DSPACE & PUPPET

CLUSTERING UND CUSTOMISATION ZENTRAL VERWALTEN

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WHAT WE WANT

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- Automatic, customizable and secure all-in-one or cluster configuration
- Horizontal scaling, improved availability and improved maintainability via Clustering
- Integration into central authentication, monitoring and backup/archive services

WHAT DSPACE NEEDS

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Software stack

- Apache web server
- Tomcat application server
- PostgreSQL database server
- Solr index server
- DSpace web application
- File system

Installation of source code

- Build:
  Maven
- Install: Ant

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Customisations in

- Configuration files
- Source code

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HOW WE GET WHAT WE WANT

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Software stack

- GitLab: Source Code Management & CI & CD
- Puppet: Configuration Management & Orchestration
- Custom Puppet module for DSpace

Custom Puppet module for DSpace

- Handles installation & configuration of all DSpace components
- Handles firewall, orchestration and communication in cluster setting

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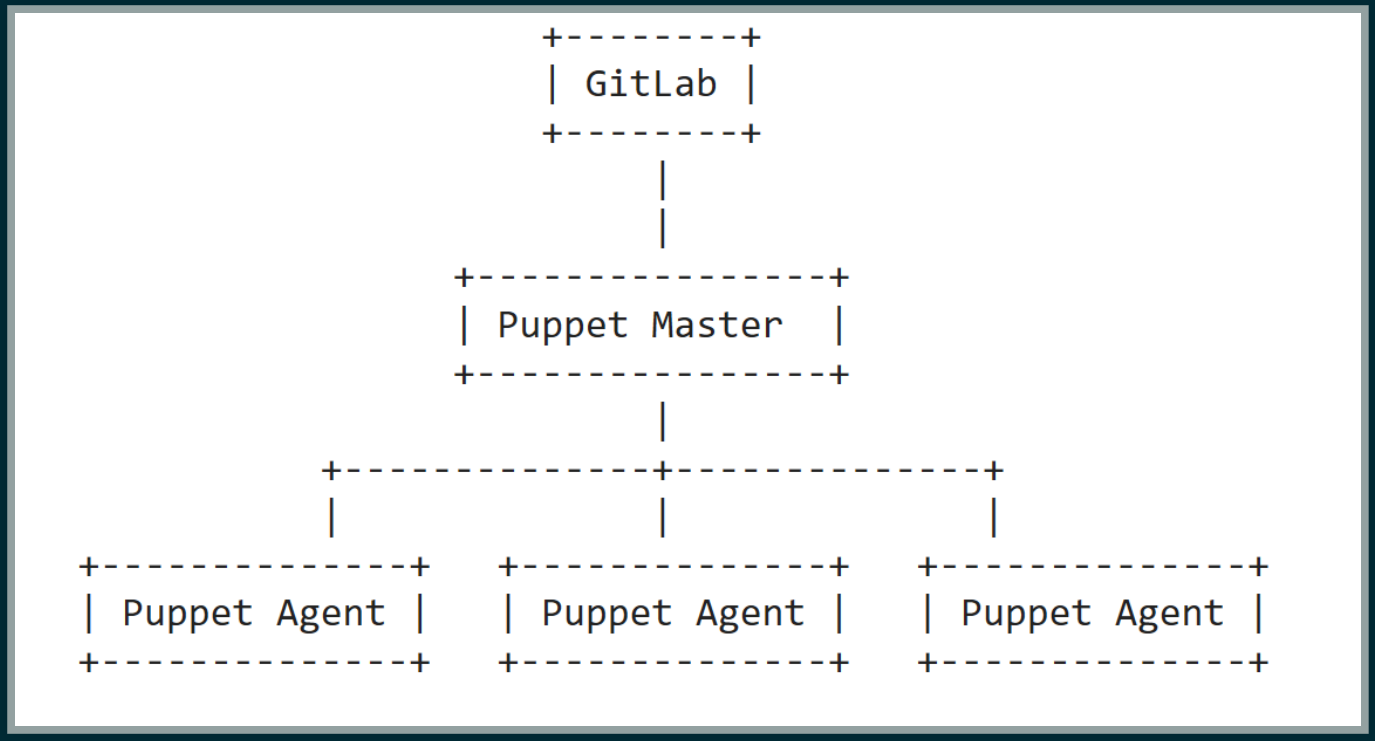
GitLab + Puppet:



