CHEF™

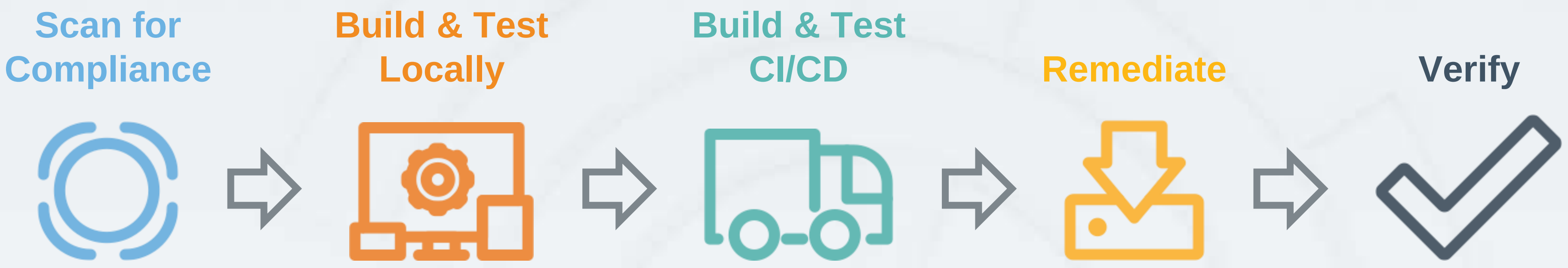
Getting Started with Compliance Automation

Running Scans

InSpec: Turn security and compliance into code

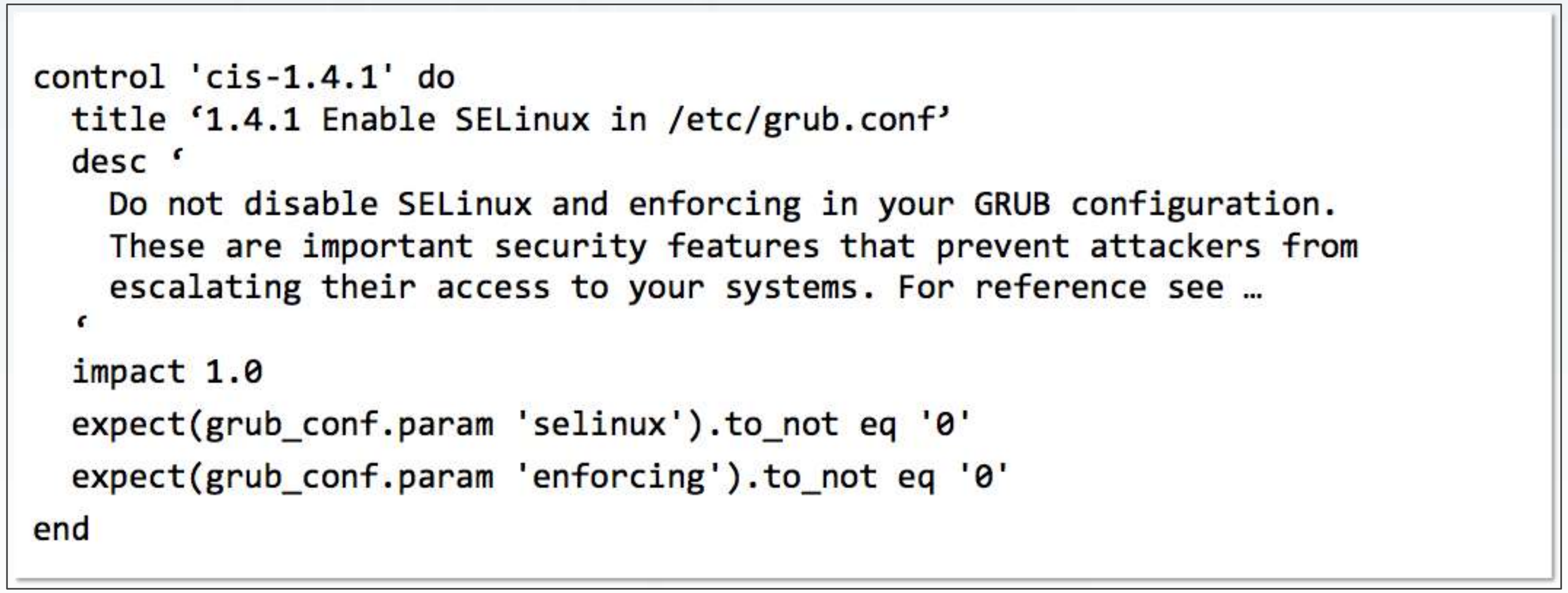
- Translate compliance into Code
- Clearly express statements of policy
- Move risk to build/test from runtime
- Find issues early
- Write code quickly
- Run code anywhere
- Inspect machines, data and APIs

Part of a process of continuous compliance



Scan for Compliance → Build & Test Locally → Build & Test CI/CD → Remediate → Verify

A simple example of an InSpec CIS rule



```
control 'cis-1.4.1' do
  title ‘1.4.1 Enable SELinux in /etc/grub.conf’
  desc ‘
    Do not disable SELinux and enforcing in your GRUB configuration.
    These are important security features that prevent attackers from
    escalating their access to your systems. For reference see …
  ‘
  impact 1.0
  expect(grub_conf.param 'selinux').to_not eq '0'
  expect(grub_conf.param 'enforcing').to_not eq '0'
end
```

Objectives

After completing this module, you should be able to:

- Add a node to test for compliance.
- Run a Compliance scan.
- Test for compliance with InSpec from the command line interface.

CONCEPT

Adding a Node to Scan

To add a node you'll need:

- The IP address or FQDN of the nodes to be tested.
- Access configuration (ssh or WinRM).
- The node's username and password OR
- The node's username plus security key pair.

EXERCISE

Group Lab: Adding a Node to Scan

Objective:

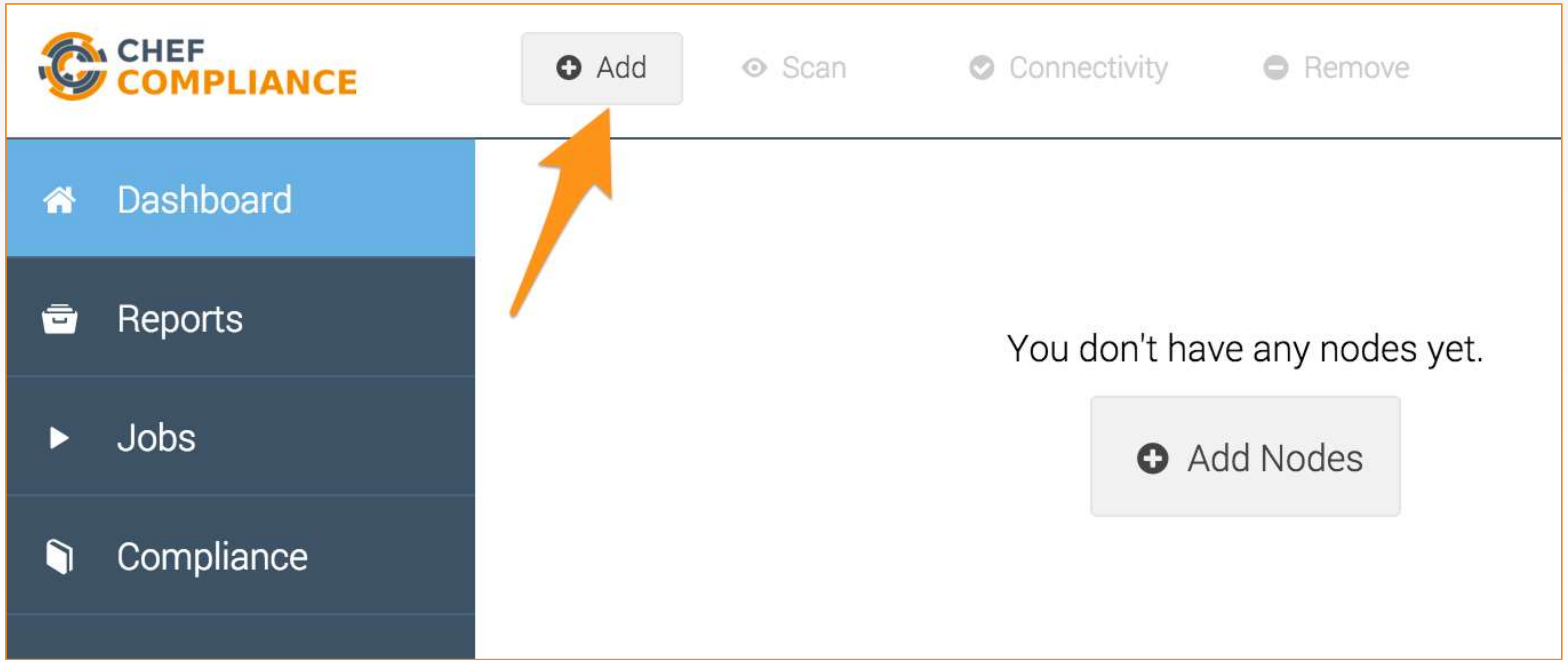
❑ Add a Linux Node to Scan

❑ Test connectivity

Note: In the next module you will perform the same exercises as in this module but using a Windows node as your target node.

