Caltech | Center for Technology & Management Education

Post Graduate Program in DevOps

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Caltech | Center for Technology & Management Education

Configuration Management with Ansible and Terraform

Powerd by simplilearn

YAML Basics

Learning Objectives

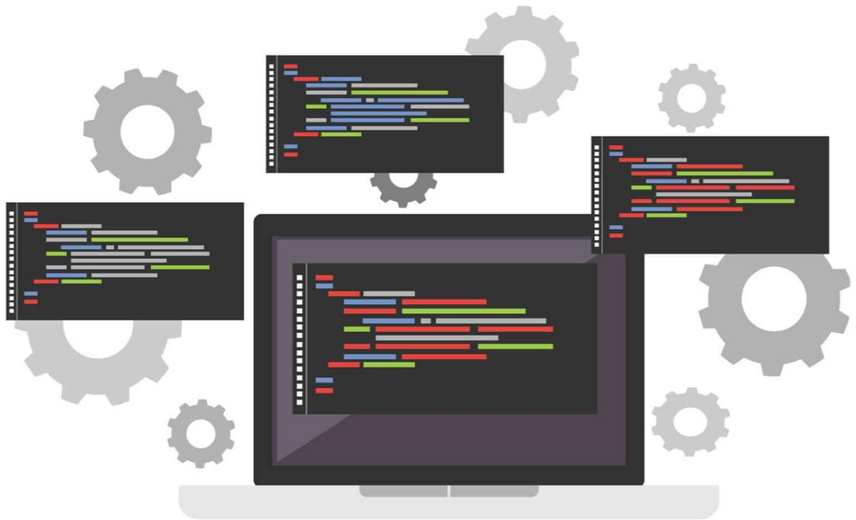
By the end of this lesson, you will be able to:

- Define YAML and its uses
- Describe YAML structure and syntax
- List out data types in YAML
- Write simple YAML script

Introduction to YAML

Data Serialization

Data serialization is the process of converting data objects present in complex data structures into a byte stream for storage, transfer, and distribution purposes on physical devices.



Data Serialization

Commonly used data serialization formats are:

01 XML

02 YAML

03 JSON

04 BSON

05 MessagePack

06 Protobuf

What Is YAML?

YAML is a data serialization language that is often used to write configuration files and works in concurrence with any programming language.

YAML stood for “Yet Another Markup Language”. The acronym was later changed to “YAML Ain’t Markup Language”.

What Is YAML Used for?

The most common use for YAML is to create configuration files.

YAML is also used by the automation tool Ansible to create automation processes.

Kubernetes resources and deployments can be created using YAML files.

YAML files can be added to GitHub so that changes can be tracked and audited.

YAML Features

Some of the features of YAML are:

Multi-Document Support
Users can add multiple documents to a single YAML file by separating different documents with three dashes (**---**).

Built-In Comments
Users can add comments to their code using the **#** symbol.

No Tabs
YAML does not allow tabs. Spaces are the only way to achieve indentation.

Clean Syntax
YAML relies on indentations to show the levels and structure in the data.

YAML Features

Some of the features of YAML are:

Precise Feedback
It helps the user in quickly finding and fixing errors.

Support for Complex Structures
It helps the user in referring to other data objects.

Explicit Data Types with Tags
It auto-detects the type of data, but users are free to specify the type they need.

No Executable Commands
It does not have executable commands, which makes the language highly secure.

Overview of YAML Syntax

Basic YAML Rules

YAML has some rules in place to avoid challenges related to ambiguity about different languages and editing programs.

YAML files are saved with **.yml** or **.yaml** extension.

YAML is case-sensitive.

YAML

YAML has features that are derived from Perl, C, XML, HTML, and other programming languages.

1. Scalars, lists, and arrays come from Perl.
2. The three-dash separator comes from MIME.
3. Whitespace wrapping comes from HTML.
4. Escape sequences come from C.

YAML Syntax

The structure of a YAML file is a Map or a List.

Colon and a single space define a scalar (or a variable):

```
string: “17”

integer: 17

float: 17.0

boolean: No
```

YAML Syntax

A **|** character denotes a string that preserves newlines, and a **>** character denotes a string that folds newlines.

```
data: |
 Every one
 Of these
 Newlines
 Will be
 Broken up.
```

```
data: >
 This text
 is wrapped
 and will
 be formed into
 a single paragraph.
```

YAML Maps

Maps associate key-value pairs, which is an important part of setting up data.

A YAML configuration file can start like this:

```
---

apiVersion: v3

kind: Pod

metadata:

 name: rss-site

 labels:

  app: web
```

YAML Lists

A list is a collection of values in a specific order that can contain any number of entries.

- A list sequence starts with a dash (-) and a space.
- Indentation separates it from the parent.
- A list can be embedded into a map.

