Google ganeti

Ganeti

Ganeti Core Team - Google
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Monitoring

How and what to monitor in Ganeti

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Latest version of these slides

Please find the latest version of these slides at:

https://code.google.com/p/ganeti/wiki/LISA2013

What to monitor

- "Right Now" things (pagable)
  - node down
  - instance down
  - cluster status
  - DRBD issues
- "Historical" things
  - Capacity
  - Utilization

Monitoring Clusters

The master IP should:

- ping
- answer to SSH
- respond to RAPI calls (`version` is a good 'no op')
- `gnt-cluster verify` output should not contain the word "ERROR"

Monitoring Nodes

- nodes should be pingable, ssh'able
- load average:
  - Xen: shouldn't be above 2.0 for very long
  - KVM: ...more complicated...
- DRBD issues
  - Nagios monitoring for DRBD:
    - http://code.google.com/p/ganeti/wiki/DrbdDevicesMonitoring

Monitoring Instances

- Do you provide monitoring for your users or are they responsible for it?
- Instance owner does it:
  - Do they have the skill?
  - Can you give them access to your monitoring system?
- Monitoring on behalf of the owner:
  - Best way to know if you are providing good service
  - "Fixed before the user notices"
  - Owner should be able to temporarily disable paging if instance will be down intentionally
  - Who gets paged? you or instance owner or both?

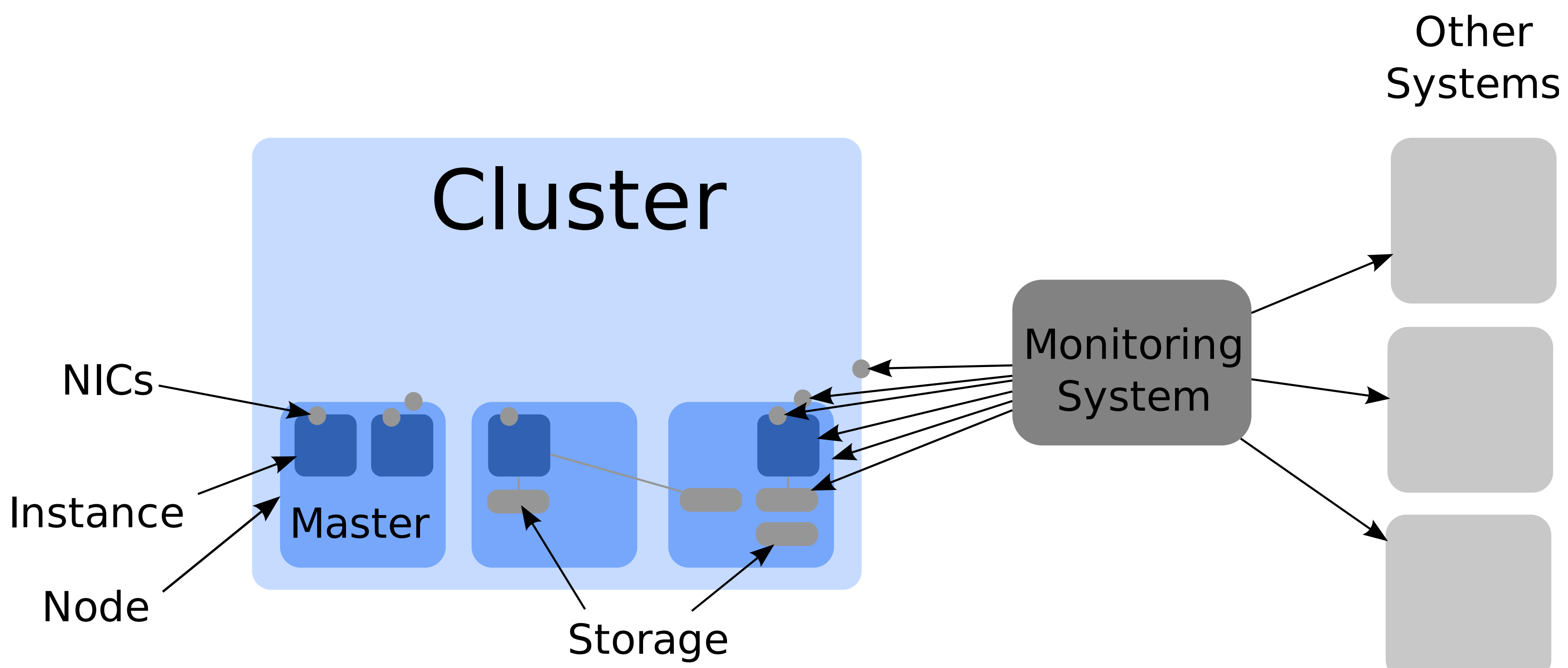
Historical Monitoring

Keep long history of utilization for capacity planning, budgeting, and troubleshooting.

