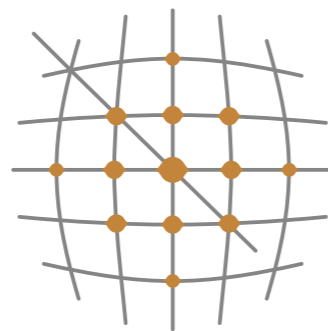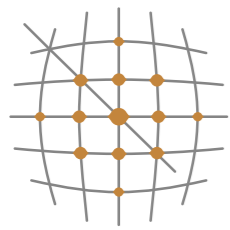# Cloud infrastructure for the on demand provisioning of Worker Nodes

A. Andronidis, P. Korosoglou, G. Fergadis and P. Argyrakis
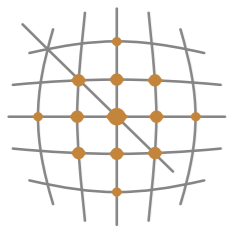
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Outline

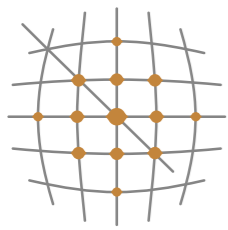- Observation

- Idea

- Implementation

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http://www.grid.auth.gr

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# Our observations (last Spring)

- Scientific applications performance penalty in the range 5%-25%
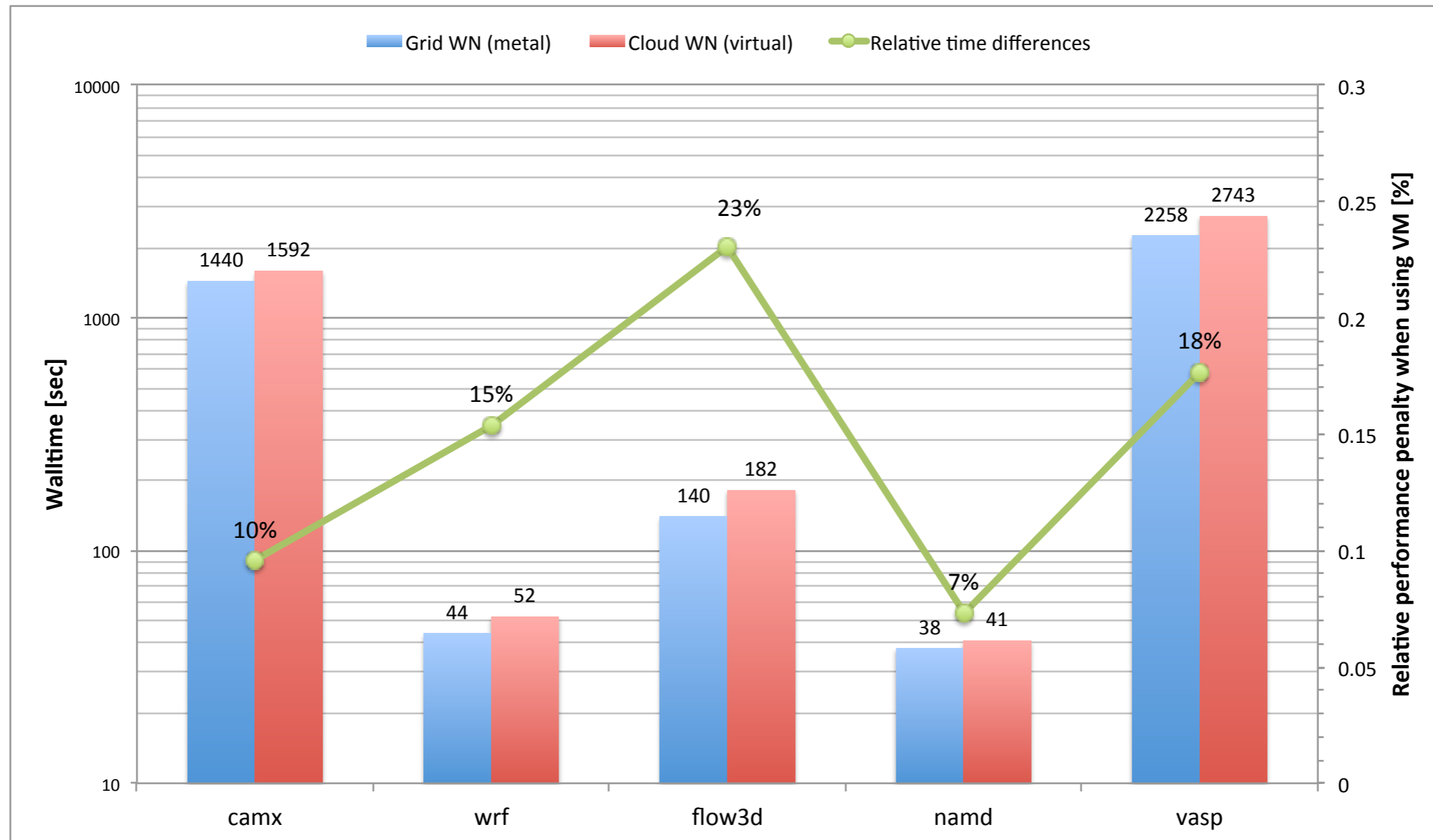
Concept