GL: Adding a Node to Scan

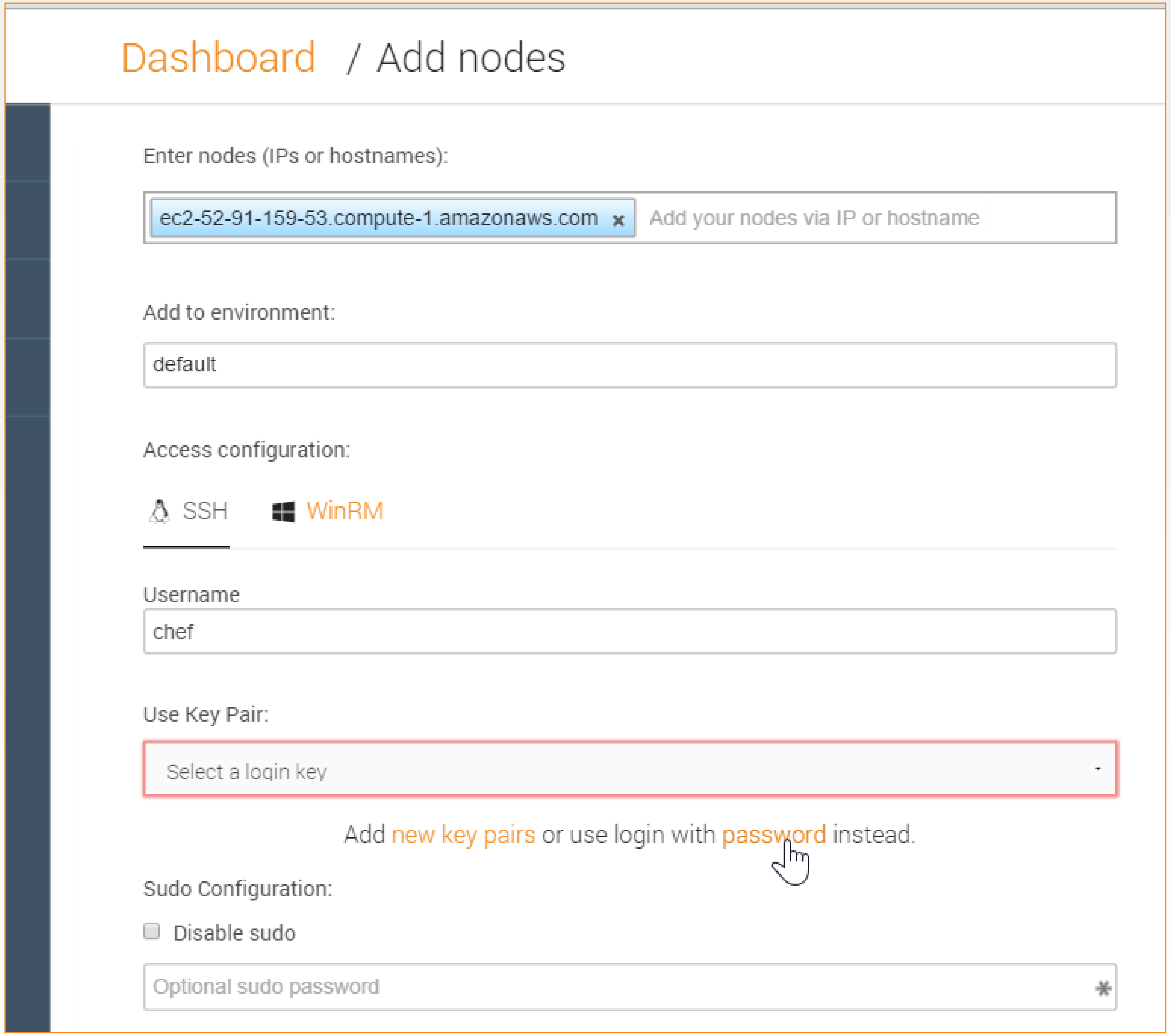
1. From your Chef Compliance Dashboard, click Add Node.



You don't have any nodes yet.

GL: Adding a Node

2. From the resulting page, enter the node's FQDN or IP address.
3. Leave environment blank. A ‘default’ environment will be used
4. Accept the default **SSH** Access configuration
5. Type **chef** in the **username** field.
6. Click the **password** link as shown in this illustration.



Dashboard / Add nodes

Enter nodes (IPs or hostnames): ec2-52-91-159-53.compute-1.amazonaws.com ×

Add to environment: default

Access configuration: SSH

Username: chef

Use Key Pair: Select a login key

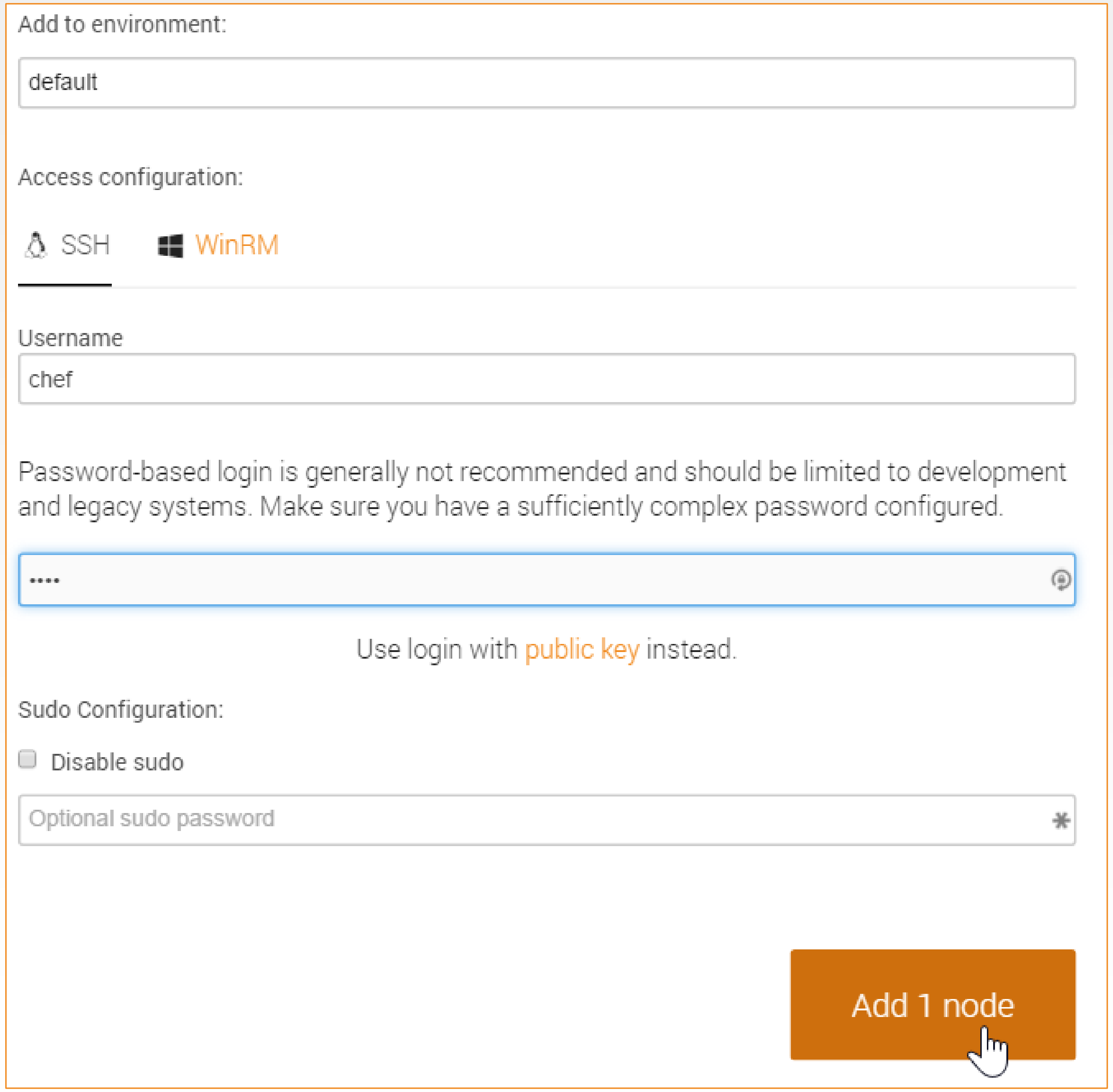
Add new key pairs or use login with password instead.

Sudo Configuration:

□ Disable sudo

GL: Adding a Node to Scan

7. Type the password (**chef**) in the password field.
8. Click the **Add 1 node** button as shown in this illustration.



Add to environment:

default

Access configuration:

Username

chef

Password-based login is generally not recommended and should be limited to development and legacy systems. Make sure you have a sufficiently complex password configured.

••••

Use login with public key instead.