- What to collect:
  - Hourly (or more) history of disk I/O, RAM and network utilization
  - Daily/weekly history of # nodes, # instances, # instance create/delete
  - Uptime statistics
- Troubleshooting:
  - Did problem appear when disk I/O reached a certain level?
  - Is the current network utilization heavy or light?
- Capacity and budget planning:
  - When will resources be exhausted? (don't be surprised)
  - Based on current growth, what do we need to buy?
  - How much money have we saved by using virtualization?
  - How many users/machines do we have?

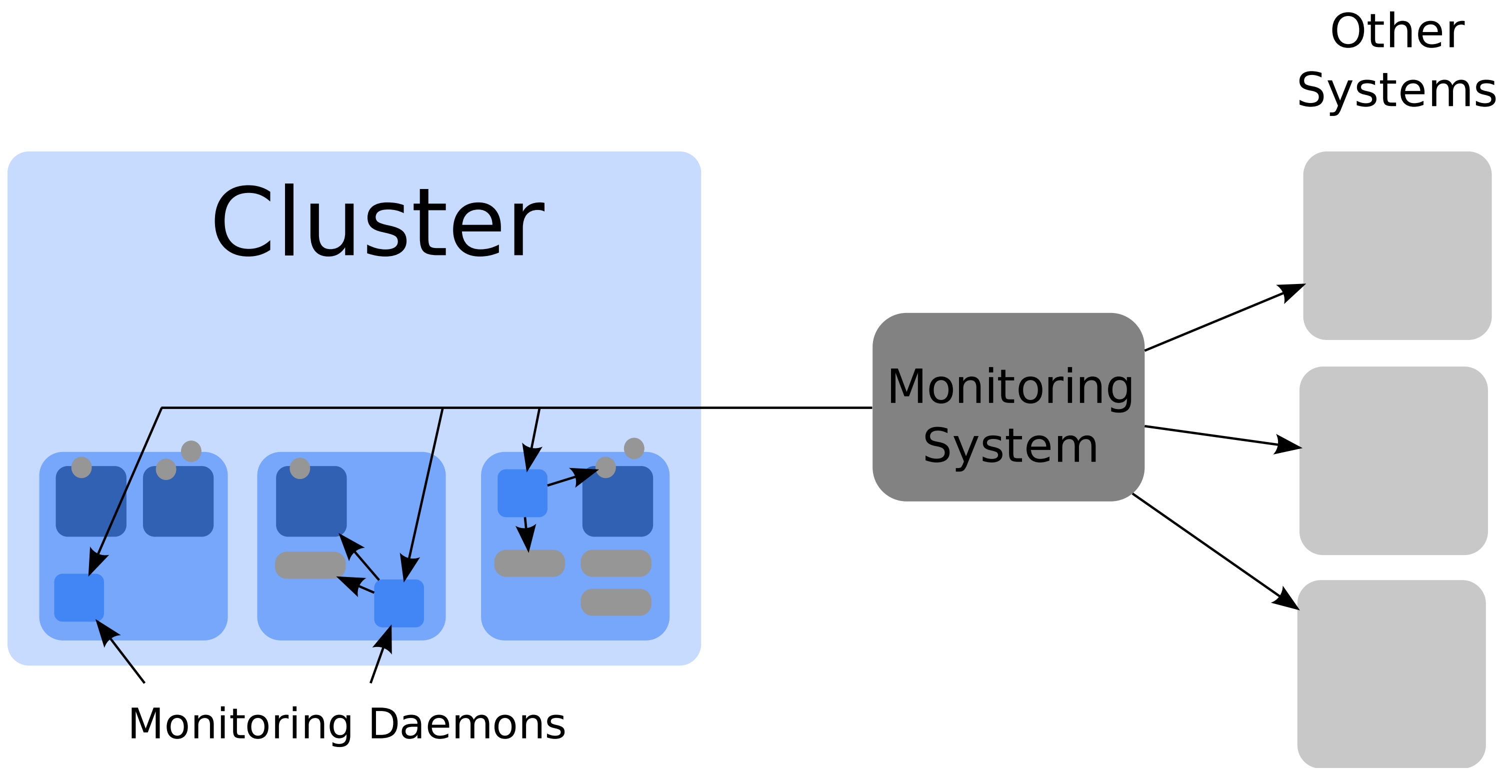
Monitoring a cluster

The old school way



Monitoring a cluster

Using the monitoring daemon



What is the monitoring daemon?

Provides information:

- about the cluster state
- about the cluster health
  - automatically computed
- live
- read-only

design doc: `design-monitoring-agent.rst`

How is the monitoring daemon?

- HTTP daemon
- Replying to REST-like queries
  - Actually, GET only
- Providing JSON replies
  - Easy to parse in any language
  - Already used in all the rest of Ganeti
- Running on every node (Not: only master-candidates, VM-enabled)
- Additionally: `mon-collector`: quick 'n dirty CLI tool

Data collectors

- provide data to the deamon
- one collector, one report
- one collector, one category:
  - storage, hypervisor, daemon, instance
- two kinds: performance reporting, status reporting
- new feature: stateful data collectors

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Data collectors

What data can be retrieved right now?

Now:

- instance status (Xen only) (category: instance)
- diskstats information (storage)
- LVM logical volumes information (storage)
- DRBD status information (storage)
- Node OS CPU load average (no category, default)

Soon(-ish):

- instance status for KVM (instance)
- Ganeti daemons status (daemon)
- Hypervisor resources (hypervisor)
- Node OS resources report (default)

The report format

```
JSON
{
  "name" : "TheCollectorIdentifier",
  "version" : "1.2",
  "format_version" : 1,
  "timestamp" : 1351607182000000000,
  "category" : null,
  "kind" : 0,
  "data" : { "plugin_specific_data" : "go_here" }
}
```

- `name:` the name of the plugin. Unique string.
- `version:` the version of the plugin. A string.
- `format_version:` the version of the `data` format of the plugin. Incremental integer.
