

# Heat - Orchestration for OpenStack

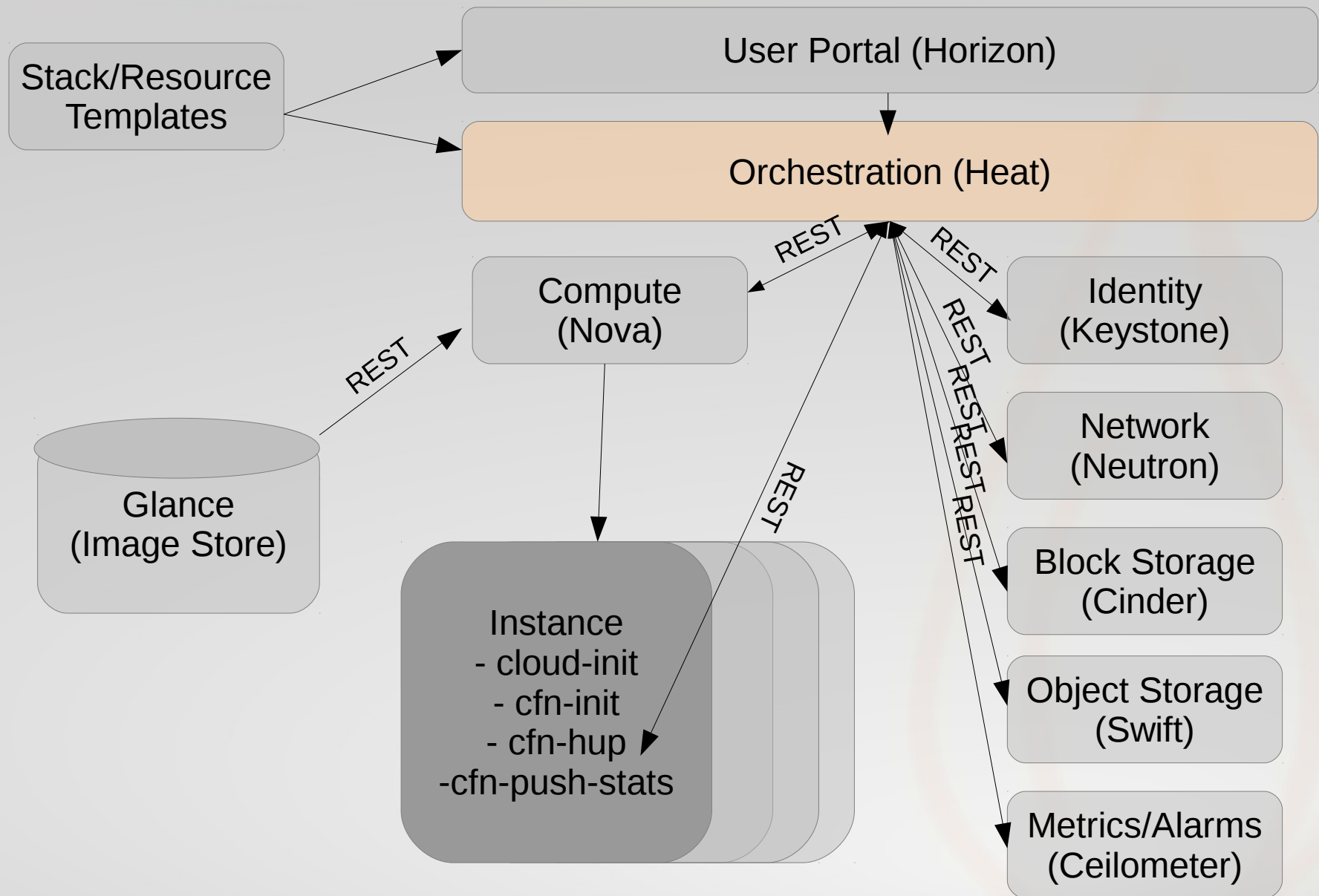
Icehouse project update



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# Heat Overview



# Heat Template Overview



## Template

**Parameters**

**Resources**

**Outputs**

## Resource

**Reference**

**Properties**

**Attributes**



# Heat Orchestration Template

```
heat_template_version: 2013-05-23
```

```
parameters:
```

```
  image:
```

```
    type: string
```

```
    constraints:
```

```
      - custom_constraint: glance.image
```

```
resources:
```

```
  my_instance:
```

```
    type: OS::Nova::Server
```

```
    properties:
```

```
      flavor: m1.small
```

```
      image: {get_param: image}
```

```
outputs:
```

```
  networks:
```

```
    description: my_instance network details
```

```
    value: {get_attr : [my_instance, networks]}
```



