x 5 sites x 20jobs = 1000 x getProperties / minute (or more)

Proposed portal roadmap

Foundation

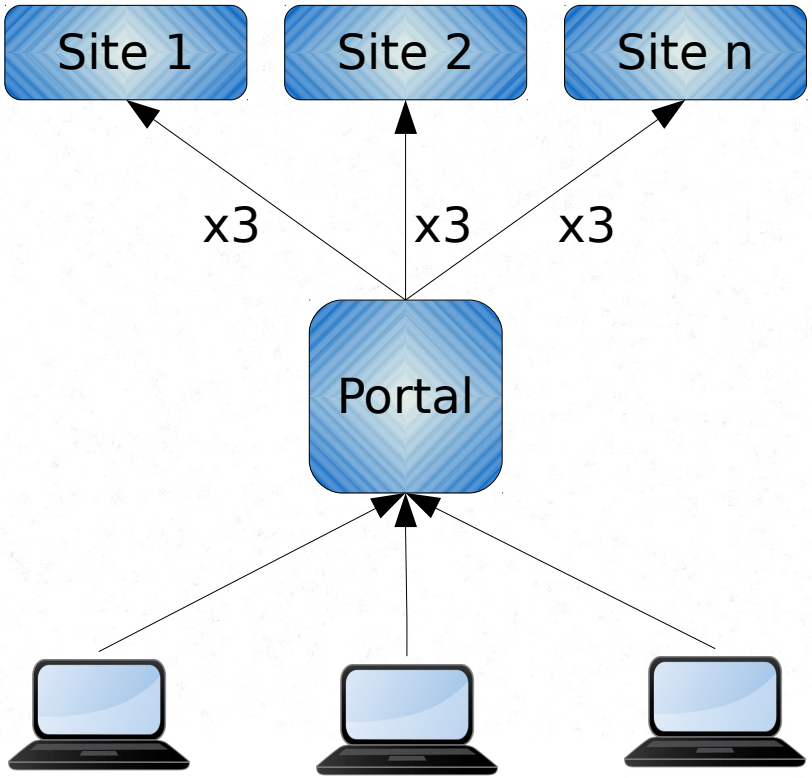
- Use standard solutions as architecture foundation: IoC (e.g. Spring) instead of custom code
  - Less code to maintain, less verbose code, app singletons dependencies, dependency cycles control, more assembly features.
- Decouple UI assembly from dependency and singletons.

The state

- Refactor grid state model so that:
  - It implements what is needed (cleanup of URC specific code)
  - The Grid topology view can be build for the portal once, not per user.
    - Faster, always available, less resource usage.
  - The cache is reliable, fast.
  - Internal events system is simpler (current is terribly heavy weight)