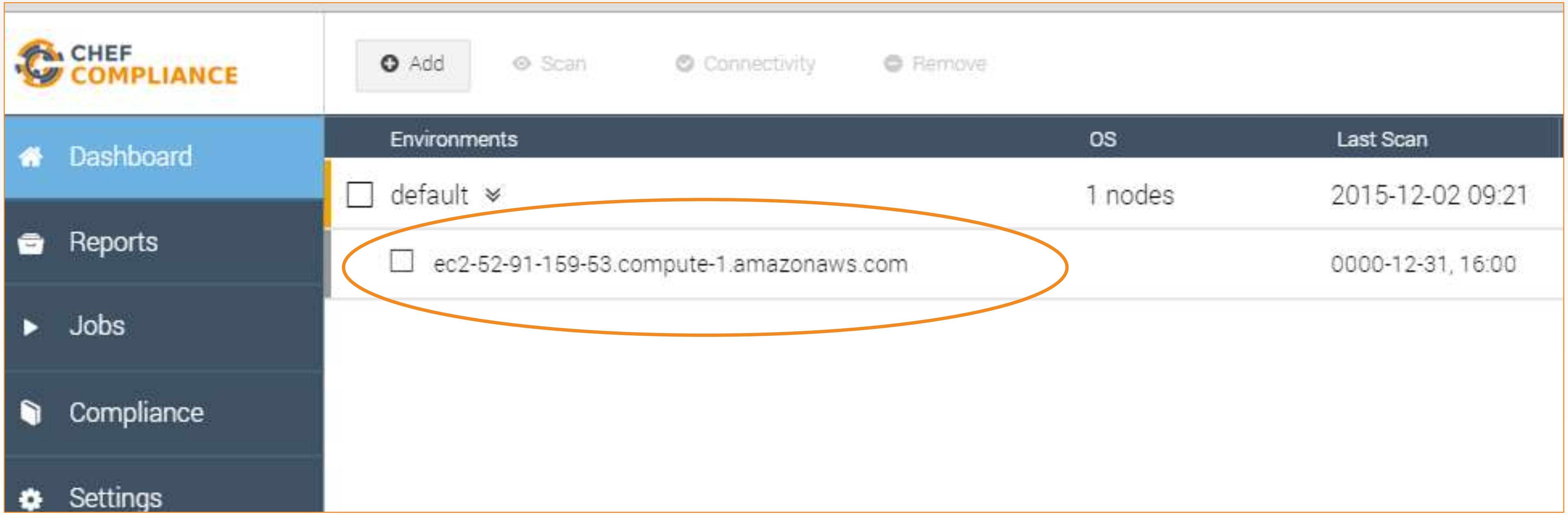
Sudo Configuration:

□ Disable sudo

Optional sudo password

GL: Adding a Node to Scan

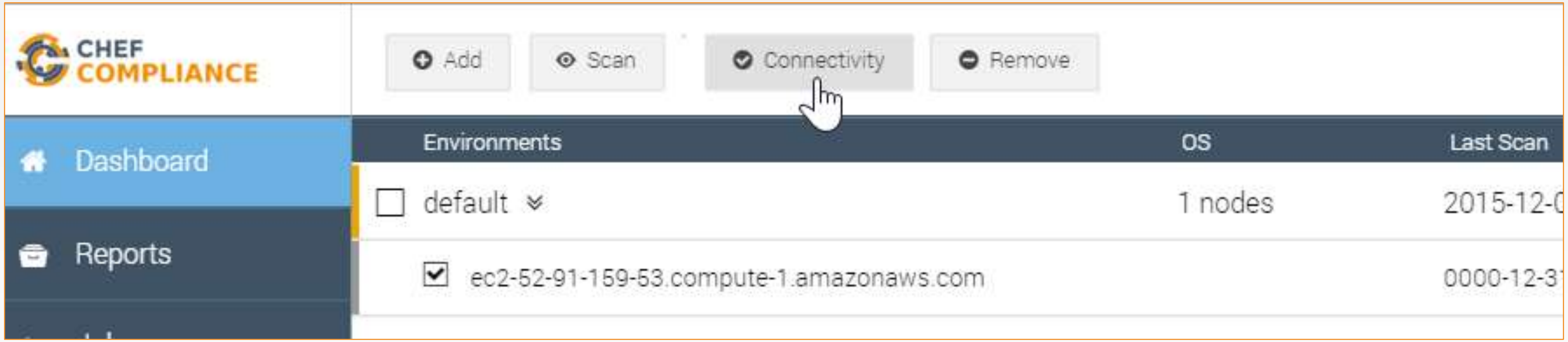
At this point your Compliance Dashboard should list the node you just added.



	Environments	OS	Last Scan
□	default ≫	1 nodes	2015-12-02 09:21
□	ec2-52-91-159-53.compute-1.amazonaws.com		0000-12-31, 16:00

GL: Testing Connectivity to Your Node

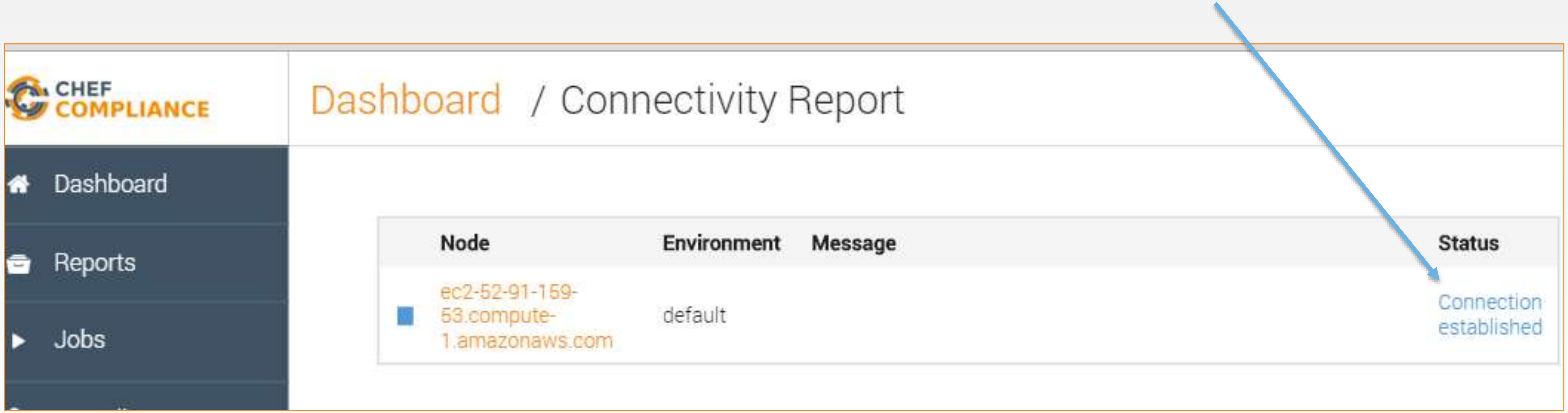
1. Click the **check box** next to your node and then click the **Connectivity** button.



	Environments	OS	Last Scan
□	default	1 nodes	2015-12-(
☑	ec2-52-91-159-53.compute-1.amazonaws.com		0000-12-3

GL: Testing Connectivity to Your Node

The Status column of you node should now indicate **Connection established**.



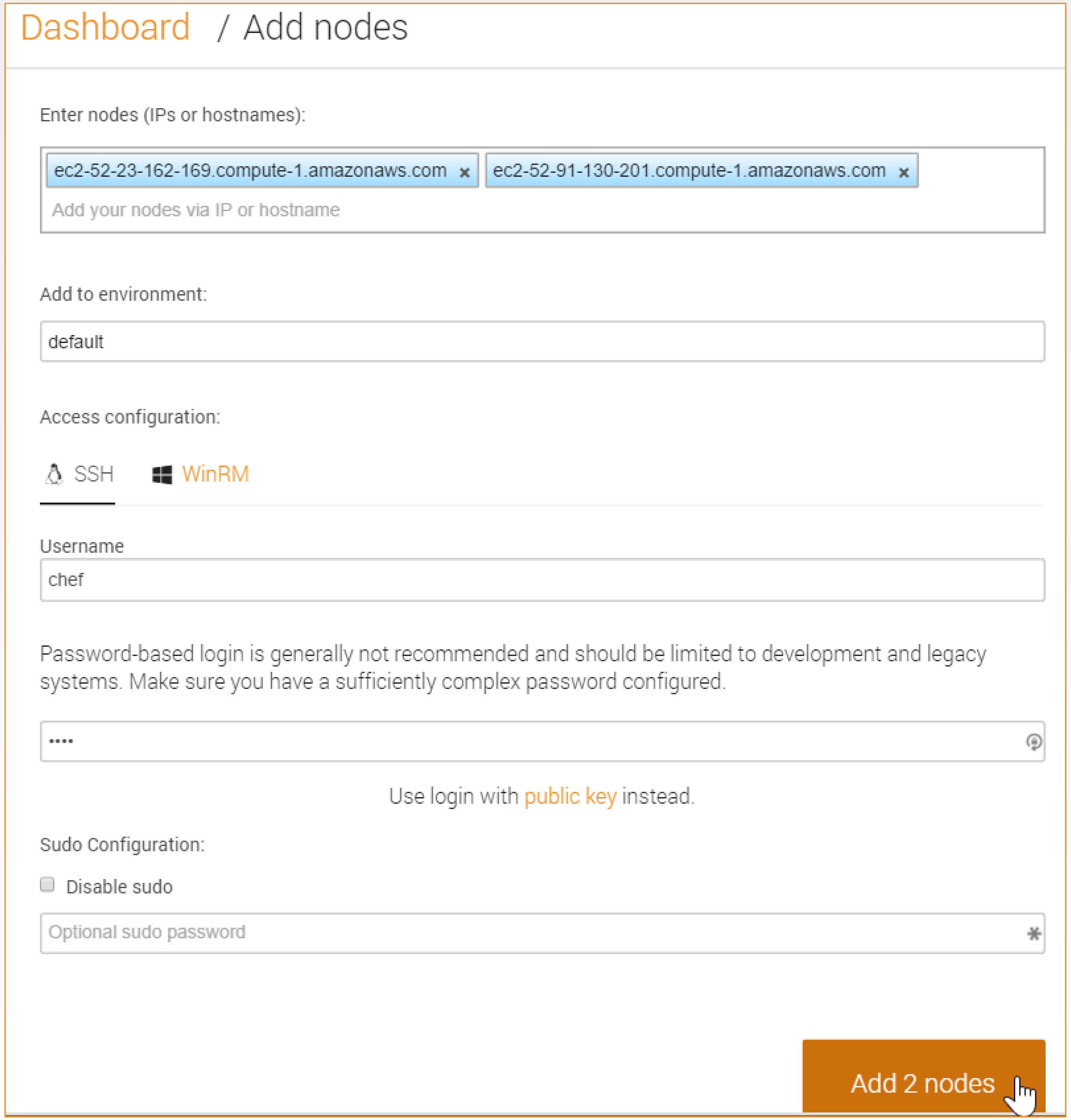
	Node	Environment	Message	Status
🟦	ec2-52-91-159-53.compute-1.amazonaws.com	default		Connection established

Adding Nodes in Bulk

You could add additional nodes by simply repeating the previous steps.