# Heat Template Links

- [docs.openstack.org/developer/heat/template\\_guide](https://docs.openstack.org/developer/heat/template_guide)
- [github.com/openstack/heat-templates](https://github.com/openstack/heat-templates)
- `heat resource-type-list`
- `heat resource-type-show OS::Nova::Server`
- [docs.openstack.org/developer/heat/template\\_guide/hot\\_spec.html](https://docs.openstack.org/developer/heat/template_guide/hot_spec.html)



# Havana features

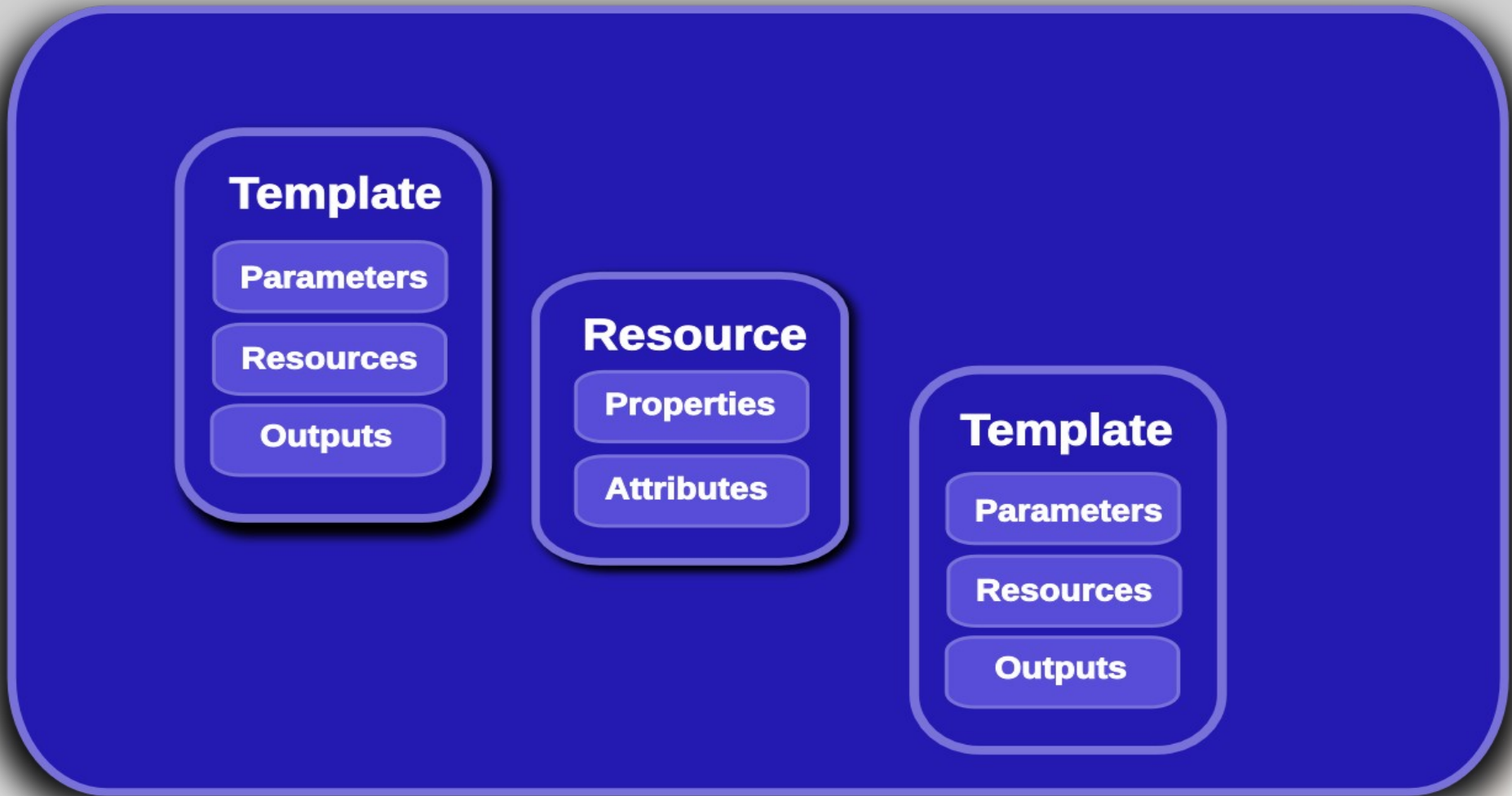
- Concurrent resource operations
- Much improved networking/Neutron support
- **Initial support for native template language (HOT)**
- **“Provider/Environment” abstractions (template-defined resources)**
- Ceilometer integration for metrics/monitoring/alarms
- UpdateStack improvements
- Integration with keystone trusts
- Many more native resource types
- Horizon (UI) integration
- Stack “actions” (suspend/resume)