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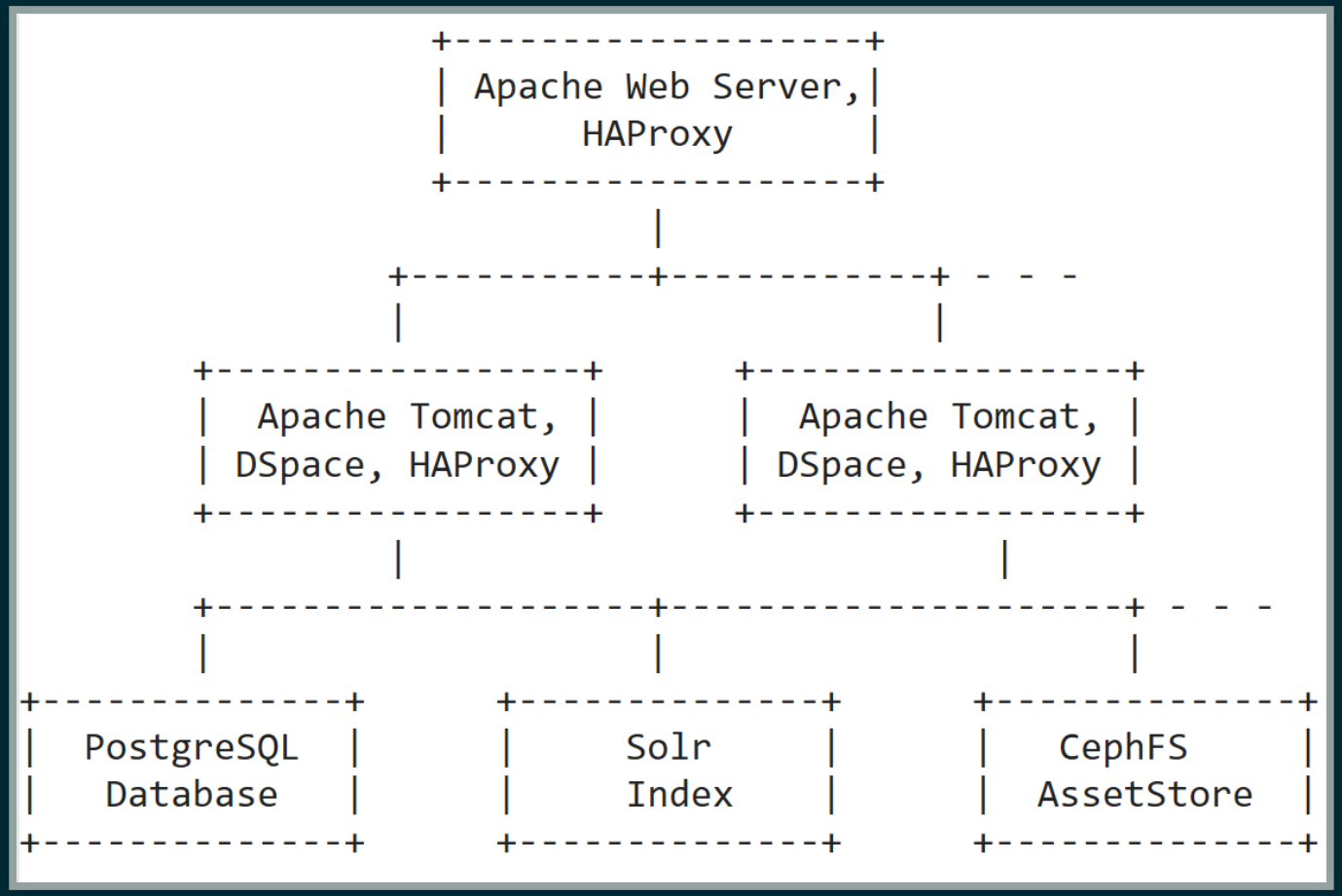
DSpace Components



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Characteristics of our Clustering

- The components portal, application, database and index are installed and configured on designated nodes
- All DSpace-specific server components listen to local host
- Only Web server listens on the public interface

Characteristics of our Clustering

- In cluster mode all components are transparently connected via HAProxy
- Secure firewall configuration

Configuration and customization via parametrized Puppet classes

- Configuration of basic System/Java/Tomcat environment variables (*dspace::environment*)
- Configuration of basic DSpace-related settings via (*dspace::configuration*)
- Configuration of DSpace-component related things (*dspace::portal*, *dspace::application*, *dspace::database*, *dspace::index*)

Configuration and customization via Puppet module, custom Git repositories and Maven overlay

- Git repository with slightly modified basic DSpace source code
- Git repository with different branches of DSpace Maven overlay source code
- Embedded-Ruby templates for *local.cfg* and several other configuration files

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EXAMPLE

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A DSpace Application node in Puppet

```
class { 'dspace::configuration':
  dspace_name     => 'My DSpace Repository',
  dspace_base_url => 'https://my-dspace-repository.org',
}

class { 'dspace::application::source':
}

class { 'dspace::application::server':
}

class { 'dspace::application::node':
  cluster => 'my-dspace-cluster',
}
```

Puppet Agent on a DSpace Application node (*dspace::application::source*)

- Gets configuration from Puppet Master
- Clones/pulls the basic DSpace Git repository
- Clones/pulls the DSpace maven overlay Git repository

Puppet Agent on a DSpace Application node (*dspace::application::server*)

- Fills and places configuration template files
- Runs Maven and Ant
- Restarts Tomcat

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Puppet Agent on a DSpace Application node (*dspace::application::node*)

- Sets a HAProxy frontend for communication with frontend web server (*dspace::portal::server*)
- Sets a HAProxy backend for the database (*dspace::database::server*)
- Sets a HAProxy backend for the index (*dspace::index::server*)

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Puppet Agent on a DSpace Application node (*dspace::application::node*)

- Collects firewall *allow* rule from all web servers (*dspace::portal::server*) in cluster
- Exports a HAProxy backend to all web servers (*dspace::portal::server*) in cluster
- Restarts HAProxy

WHAT WE NEED TO KNOW

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Shared resources in a cluster setting

- Database and index
- AssetStore directory (we use *CephFS*)
- Some other directories (e.g. *exports*, we use *CephFS*)
- Session data? Could be shared, but currently we just pin the client on a worker

There will be no conflicts/collissions, right?

- DSpace ensures that the asset creation and update process is consistently serialized via database
- But there are some other things to keep in mind

Avoiding conflicts

- When doing a DSpace upgrade, only one application machine should be running
- Index and maintanance jobs should run only on one node in the cluster at a time

THANK YOU!

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QUESTIONS

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