

GLOBAL VIRTUAL CLUSTER DEPLOYMENT THROUGH A CONTENT DELIVERY NETWORK

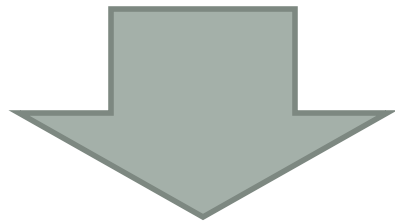
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Some History

PRAGMA 21

- Easily share computational infrastructure components between PRAGMA members



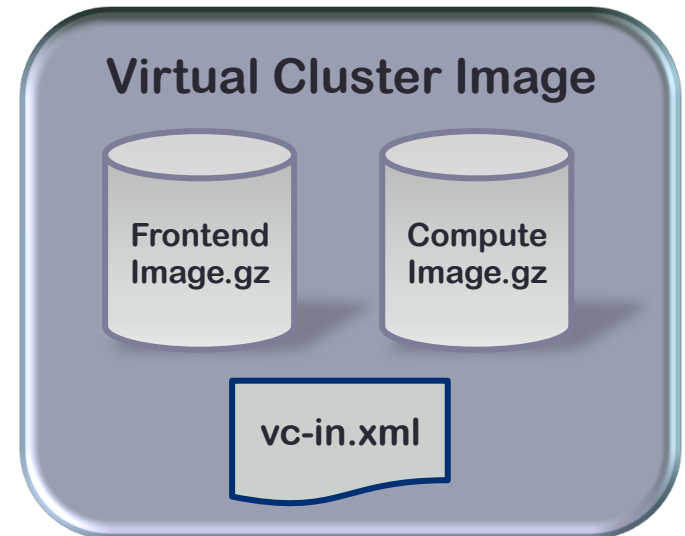
- PRAGMA Virtual Cluster Sharing



Virtual Cluster Sharing

1. Virtual Cluster Images Standard

- KVM
- Single disk image RAW format
- The first partition is the *root* / partition
- No LVM or RAID!!
- Frontend 2 network interfaces
 - First private
 - Second public
- Compute 1 network interface
- /root/vc-out.xml for all network configuration



Virtual Cluster Sharing

2. Deployment mechanism

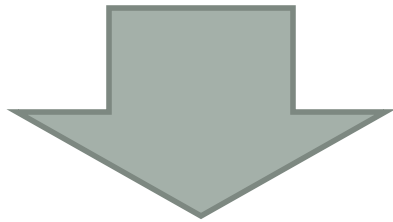
- Pragma Bootstrap: a software tool to help with deployment of PRAGMA compliant virtual cluster.
- Available at: https://github.com/pragmagrid/pragma_boot
- Plugins architecture (to support more platforms)



- DynIP: To enable Rocks cluster to work inside PRAGMA Bootstrap
 - <https://github.com/rockclusters/dynip>
- VC-out-parser: generic driver for RedHat system
 - <https://github.com/pragmagrid/vc-out-parser>