You could also add a number of nodes at once by separating each hostname or IP address with a comma or a space, as shown in this illustration.

Chef Compliance also supports bulk loading of nodes via API.



Enter nodes (IPs or hostnames):

ec2-52-23-162-169.compute-1.amazonaws.com × ec2-52-91-130-201.compute-1.amazonaws.com ×

Add your nodes via IP or hostname

Add to environment:

default

Access configuration:

Username

chef

Password-based login is generally not recommended and should be limited to development and legacy systems. Make sure you have a sufficiently complex password configured.

••••

Use login with public key instead.

Sudo Configuration:

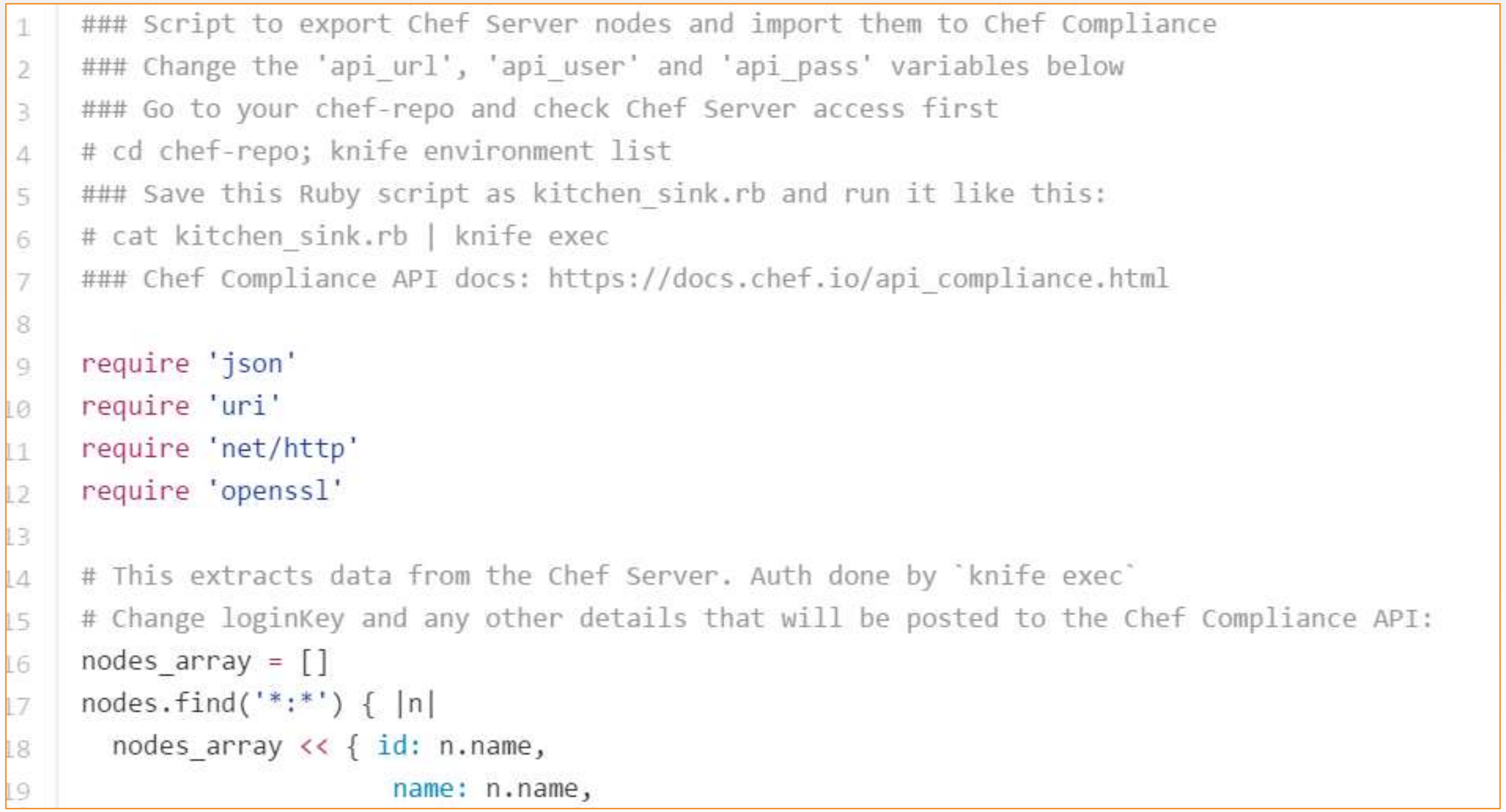
□ Disable sudo

Optional sudo password

Adding Nodes in Bulk via API

After class you can go to the following link.

The resulting kitchen_sink.rb will step you through how to upload nodes in bulk.



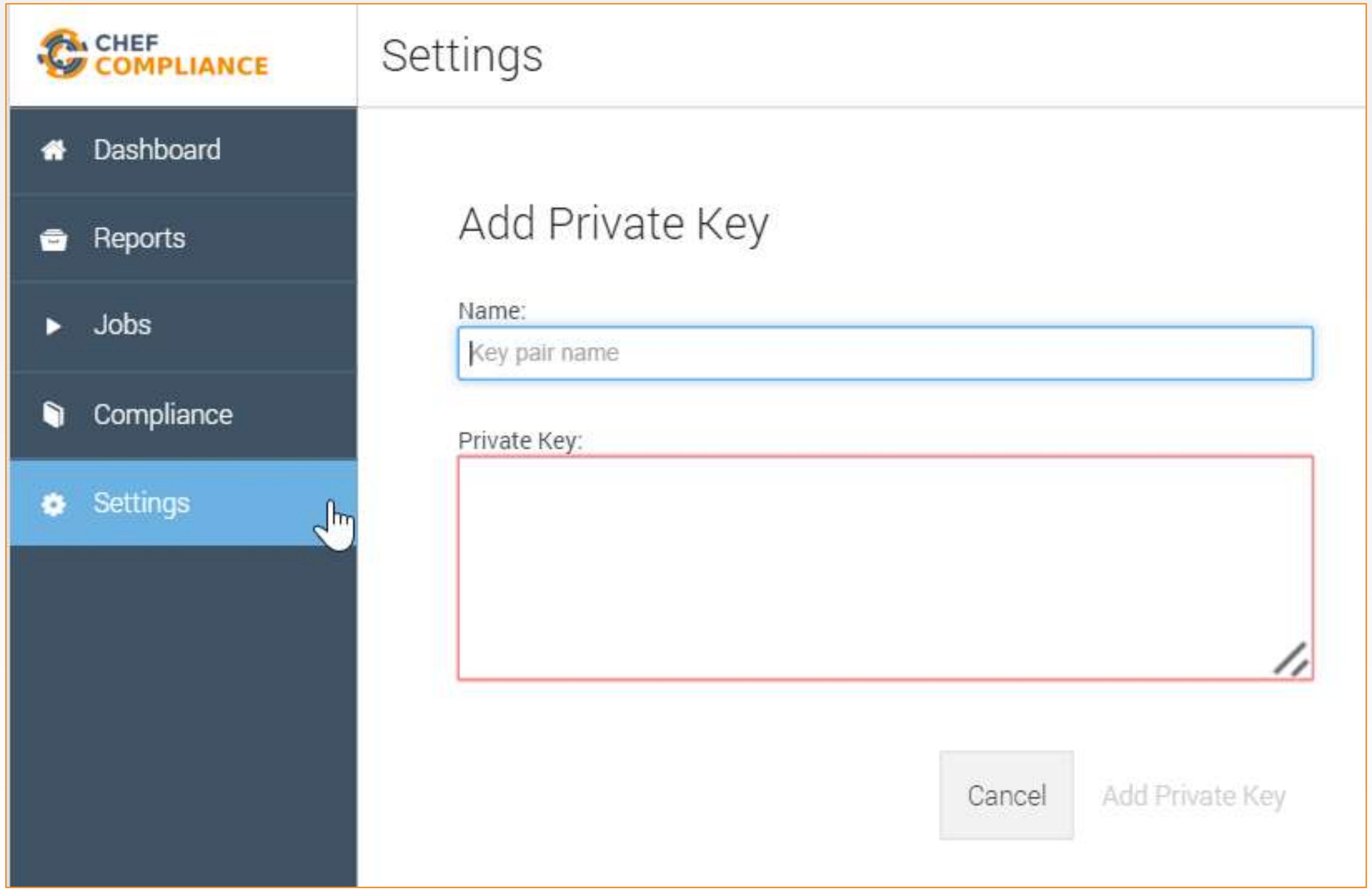
```ruby
### Script to export Chef Server nodes and import them to Chef Compliance
### Change the 'api_url', 'api_user' and 'api_pass' variables below
### Go to your chef-repo and check Chef Server access first
# cd chef-repo; knife environment list
### Save this Ruby script as kitchen_sink.rb and run it like this:
# cat kitchen_sink.rb | knife exec
### Chef Compliance API docs: https://docs.chef.io/api_compliance.html

require 'json'
require 'uri'
require 'net/http'
require 'openssl'

# This extracts data from the Chef Server. Auth done by `knife exec`
# Change loginKey and any other details that will be posted to the Chef Compliance API:
nodes_array = []
nodes.find('*:*') { |n|
  nodes_array << { id: n.name,
                    name: n.name,
```

https://gist.github.com/alexpop/01b0bba8d259adeee320

Private Keys

In the workplace, using a security key would be a more secure method for connecting to nodes than using the password method.

By clicking **Settings > Add Private Key** you will see where to paste a private key.



Add Private Key

Name:

Key pair name

Private Key:

CONCEPT

Running Compliance Scans

You can run Compliance scans on demand or schedule them to run at a later time.

