**R10k** is a tool used in Puppet environments to manage and deploy Puppet code. It helps in handling Puppet modules and environments, enabling a scalable and organized approach to configuration management. Here’s an introduction to R10k, covering its key features, installation, and usage.

**1. What is R10k?**

R10k is a tool that automates the deployment of Puppet code from version control repositories (e.g., Git). It is designed to manage environments and modules in Puppet by pulling code from repositories and deploying it to the Puppet master or agents.

**Key Features of R10k:**

* **Environment Management**: Automatically creates and manages Puppet environments based on Git branches or tags.
* **Module Deployment**: Pulls modules from specified Git repositories and deploys them to Puppet environments.
* **Scalability**: Handles large-scale Puppet deployments with multiple environments and modules.
* **Integration**: Works well with Git, GitHub, GitLab, and other version control systems.

**2. Installation of R10k**

R10k can be installed as a Ruby gem. Here’s how to install it:

**a. Install Ruby and RubyGems**

R10k is a Ruby gem, so Ruby and RubyGems must be installed on your system. Use the following commands to install Ruby and RubyGems:

bash

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sudo apt-get update

sudo apt-get install ruby ruby-dev

**b. Install R10k Gem**

Install R10k using the gem command:

bash

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gem install r10k

**c. Verify Installation**

Check that R10k is installed correctly:

bash

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r10k --version

**3. Configuration of R10k**

R10k uses a configuration file, typically located at /etc/puppetlabs/r10k/r10k.yaml, to manage environments and modules.

**a. Create the Configuration File**

Here’s a sample r10k.yaml configuration file:

**File: /etc/puppetlabs/r10k/r10k.yaml**

yaml

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# Sample R10k configuration file

# The source of Puppet code repositories

sources:

my\_source:

remote: 'https://github.com/your\_org/your\_puppet\_repo.git'

basedir: '/etc/puppetlabs/code/environments'

branch: 'main' # or 'master' or any other branch

* **sources**: Defines the Git repositories that R10k will use to pull code.
  + **remote**: The URL of the Git repository.
  + **basedir**: The directory where environments will be deployed.
  + **branch**: The branch of the Git repository to deploy.

**b. Environment Configuration**

R10k can manage multiple environments. For example:

yaml

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sources:

my\_source:

remote: 'https://github.com/your\_org/your\_puppet\_repo.git'

basedir: '/etc/puppetlabs/code/environments'

branch: 'main'

prefix: 'myorg'

This setup will deploy environments under /etc/puppetlabs/code/environments/myorg.

**4. Using R10k**

**a. Deploy Environments**

To deploy environments based on the configuration file:

bash

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r10k deploy environment -p

* **deploy environment**: Deploys Puppet environments defined in the r10k.yaml configuration file.
* **-p**: Purges any environments that are not listed in the configuration file.

**b. Deploy Modules**

To deploy modules:

bash

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r10k deploy module -p

* **deploy module**: Deploys Puppet modules defined in the r10k.yaml configuration file.

**c. Testing R10k Configuration**

You can test your R10k configuration to ensure it’s correctly set up:

bash

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r10k puppetfile install

This command checks your Puppetfile (if used) for module dependencies and installs them.

**5. Advanced Configuration**

**a. Puppetfile**

R10k can use a Puppetfile to specify module dependencies:

**File: Puppetfile**

ruby

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forge 'https://forge.puppet.com'

mod 'puppetlabs/stdlib', '6.0.0'

mod 'puppetlabs/apache', '6.0.0'

* **forge**: Specifies the Puppet Forge URL.
* **mod**: Defines modules to be installed.

Run r10k puppetfile install to install modules specified in the Puppetfile.

**b. Environment-Specific Branches**

You can configure R10k to manage multiple branches or tags for different environments:

yaml

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sources:

my\_source:

remote: 'https://github.com/your\_org/your\_puppet\_repo.git'

basedir: '/etc/puppetlabs/code/environments'

branch: 'main'

environment:

production:

branch: 'production'

development:

branch: 'development'

**6. Troubleshooting**

If R10k encounters issues:

* **Check Logs**: Review logs for errors (/var/log/puppetlabs/).
* **Verify Configuration**: Ensure the r10k.yaml file is correctly formatted and paths are accurate.
* **Test Connectivity**: Verify that R10k can access the specified Git repositories.

**Summary**

1. **Introduction**: R10k is used for managing Puppet code deployments and environments from Git repositories.
2. **Installation**: Install R10k using RubyGems and configure it with a YAML file.
3. **Configuration**: Set up repositories and environments in r10k.yaml.
4. **Usage**: Deploy environments and modules using R10k commands.
5. **Advanced Features**: Utilize Puppetfile for module management and configure environment-specific branches.
6. **Troubleshooting**: Check logs, verify configuration, and test repository connectivity if issues arise.

By understanding and using R10k, you can efficiently manage and deploy Puppet code, making your configuration management process more scalable and organized.