# Icehouse key new features

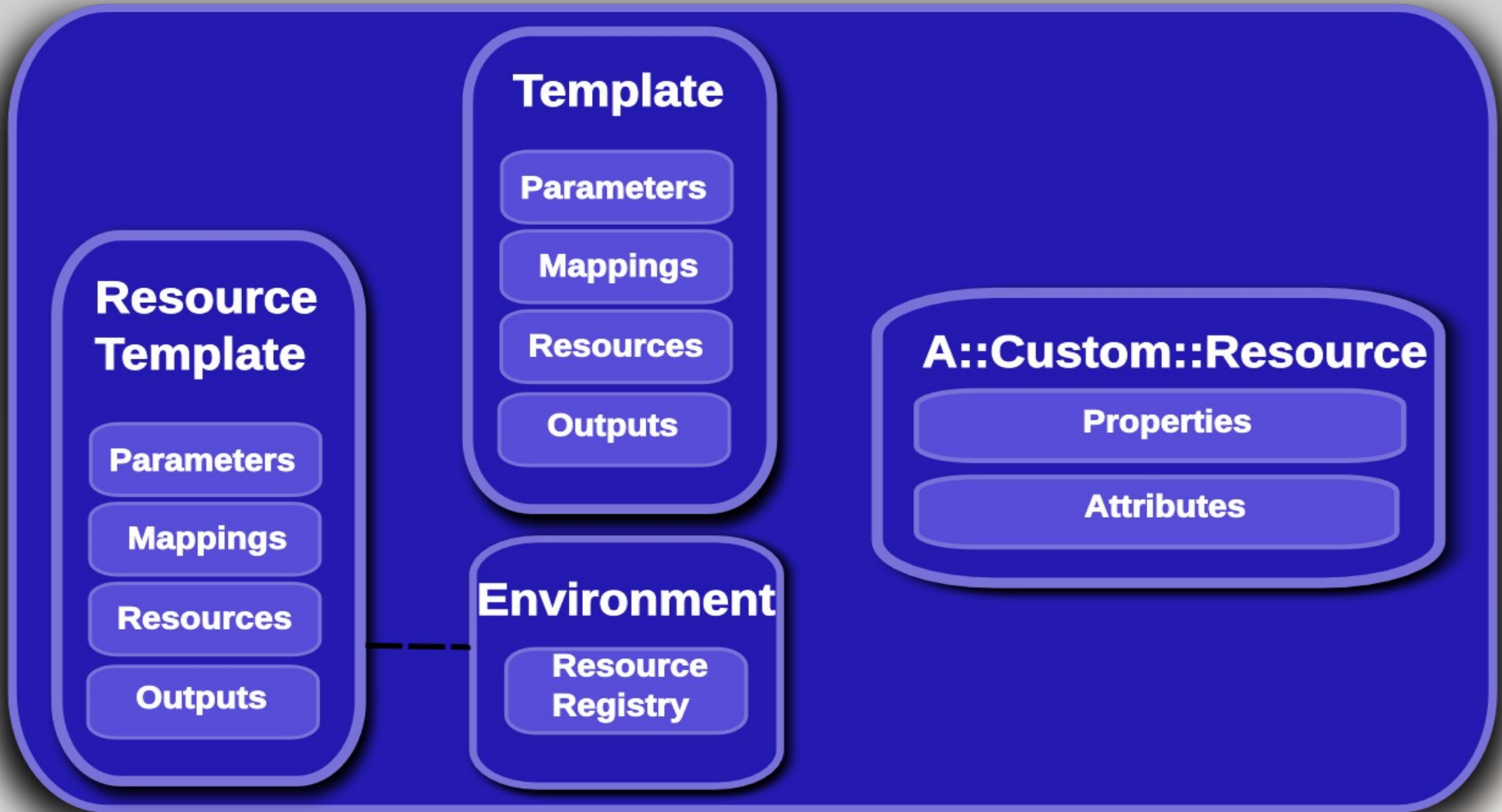
- HOT DSL feature-complete and declared stable
- Software-config initial implementation complete
- “stack domain users” (no more admin requirement)
- Native auto-scaling resources
- Pluggable parameter constraints
- Pluggable template parser/functions
- Scalable heat-engine
- “management API” additions