Virtual Cluster Sharing

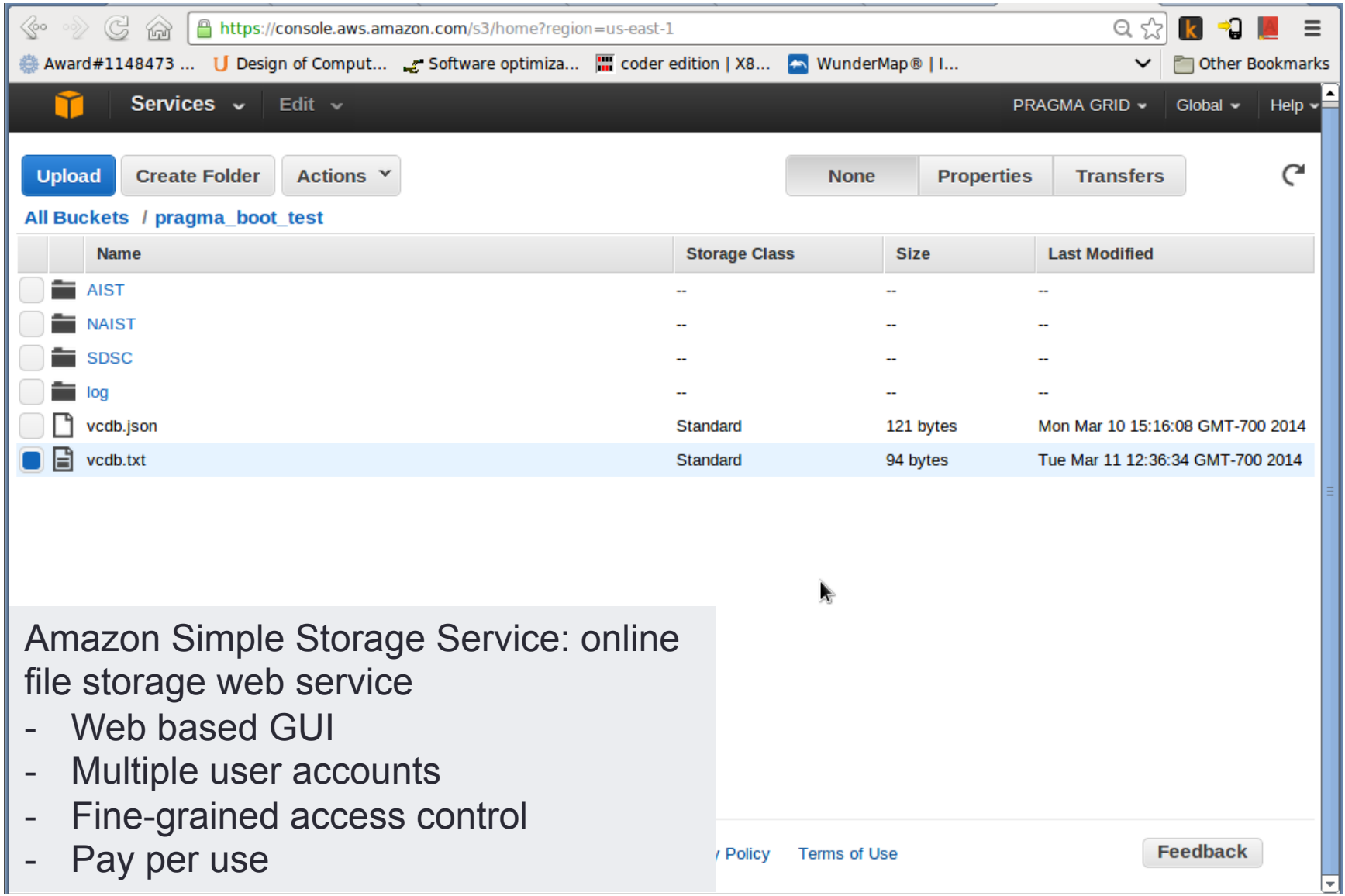
- Where is the sharing?



- Amazon Simple Storage Service (S3): an online file storage web service
- Amazon CloudFront: is a content delivery network



Amazon S3



The screenshot shows the Amazon S3 console interface. The browser address bar displays <https://console.aws.amazon.com/s3/home?region=us-east-1>. The console header includes the AWS logo, 'Services' dropdown, 'Edit' dropdown, 'PRAGMA GRID' dropdown, 'Global' dropdown, and 'Help' dropdown. The main content area shows the 'All Buckets / pragma_boot_test' view. At the top of the content area are buttons for 'Upload', 'Create Folder', and 'Actions', along with tabs for 'None', 'Properties', and 'Transfers'. Below this is a table listing the contents of the bucket:

	Name	Storage Class	Size	Last Modified
<input type="checkbox"/>	AIST	--	--	--
<input type="checkbox"/>	NAIST	--	--	--
<input type="checkbox"/>	SDSC	--	--	--
<input type="checkbox"/>	log	--	--	--
<input type="checkbox"/>	vcdb.json	Standard	121 bytes	Mon Mar 10 15:16:08 GMT-700 2014
<input checked="" type="checkbox"/>	vcdb.txt	Standard	94 bytes	Tue Mar 11 12:36:34 GMT-700 2014

At the bottom of the console, there are links for 'Policy' and 'Terms of Use', and a 'Feedback' button.

Amazon Simple Storage Service: online file storage web service

- Web based GUI
- Multiple user accounts
- Fine-grained access control
- Pay per use

Amazon CloudFront

- AWS Edge Locations
- Regions



Global Content Delivery Network:

- Multiple edge locations in Asia
- Work with Amazon S3
- Pay as you use
- Access control for protected content