Chef Compliance maintains profiles as a collection of individual controls that comprise a complete audit.

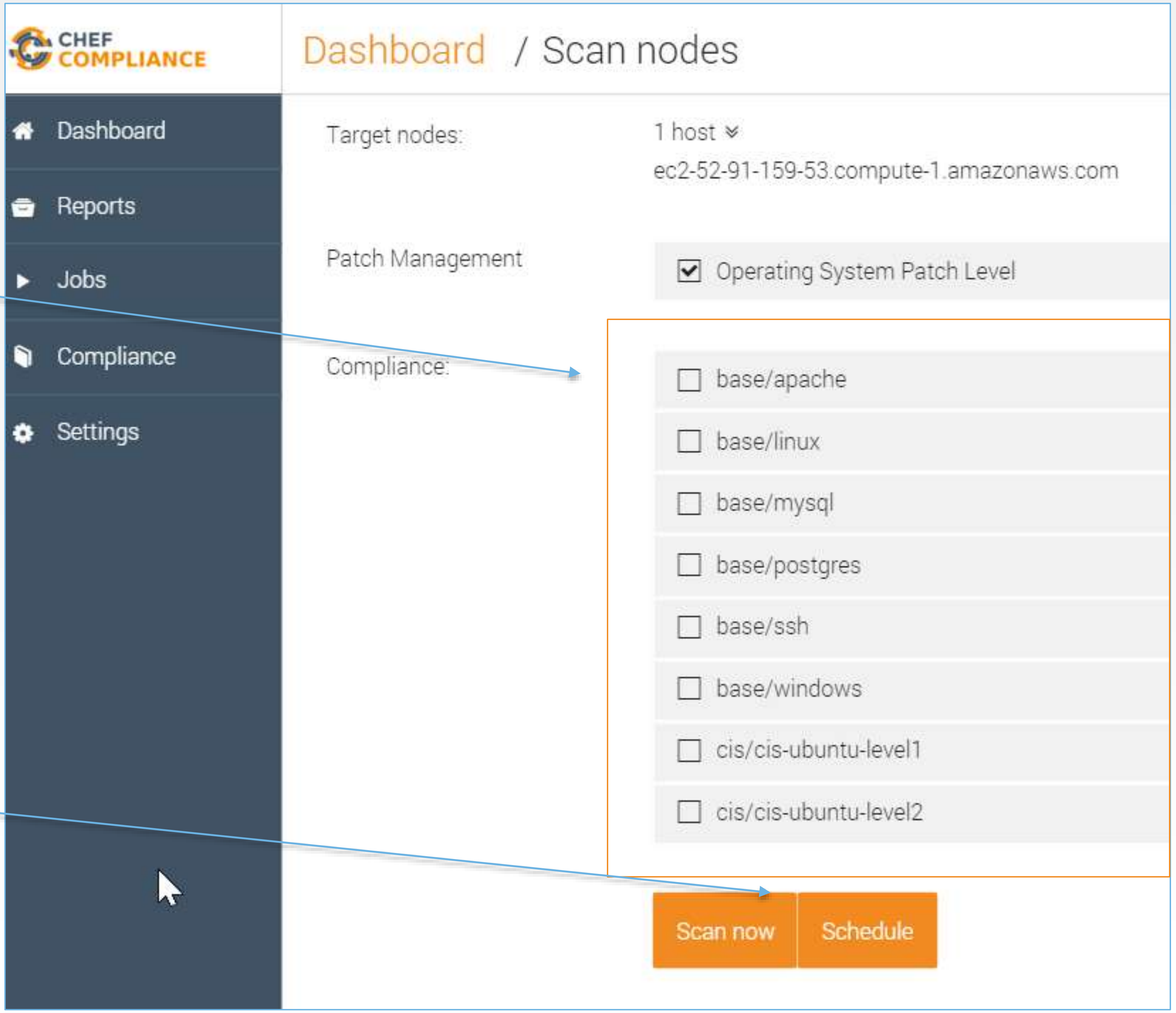
As mentioned previously, Chef Compliance comes with a few reference profiles of various compliance policies that you can leverage or use as examples to create your own.

Compliance Profiles Used in Scans

This image shows the default Compliance Profiles as accessed from the Scan Nodes page.

You should be thoughtful with which profiles choose.

Notice how you can also choose to run a scan on demand or schedule a scan.



Dashboard / Scan nodes

Target nodes: 1 host
ec2-52-91-159-53.compute-1.amazonaws.com

Patch Management: ☑ Operating System Patch Level

Compliance:
- ☐ base/apache
- ☐ base/linux
- ☐ base/mysql
- ☐ base/postgres
- ☐ base/ssh
- ☐ base/windows
- ☐ cis/cis-ubuntu-level1
- ☐ cis/cis-ubuntu-level2

EXERCISE

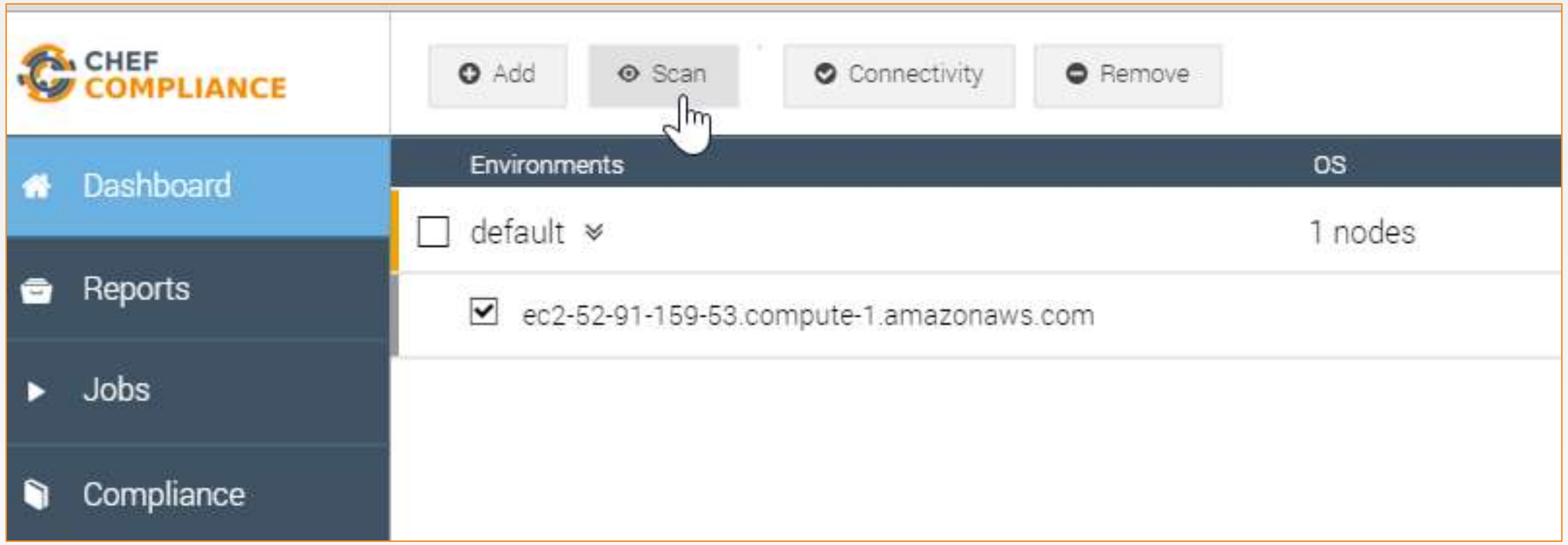
Group Lab: Running a Scan

Objective:

- ❑ Run a Compliance scan.
- ❑ View the output of a scan.