- `timestamp:` when the report was produced. Nanoseconds. Can be zero-padded.

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Status reporting collectors: report

They introduce a mandatory part inside the `data` section.

```
"data" : {
  ...
  "status" : {
    "code" : <value>
    "message: "some summary goes here"
  }
}
```

JSON

- `<value>:` by increasing criticality level
  - 0: working as intended
  - 1: temporarily wrong. Being auto-repaired
  - 2: unknown. Potentially dangerous state
  - 4: problems. External intervention required

How to use the daemon?

- Accepts HTTP connections on `node.example.com:1815`
  - Not authenticated: read only
  - Just firewall, or bind on local address only
- GET requests to specific addresses
- Each address returns different info according to the API

```
/  (return the list of supported protocol version)
/1/list/collectors
/1/report/all
/1/report/[category]/[collector_name]
```

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The reason trail

Introduction

- Initially required for the instance status (Xen) collector
  - Why did the instance last change its status?
  - Not just a message, but a complete track of what happened
  - More information available in the design doc: `doc/design-reason-trail.rst`

The reason trail

What format?

List of triples `(source, reason, timestamp)`

PYTHON

```
[("user", "Cleanup of unused instances", 1363088484000000000),
 ("gnt:client:gnt-instance", "stop", 1363088484020000000),
 ("gnt:opcode:shutdown", "job=1234;index=0", 1363088484026000000),
 ("gnt:daemon:noded:shutdown", "", 1363088484135000000)]
```

- `source:` the entity deciding to perform/forward the command. Free form, but the `gnt:` prefix is reserved
- `reason:` why the entity decided to perform the operation
- `timestamp:` timestamp since epoch, in nanoseconds

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The reason trail

How is it generated?

- Automatically, from RAPI/CLI down to opcode level
- Before opcode generation:
  - User message (now):
    - CLI: `--reason`
    - RAPI: `reason` parameter added to the request
- After opcode's job execution:
  - Specialized usages and manual implementations
    - Instance state change reason (start, stop, reboot. Serialized on file)

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Thank You!

Questions?