Amazon CloudFront

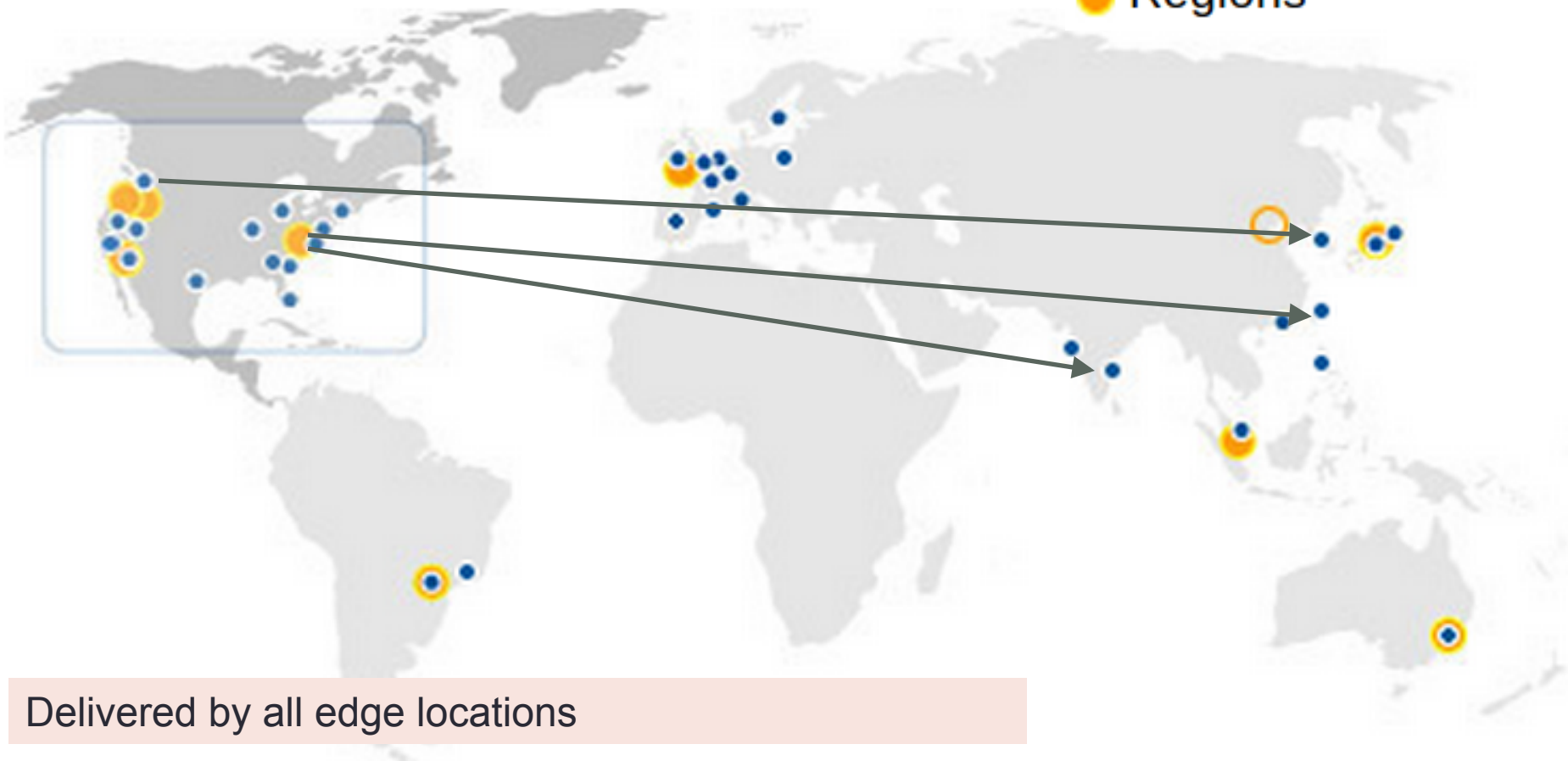
- AWS Edge Locations
- Regions



Our images are stored in the US Standard S3 bucket

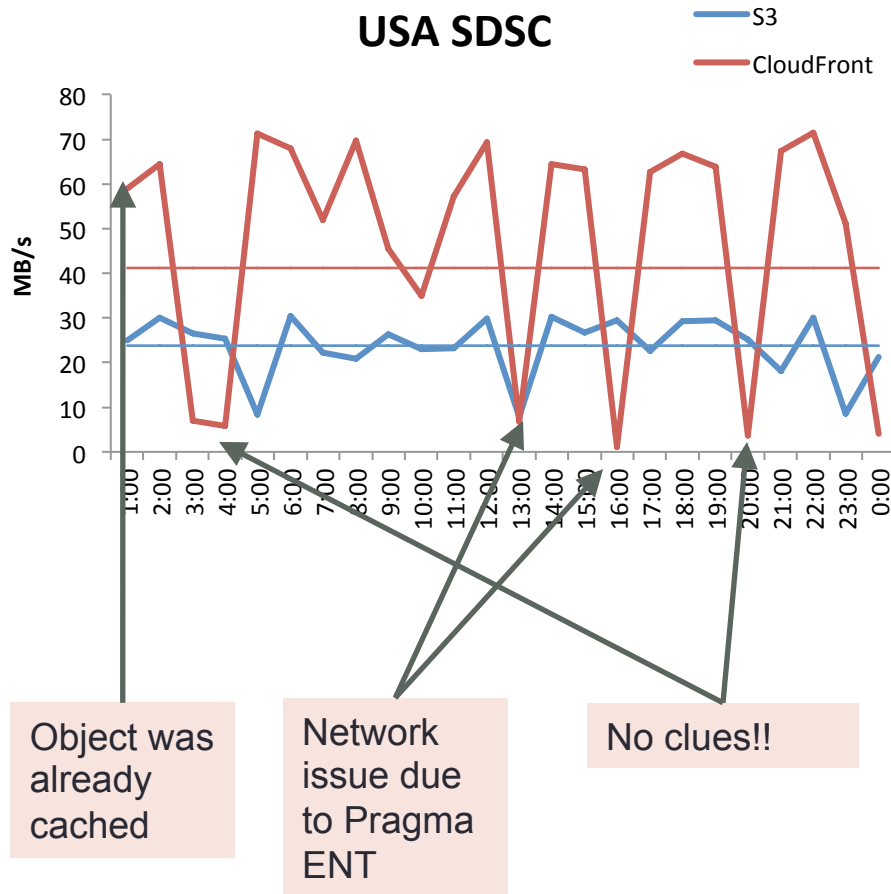
Amazon CloudFront

- AWS Edge Locations
- Regions

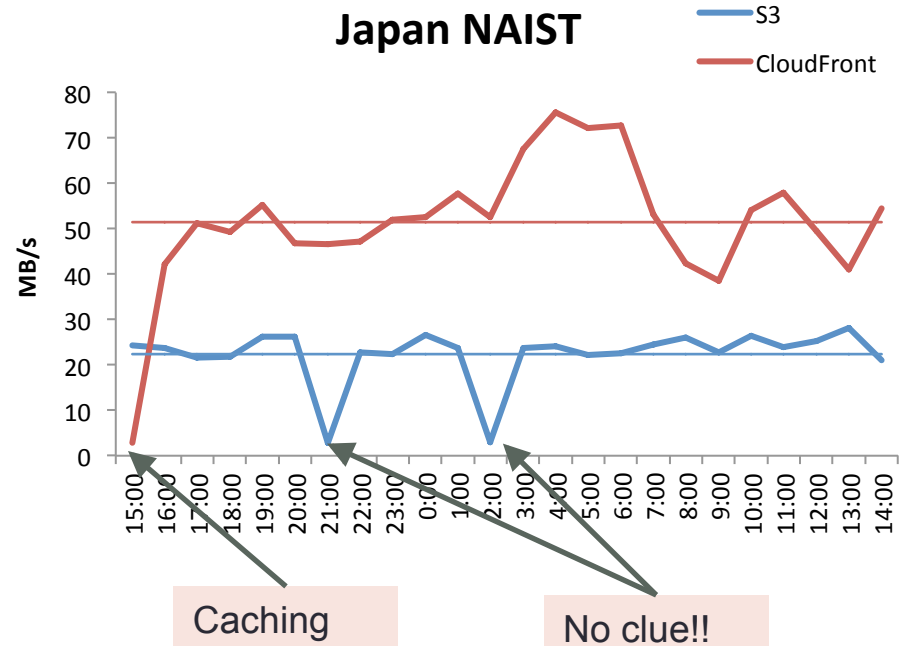


Performance

USA SDSC



Japan NAIST

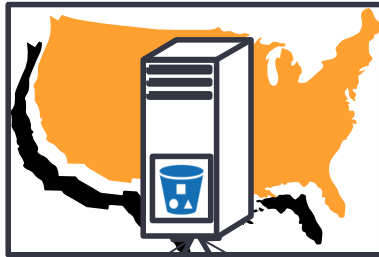


On average:

- S3: ~20-25 MB/s
- CloudFront hit: 50 MB/s
- CloudFront miss: 2 MB/s

Pragma Bootstrap

S3 bucket

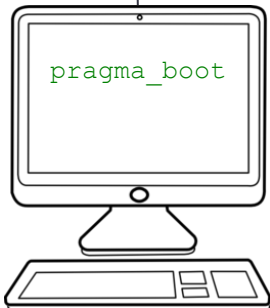


Disk images are delivered by local
CloudFront Edge servers

GET /abs/disk1.vda



GET /abs/disk1.vda



GET /abs/disk1.vda



Pragma Bootstrap

- Pluggable download architecture
 - Local: use local file
 - Http: use plain http or https to download file
 - CloudFront: support Cloud Front security mechanism (signed URL)
- Supported file format:
 - raw: plain file
 - gzip: compressed with gzip
 - splited: split file in multiple sub-files
 - splited_gzip: split file in multiple sub-files and compress them

Thank you!

- Questions?



Source code available at:

- pragma_boot:
https://github.com/pragmagrid/pragma_boot

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