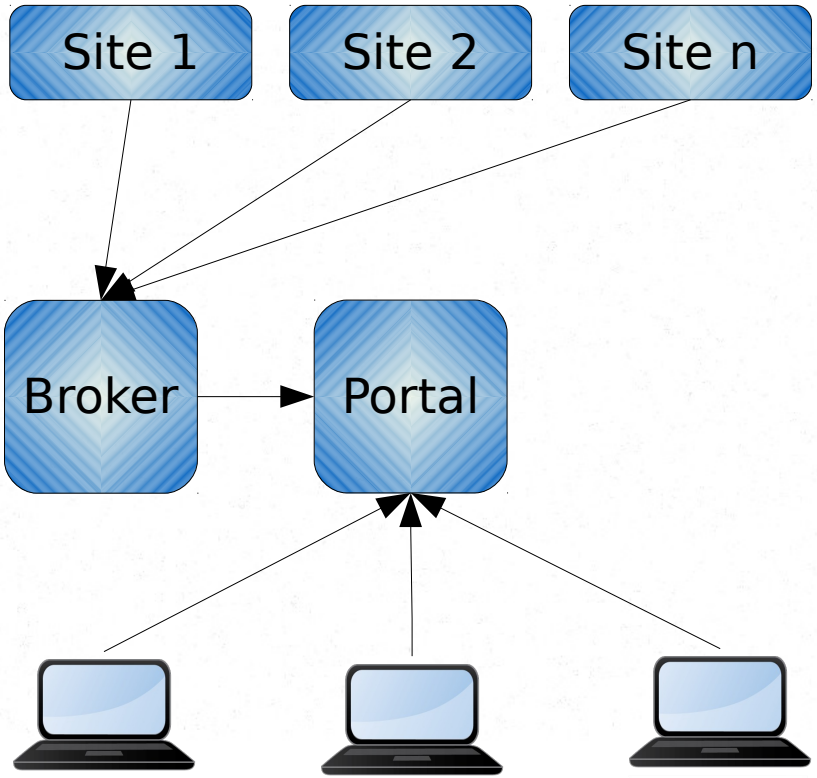
Do not poll

Current polling model



Do not poll

Proposed events model



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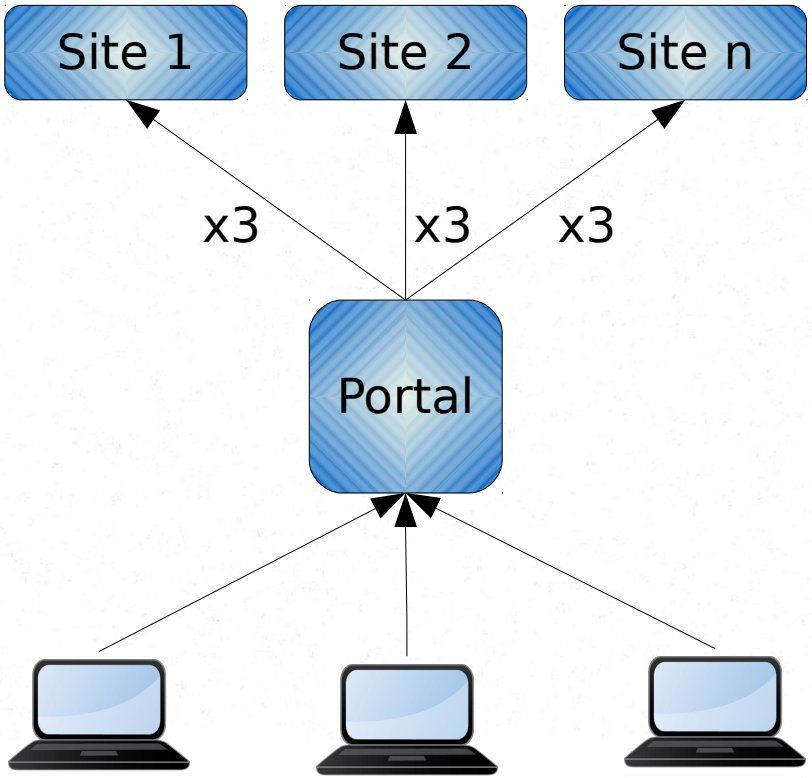

Requires support at server side!

Reusable UI components

- Single root package
- Fully API configurable
- Flexible

- Jobs Table Viewer
  - Selectable columns, filterable contents (by application, by tag), no need for manual refresh.
  - Support for worflows – can be another component (Tree table?)
- Resources selection components
  - Simple one with label like presentation
  - Control on resources being shown

Reusable UI components (2)

- File monitoring component
  - Ability to provide custom handler.
- File imports and exports component.
- Variables component.
- Upload to the Grid component.
- Download from the Grid component.
- Data Manager can be useful but is very complicated (too many storages).
- The need for the Grid Browser and Sites Browser is minimal.
  - Grid admins only?

High level API

- Possibility to easily perform common tasks:
  - Discover Grid state, jobs
  - Get notifications about updates
  - NOT Grid browser oriented. E.g. getAllJobs, instead of get all job-type children of an enumeration node...
- Gridlet API can be used as a base.

The last mile

- For typical applications a GridBean-like framework can be provided.
- 10x simpler:
  - Generic UI, where app integrator can select with few lines of code which modules are needed (submit button, resources panel and file imports)
  - Should provide common look and fill for apps in the portal and promote good UI practices.
- The only goal should be: make simple app integration easier. No more, no less.