- Create and save an image preconfigured to act as a WN

- Whenever a high demand on Computing Resources is at place:

    - Boot up a predefined number of Virtual WNs

    - Configure them appropriately under the CREAM service

- Once the demand is low again remove resources from the CREAM service and terminate instances

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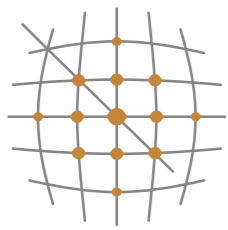
Implications

- Which are the thresholds (i.e. when to boot up or terminate instances)

- Where to run the service (i.e. on the CREAM service)

- Image creation and templating

- Network connectivity & firewall configuration

- Instance sizes (wrt instance size options available)
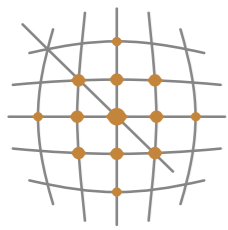
- Yaim functions

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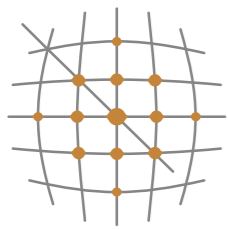
Thresholds

- Simplistic approach

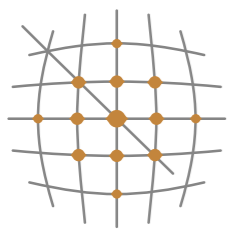 - When jobs on queue exceed a pre-fixed number fire up Virtual WNs, else terminate them if any exist

$$(w(t) > a(t=0)) \: ? \: add(n(t)) : check\_n\_remove(n(t)) \: ;$$

  - $w(t)$: waiting jobs at time t

  - $a(t=0)$: available job slots at t=0 (fixed number)

  - $n(t)$: Number of Virtual WNs to boot/terminate

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Image creation and templating

- EMI-2 based WNs

  - OS: CentOS 6.3 base image with small (EC2) size is sufficient

  - Additional repositories: EMI, EGI-Trustanchors

  - Additional packages:

    - gluster-fuse

    - emi-wn

    - emi-torque-client

  - Additional configuration:

    - munge key & service

    - Supported VO files & yaim configuration files

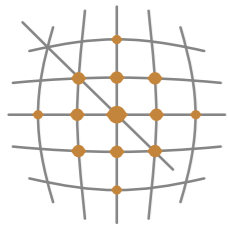   - Post-boot scripts to configure instances via yaim (in `/etc/rc.local`)