GL: Running a Scan

1. Click the **check box** next to your node and then click the **Scan** button.



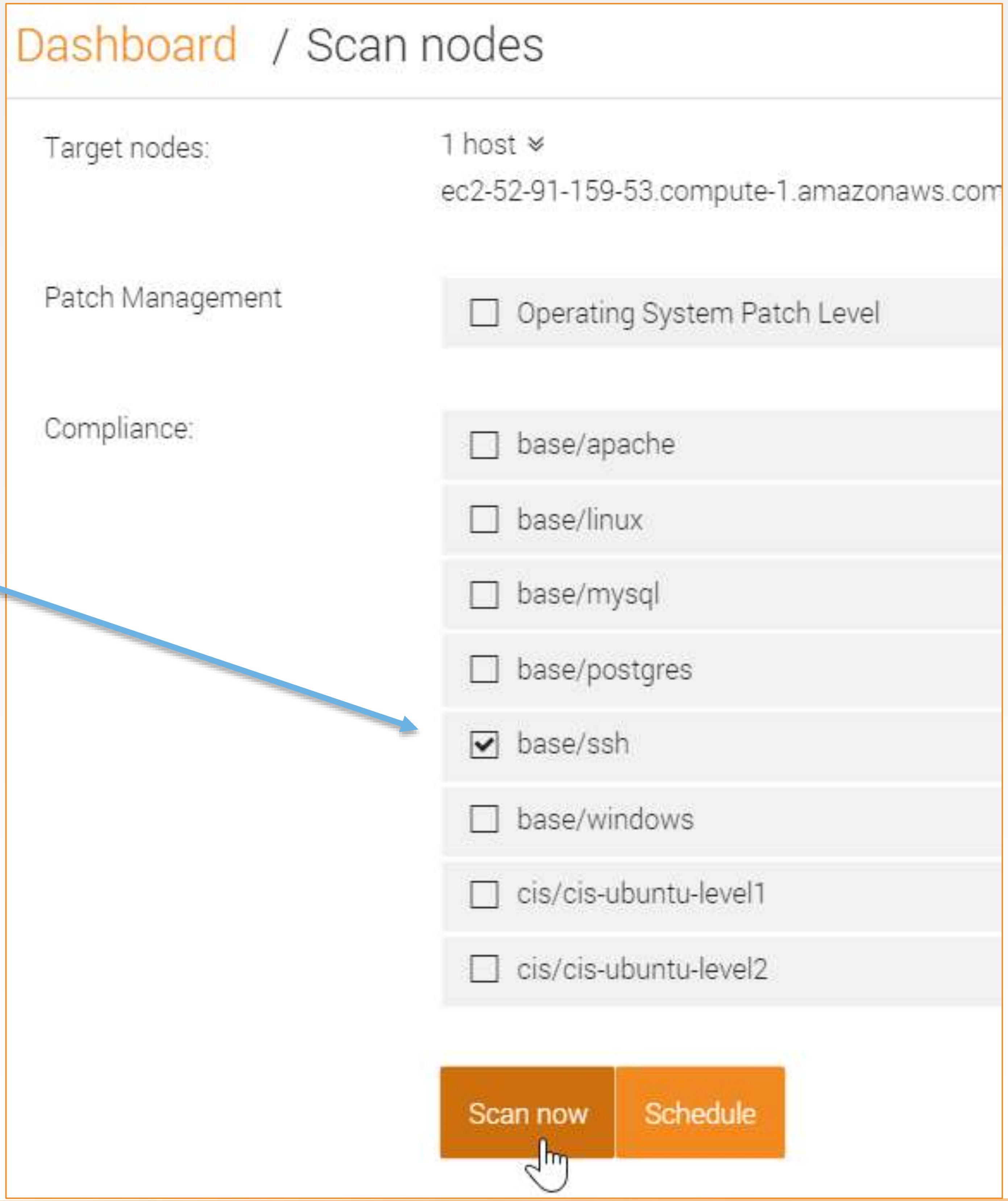
□ default
1 nodes

☑ ec2-52-91-159-53.compute-1.amazonaws.com

GL: Running a Scan

2. From the resulting page, check the **base/ssh** profile and uncheck any other check boxes.

3. Click the **Scan now** button.



Dashboard / Scan nodes

Target nodes: 1 host

ec2-52-91-159-53.compute-1.amazonaws.com

Patch Management: □ Operating System Patch Level

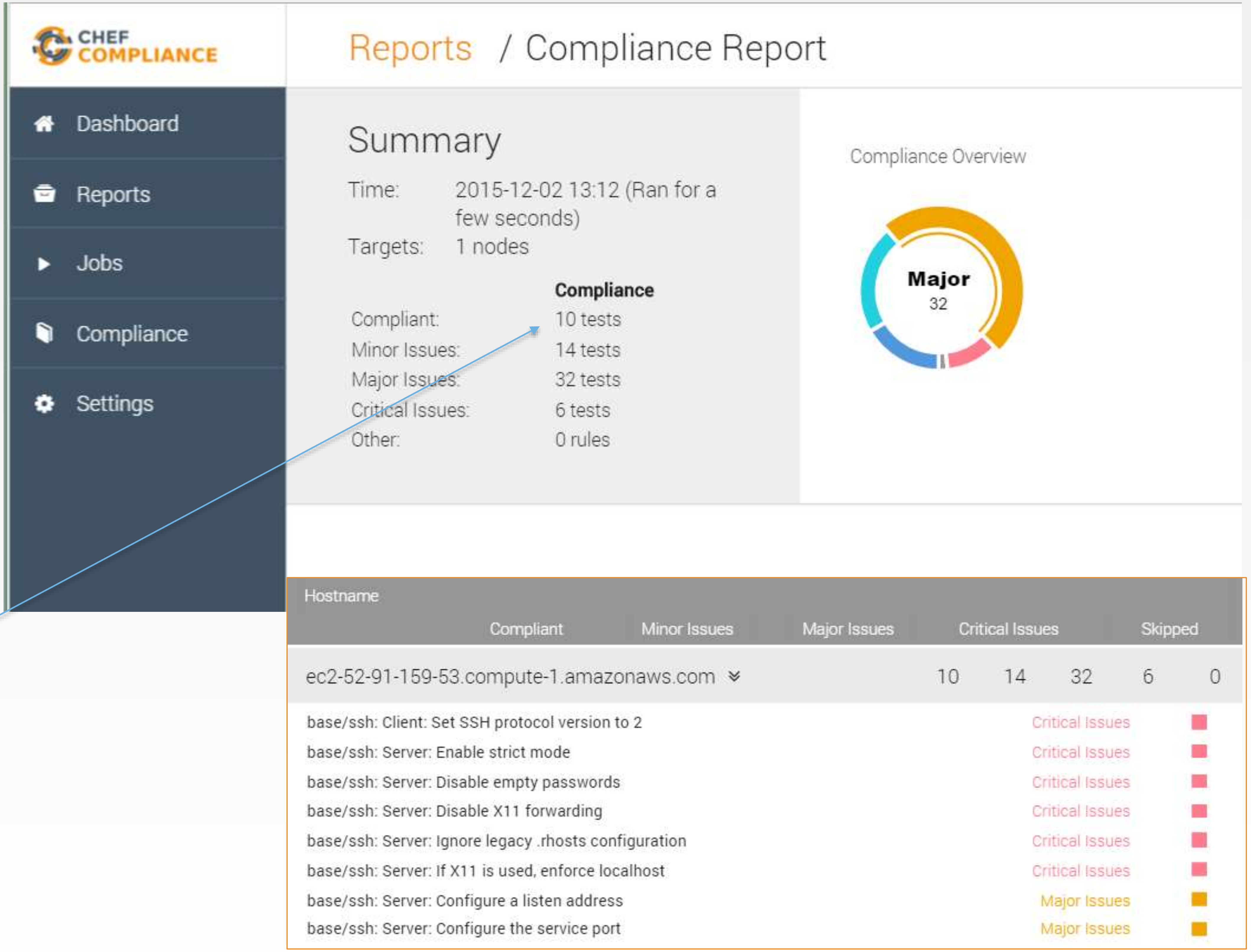
Compliance:

- □ base/apache
- □ base/linux
- □ base/mysql
- □ base/postgres
- ☑ base/ssh
- □ base/windows
- □ cis/cis-ubuntu-level1
- □ cis/cis-ubuntu-level2

Scan Results

A Compliance Report should now display and your scan results should be similar to that shown here.

Notice how in the upper Summary section in this example, 10 tests were compliant and 6 tests show critical issues with ssh.



Reports / Compliance Report

Summary

Time: 2015-12-02 13:12 (Ran for a few seconds)

Targets: 1 nodes

	Compliance
Compliant:	10 tests
Minor Issues:	14 tests
Major Issues:	32 tests
Critical Issues:	6 tests
Other:	0 rules

Hostname	Compliant	Minor Issues	Major Issues	Critical Issues	Skipped
ec2-52-91-159-53.compute-1.amazonaws.com	10	14	32	6	0

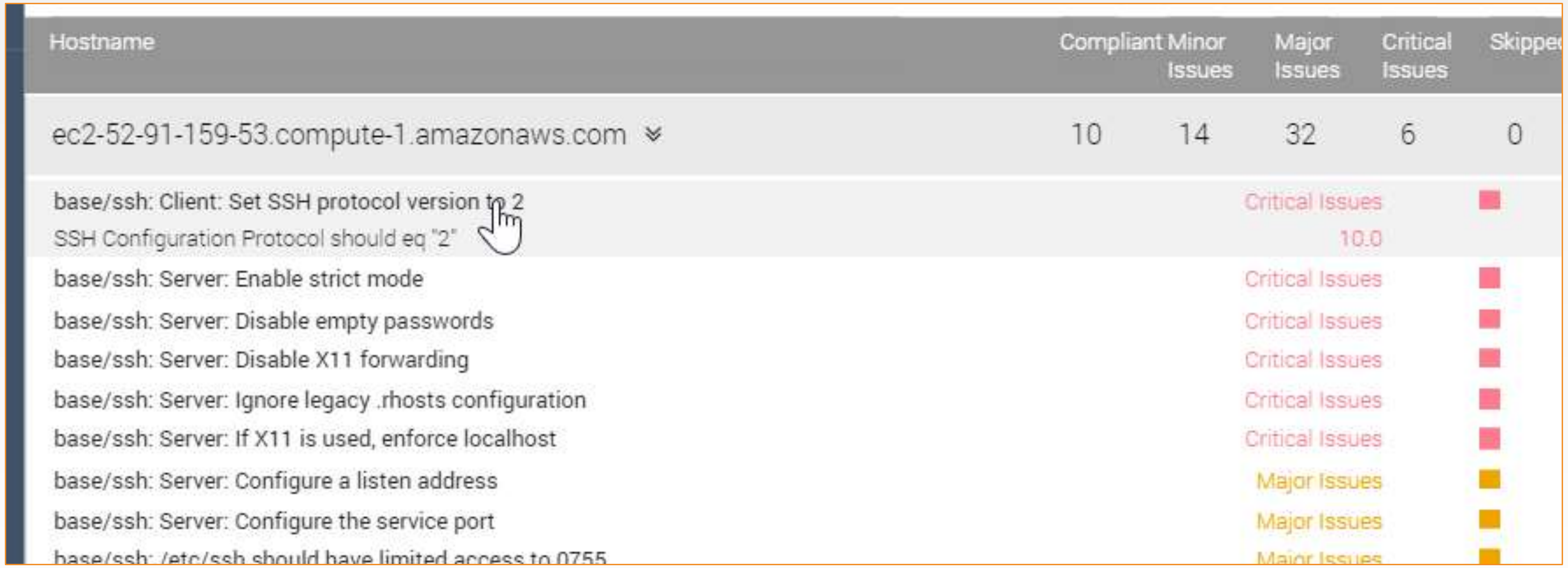
base/ssh: Client: Set SSH protocol version to 2	Critical Issues	🟥
base/ssh: Server: Enable strict mode	Critical Issues	🟥
base/ssh: Server: Disable empty passwords	Critical Issues	🟥
base/ssh: Server: Disable X11 forwarding	Critical Issues	🟥
base/ssh: Server: Ignore legacy .rhosts configuration	Critical Issues	🟥
base/ssh: Server: If X11 is used, enforce localhost	Critical Issues	🟥
base/ssh: Server: Configure a listen address	Major Issues	🟧
base/ssh: Server: Configure the service port	Major Issues	🟧

Scan Results

The bottom half of the Compliance Report shown here has a table of details of test results.