Sample YAML Script

Simple YAML script for student records that follows syntax rules

```
---
#Student Details

Student-Id: 202104

First-Name: John

Parents-Name:
 - Andrew
 - Cathy

Address:
 - street: 13 Main st.
   city: Houston
   state: TX

education: |
 4 GCSEs
 3 A-Levels
…
```

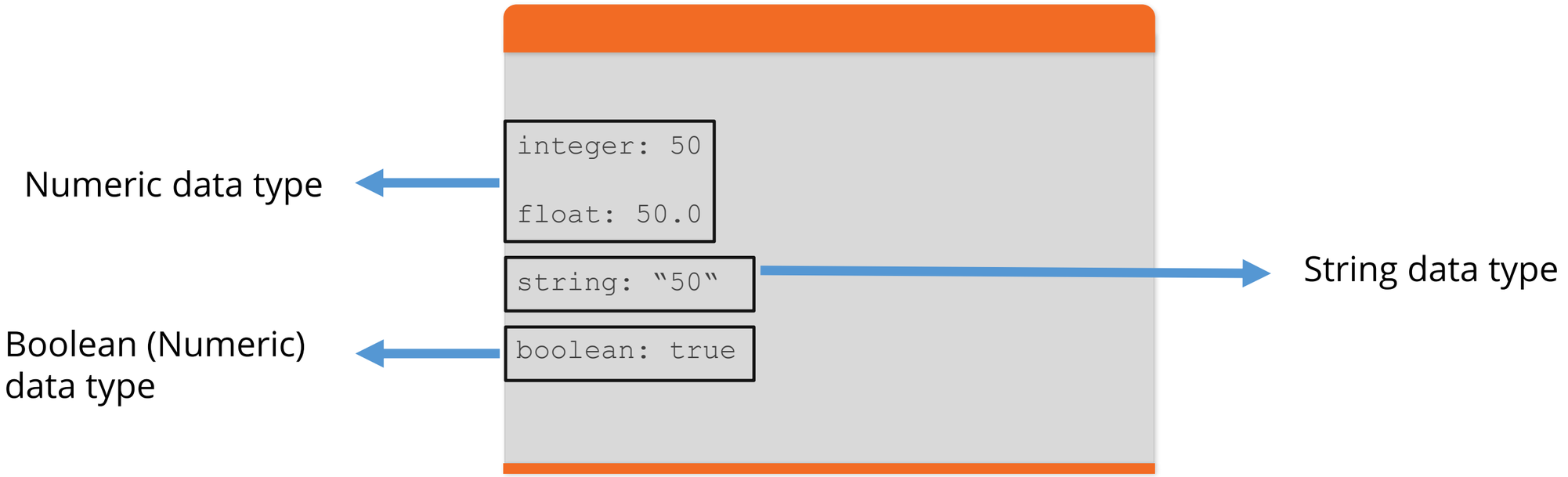
Data Types in YAML

Data Types in YAML

The basic data types of YAML are:

Scalar

In YAML, scalar means a simple value for a key.



Scalars are often called variables in programming.

Scalar

Following are the examples of numeric data types:

Integer and Floating

```
---

age: 11223

octal: 011223

hex: 0x12d4

floating: 180.0

exp: 12.3015e+05
```

Boolean

```
---

booleanvalue1: True

booleanvalue2: False

value1: On

value2: Off
```

Scalar

In YAML, strings are unicode.

String Data Type

```
---

string: this is a string

str: "the cost is 390\n"

nullstr1: null

nullstr2: ~
```

List

In YAML, each item in the list is of key-value pairs, commonly called a “hash” or a “dictionary”.

List

```
---

#List in a single line
items: [6, 7, 8, 9, 10]
name: [six, seven, eight]

# List in multiple line
items:
  - 6
  - 7
  - 8

#complex objects
newitems:
 - values:
    value1:
    value2:
    value3:
```

Dictionary

Dictionary is a collection of key-value pairs.

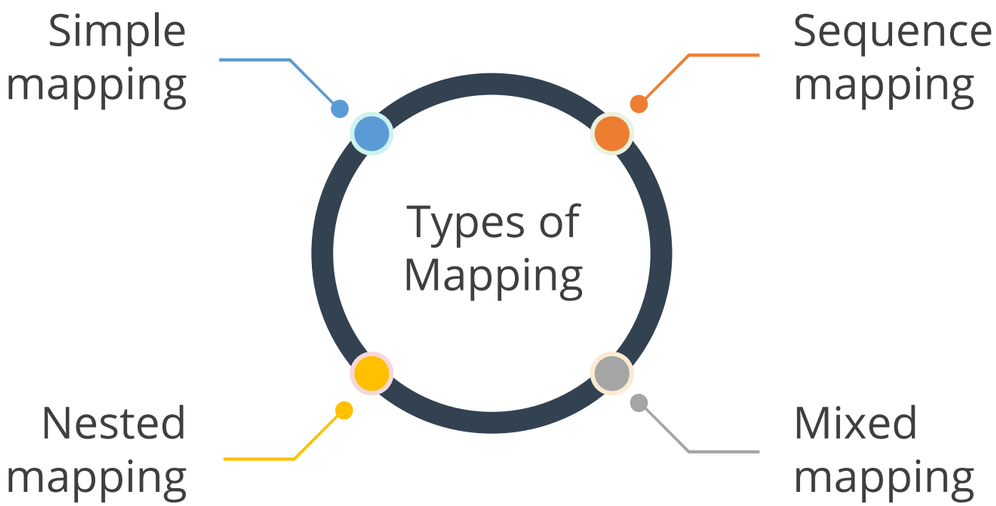
Dictionary

```
---

- developer1:
  empname: john
  skills:
   - python
   - java
   - yaml

- developer2:
  empname: martin
  skills:
   - C
   - perl
   - ruby
```

Sequence and Mapping in YAML

YAML Mapping

YAML mappings are associative arrays, hash tables, key-value pairs, or collections.



