Problem: finding an environment that supports my application on a remote resource

Solution: encapsulate the environment in a VM and deploy on remote resources

Workspace Service: Provisioning Environments

- The workspace service allows users to dynamically provision and manage workspaces (environments)
  - GT4 WSRF front-end
  - back-end manages a pool of nodes, each installed with a VMM (Xen)
- A Workspace is deployed based on a request containing:
  - VM image + meta-data
  - Resource allocation
  - Access is determined based on attribute authorization (VOMS, GridShib)
- Clients can obtain information about a workspace (i.e., the assigned IP address) using WSRF resource properties
- Workspace can be managed by renegotiating these properties (e.g. time to live)
  - Current release: 1.2.3
  - http://workspace.globus.org

Proof-of-concept: On-demand Provisioning of STAR Nodes Using VMs

New STAR nodes are dynamically added on a resource not configured to support this application:

Deployment at the TeraPort cluster at the University of Chicago: 5 TeraPort nodes (4GB memory and 2 Ghz Opteron each) were configured with Xen 3.0. One of the nodes was running the workspace service and STAR cluster headnode, the STAR worker nodes were dynamically added in response to time-varying demand.

Lessons Learned

- Image management on deployment
  - Image partitions vs images
  - Sharing and caching partitions
  - Generating blank partitions on-the-fly
- Virtual clusters
  - Deploying and managing a collection of workspaces
  - Contextualization: dynamically making VMs aware of their deployment context
- Providing and maintaining images:
  - Resource providers and consumers: a chicken and egg problem

Ongoing Work

- Resources for a production run
  - Amazon Elastic Compute Cloud (EC2)
  - Workspace gateway to EC2: from attribute based authorization to accounts
- Can providing resources be outsourced?
- Providing and maintaining VM images
  - The rPath rBuilder project
  - Developing images for scientific applications
- Preparations for a production run this summer

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