These are sorted by severity.

If you click an issue as shown here, a bit more information about the issue displays.



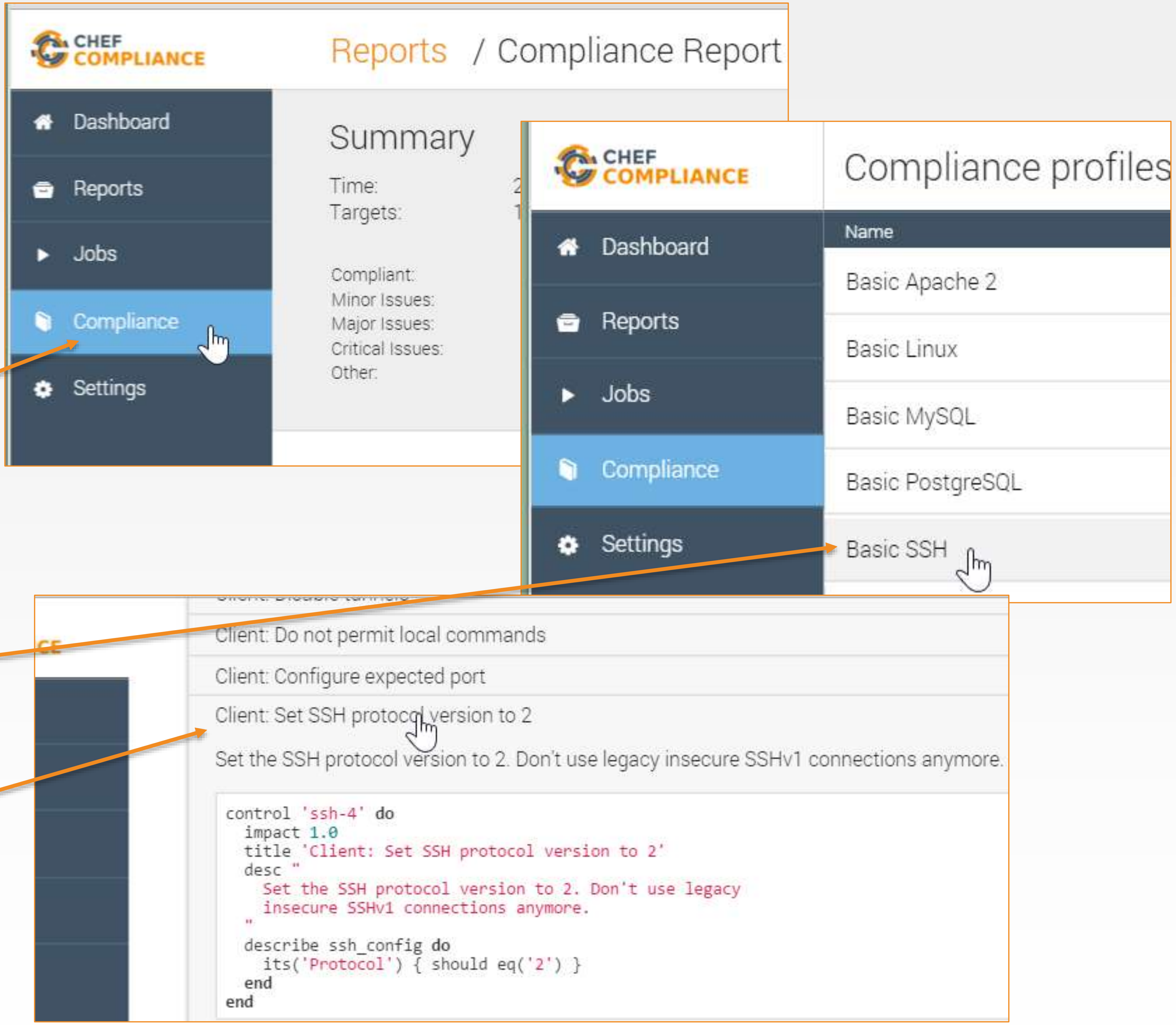
Hostname	Compliant	Minor Issues	Major Issues	Critical Issues	Skippe
ec2-52-91-159-53.compute-1.amazonaws.com ≫	10	14	32	6	0

base/ssh: Client: Set SSH protocol version to 2 SSH Configuration Protocol should eq "2"	Critical Issues 10.0	🟥
base/ssh: Server: Enable strict mode	Critical Issues	🟥
base/ssh: Server: Disable empty passwords	Critical Issues	🟥
base/ssh: Server: Disable X11 forwarding	Critical Issues	🟥
base/ssh: Server: Ignore legacy .rhosts configuration	Critical Issues	🟥
base/ssh: Server: If X11 is used, enforce localhost	Critical Issues	🟥
base/ssh: Server: Configure a listen address	Major Issues	🟧
base/ssh: Server: Configure the service port	Major Issues	🟧
base/ssh: /etc/ssh should have limited access to 0755	Major Issues	🟧

GL: Profile

To view the InSpec code that comprises this profile, do the following:

1. Click the **Compliance** button.
2. Click the relevant profile (**Basic SSH**).
3. Scroll down and click the `**Set SSH protocol version to 2**` profile.



Name
Basic Apache 2
Basic Linux
Basic MySQL
Basic PostgreSQL
Basic SSH

Client: Do not permit local commands

Client: Configure expected port

Client: Set SSH protocol version to 2

Set the SSH protocol version to 2. Don't use legacy insecure SSHv1 connections anymore.

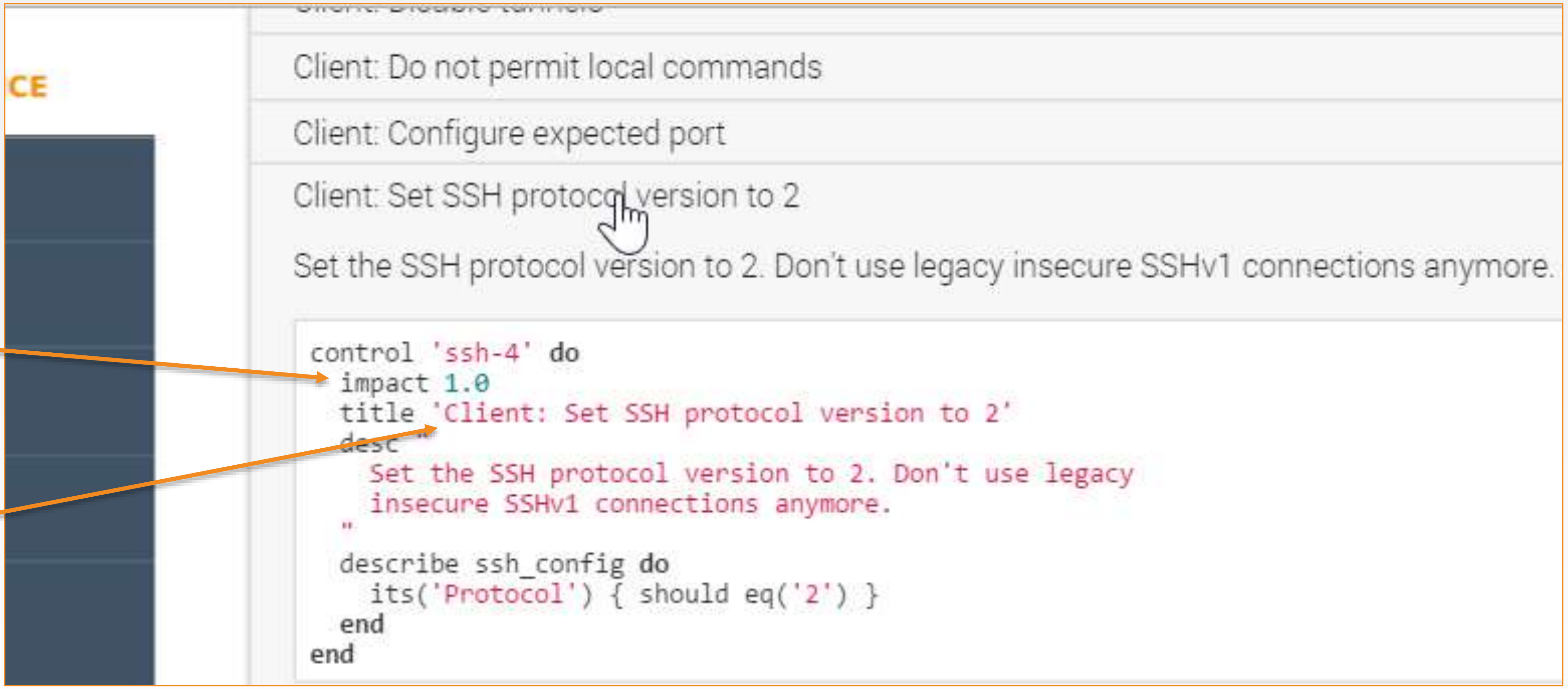
```
control 'ssh-4' do
  impact 1.0
  title 'Client: Set SSH protocol version to 2'
  desc "
    Set the SSH protocol version to 2. Don't use legacy
    insecure SSHv1 connections anymore.
  "
  describe ssh_config do
    its('Protocol') { should eq('2') }
  end
end
```

Discussion: InSpec Profile Code

Let's discuss what this profile is doing.