Note

In mapping, the name of two keys can't be the same.

YAML Mapping

Below are the examples of simple and sequence mapping:

Simple Mapping

```
---

hosts: xyz

emp: harry

job: developer
```

Sequence Mapping

```
---

student: chris

subjects:

 - maths

 - science
```

YAML Mapping

Below are the examples of nested and mixed mapping:

Nested Mapping

```
---

hosts: xyz

name: john

 address: canada

 lane: 13

 street: 42
```

Mixed Mapping

```
---

student: chris

details:
  fatherName: adam
  motherName: liam

subjects:
    - subject1
    - subject2
```

YAML Sequences

In YAML, collections are represented in sequences in the form of lists or arrays.

```
---
hobbies:
    - dancing
    - music
    - singing
    - painting
```

YAML Sequences

Nested Sequence with items and subitems can be achieved by placing a single space before each dash in the sub-items.

Nested Sequence

```
---

hosts: xyz

name: john

 address: canada

 lane: 13

 street: 42

skills:

 - python

 - java
```

Assisted Practice

Validation of Apache Web Server

Duration: 15 Min.

Problem Statement:

Apache web server is a free and open-source web server which helps in delivering web content through the internet. You are assigned to install and validate the Apache web server.

Assisted Practice: Guidelines

Steps to be performed:

1. Establishing connectivity between Ansible controller and node machine
2. Writing Ansible YAML script to install Apache server
3. Running Ansible YAML script
4. Validating Apache Web Server setup

Key Takeaways

- YAML is a data serialization language that is often used to write configuration files.
- In a YAML file, multiple documents can be added by separating them with three dashes (**---**).
- A **|** character denotes a string that preserves newlines, and a **>** character denotes a string that folds newlines.
- A list is a collection of values in a specific order that can contain any number of entries.

Installing Apache Tomcat Using Ansible Playbook on Ubuntu

Duration: 25 Min.

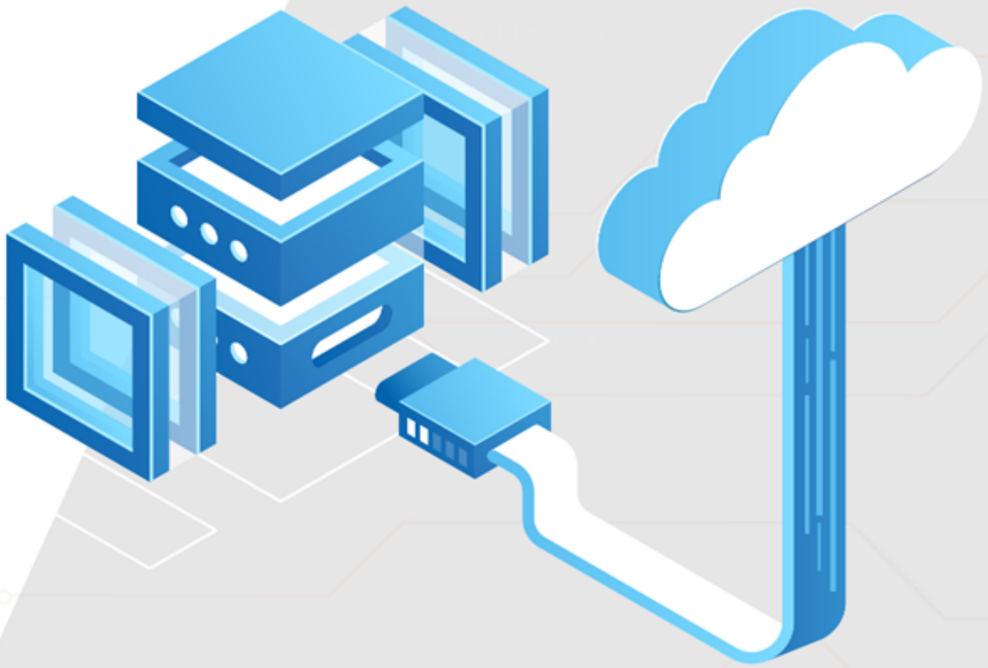
Project agenda: To Install Apache Tomcat Using Ansible Playbook on Ubuntu

Description: Apache Tomcat is often used as an application server for strictly web-based applications. It executes Java servlets and renders web pages that include JSP coding.

Perform the following:

- Installing Ansible
- Configuring Ansible
- Establishing Connectivity between Ansible controller and node machine
- Creating Apache Playbook
- Executing the Playbook
- Confirming the installation

LESSON-END PROJECT



Thank you