# Heat Nested Stack Templates





# Provider Resources





# Provider Resources

- Heat native interface to nested stacks
- No hard-coded URLs (in the template)
- Staging workflow/testing much simplified
- Allows deployer **or user** to define custom resources
  - /etc/heat/environment.d
  - /etc/heat/templates
  - Users heat stack-create -environment-file=foo.yaml
    - Users can override default deployer resources!

***resource\_registry:***

***"My::Custom::Server": server.yaml***



# Provider Resource environment

parameters:

key\_name: mykey

resource\_registry:

My::Custom::Server : my\_server.yaml

OS::Nova::Server : override\_nova.yaml

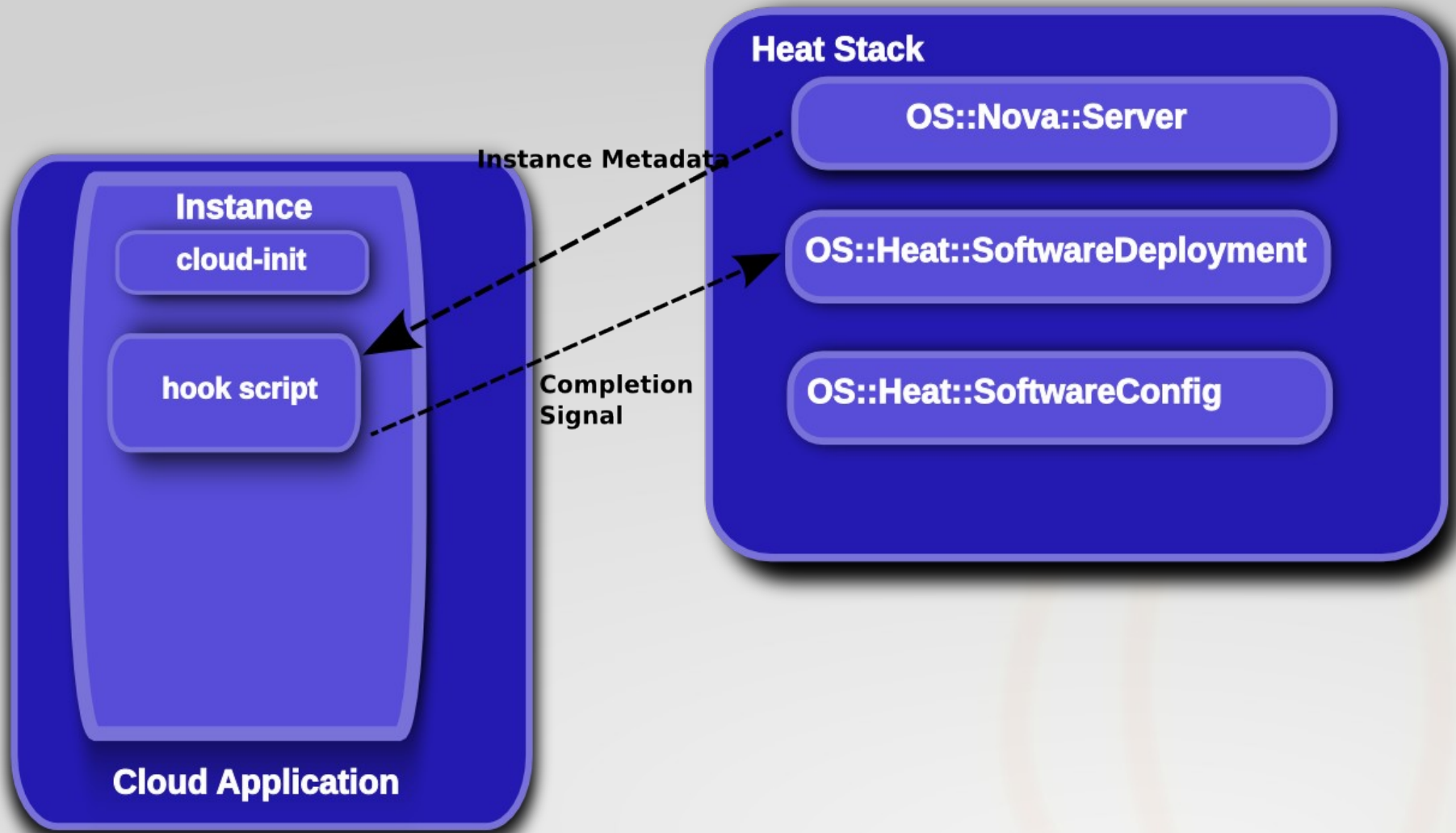
- python-heatclient resolves local files and URLs
- Files associated with environment are passed along with the stack-create/update API request
- `heat stack-create mystack -f template.yaml -e environment.yaml`



# Software Config

- Much better integration with cloud-init
  - OS::Heat::CloudConfig
  - OS::Heat::MultipartMime
  - Removes hard requirement for additional agents
- Initial software config resources implemented
  - OS::Heat::SoftwareConfig
  - OS::Heat::SoftwareDeployment
  - OS::Heat::StructuredConfig
  - OS::Heat::StructuredDeployment

# Software Config



# Software Config



- SoftwareConfig resource defines the config to be applied
  - CM tool agnostic
- SoftwareDeployment resource applies the config to a specified
  - Apply config to server
  - Takes inputs to allow parameterization of configs
  - CM tool agnostic
- Hook scripts are deployed in instance
  - Via cloud-init or pre-built image
  - Handle mapping the SoftwareConfig to the CM tool/agent
    - Heat-cfntools (cfn-init)
    - Tripleo agents (os-refresh-config/os-config-applier)
    - Puppet
    - Chef
    - ... (definable by the user/deployer)



# Roadmap (incomplete & tbc!)

- Autoscaling hooks (scale-down cleanup)
- Autoscaling parameters (choose victims)
- Enable retry from failed states
- Rolling updates
- Stack check
- Stack preview
- Cancel stack update
- Update preview
- ... Will be driven by users and downstream projects :)



# Questions?

- <https://wiki.openstack.org/wiki/Heat>
- <http://docs.openstack.org/developer/heat/>
- <https://github.com/hardys/presentations>