The `impact` of 1.0 indicates this is a Critical issue.

The `title` is what populates the Compliance Report issue title.



Client: Do not permit local commands

Client: Configure expected port

Client: Set SSH protocol version to 2

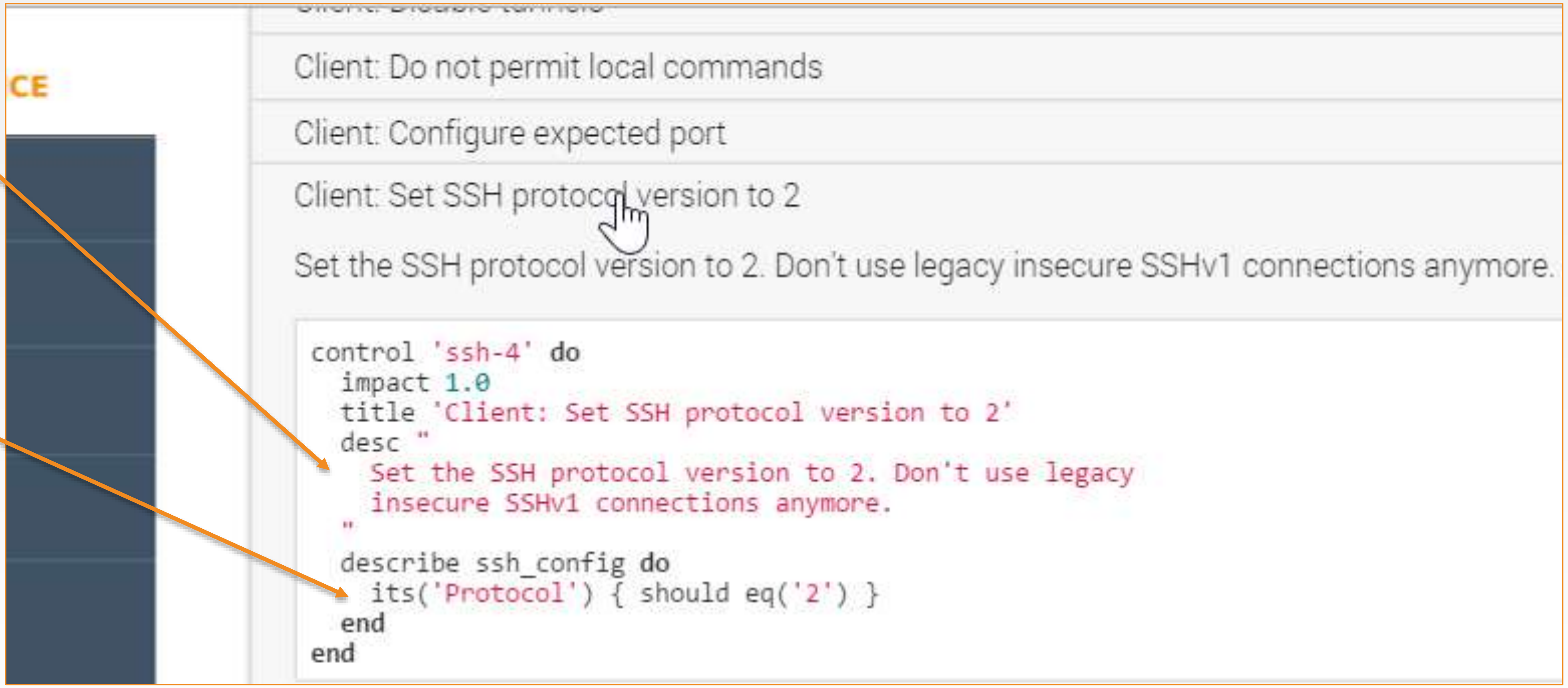
Set the SSH protocol version to 2. Don't use legacy insecure SSHv1 connections anymore.

```
control 'ssh-4' do
  impact 1.0
  title 'Client: Set SSH protocol version to 2'
  desc "
    Set the SSH protocol version to 2. Don't use legacy
    insecure SSHv1 connections anymore.
  "
  describe ssh_config do
    its('Protocol') { should eq('2') }
  end
end
```

Discussion: InSpec Profile Code

The **desc** is typically human-readable description sourced from the CIS or source doc.

The `**describe**` section is the actual test that is executed.



Client: Do not permit local commands

Client: Configure expected port

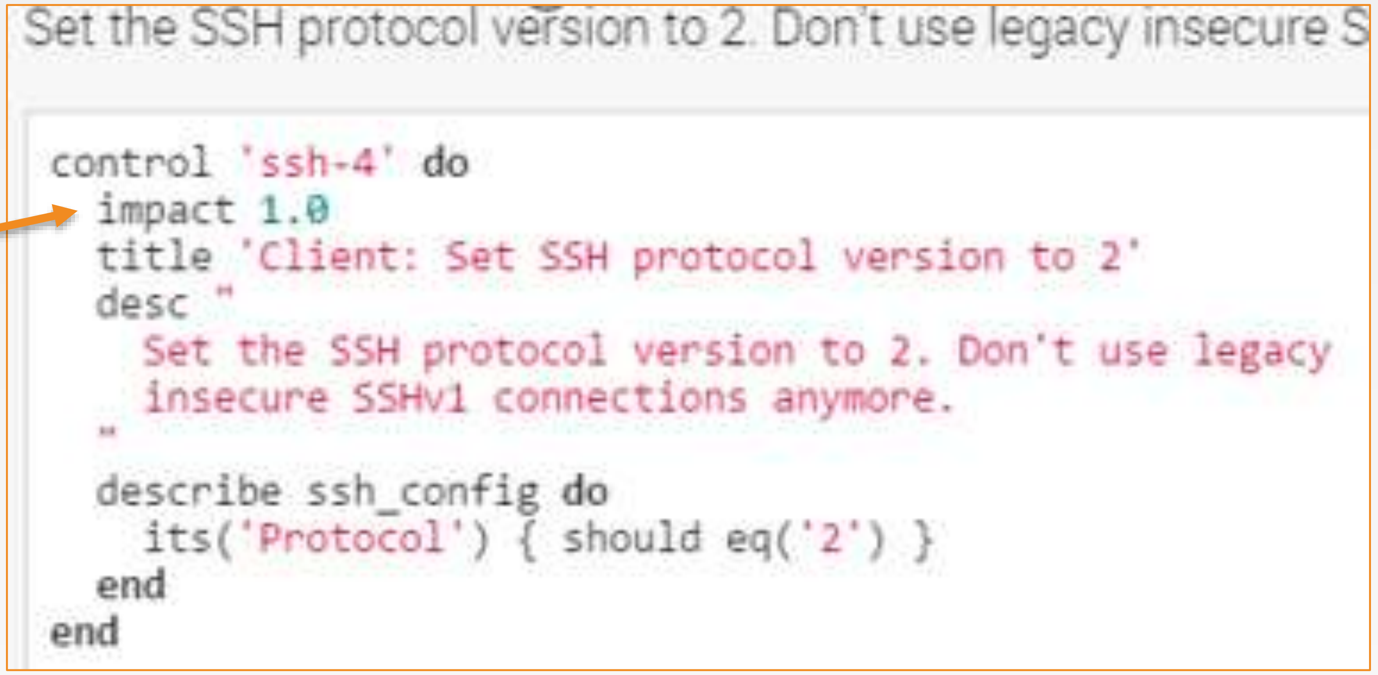
Client: Set SSH protocol version to 2

Set the SSH protocol version to 2. Don't use legacy insecure SSHv1 connections anymore.

```
control 'ssh-4' do
  impact 1.0
  title 'Client: Set SSH protocol version to 2'
  desc "
    Set the SSH protocol version to 2. Don't use legacy
    insecure SSHv1 connections anymore.
  "
  describe ssh_config do
    its('Protocol') { should eq('2') }
  end
end
```

Compliance Profile Severity Mapping

The table below shows the current mapping of Compliance Profile **impact** numbering to severity.



Set the SSH protocol version to 2. Don't use legacy insecure S

```
control 'ssh-4' do
  impact 1.0
  title 'Client: Set SSH protocol version to 2'
  desc "
    Set the SSH protocol version to 2. Don't use legacy
    insecure SSHv1 connections anymore.
  "
  describe ssh_config do
    its('Protocol') { should eq('2') }
  end
end
```

Impact Numbering	Severity Designation
0.7 - 1.0	Critical Issues
0.4 - <0.7	Major Issues
0 - <0.4	Minor Issues

Critical Issues 🟥
Critical Issues 🟥
Critical Issues 🟥
Major Issues 🟧
Major Issues 🟧
Major Issues 🟧
Minor Issues 🟦
Minor Issues 🟦

https://nvd.nist.gov/cvss.cfm

Run InSpec from the Command Line

```
control 'sshd-11' do
  impact 1.0
  title 'Server: Set protocol version to SSHv2'
  desc "
    Set the SSH protocol version to 2. Don't use legacy
    insecure SSHv1 connections anymore.
  "

  describe sshd_config do
    its('Protocol') { should eq('2') }
  end
end
```

Run InSpec from the Command Line

Test Locally:

```
$ inspec exec test.rb
```

Run InSpec from the Command Line

Remote via SSH:

```
$ inspec exec test.rb -t ssh://54.163.150.246 --user=chef --
password=chef.io
```

Run InSpec from the Command Line

Docker Container

```
$ inspec exec test.rb -t docker://3dda08e75838
```

CHEF™

Running Scans

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