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Networking and firewalling

- Additional security group

- Add new instances to appropriate security groups

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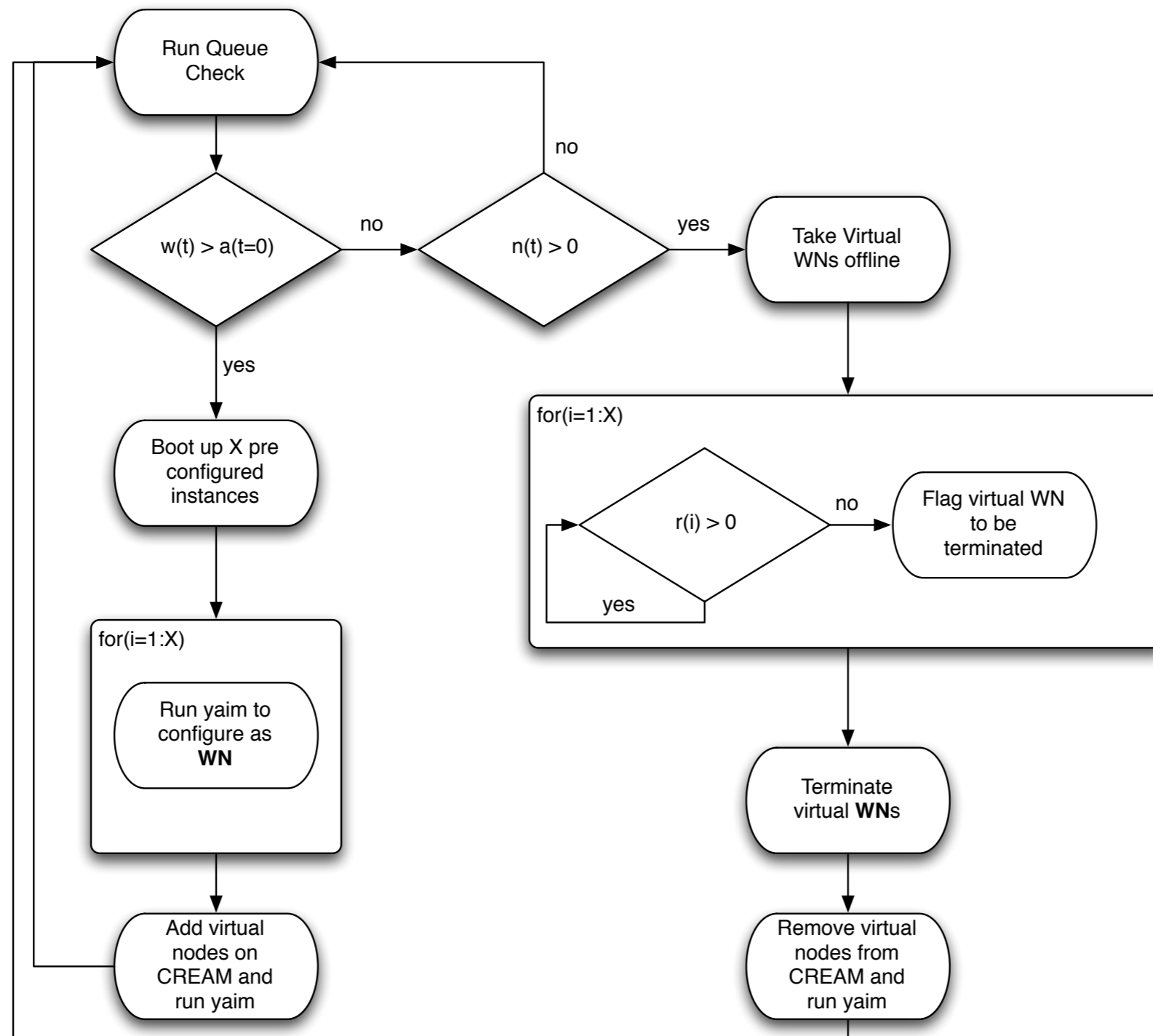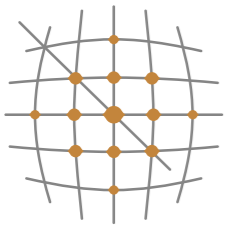EGI TF 2012, Prague

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Where to run the service

- No need to induce further load on CREAM instance

- Service may run as a cron job on any other machine that can access

  - using ssh the

    - CREAM service and the

    - Virtual WNs (instances)

  - using REST API the

    - Nova compute node

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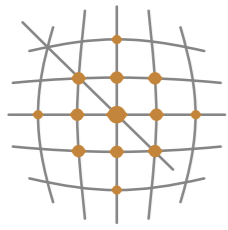
How it all comes together

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More on...

https://github.com/auth-scc/openstack-scaler

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Future work

- Develop threaded version of check mechanism that checks if a virtual WN has been emptied or not

  - Enable re-usage of offline virtual nodes

- Re-work on thresholds based on production usage of resources

- Development of OCCI interface (~okeanos)

- Further support for other middleware (i.e. ARC, Unicore) and Cloud APIs would be desirable

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Thank you!

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