📘 YAML – The ABCs of DevOps

1. What is YAML?

YAML stands for **“YAML Ain’t Markup Language”**.
It is a **human-readable data serialization language** used to store and exchange configuration data.

YAML is **not a programming language**.
It **cannot execute logic or commands**.
Its only purpose is to **describe data in a clean and structured way**.

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2. Why YAML is the ABC of DevOps

YAML is considered the **foundation of DevOps** because almost every major DevOps tool relies on it:

- Kubernetes (manifests, deployments, services)
- Docker (docker-compose)
- CI/CD tools (GitHub Actions, GitLab CI, Azure Pipelines)
- Cloud platforms (AWS, Azure, GCP)
- Infrastructure as Code tools

If you understand YAML, you can **read, modify, and debug DevOps configurations** confidently.

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3. What is Data Serialization?

Data Serialization is the process of converting data into a format that can be:

- Stored
- Transmitted
- Reconstructed later
- **Serialization** → Object → File / Stream
- **Deserialization** → File / Stream → Object

YAML is one of the formats used for this purpose, similar to JSON and XML.

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4. YAML vs Programming Languages

Aspect	**YAML**	**Programming Language**
Purpose	Store data/config	Execute logic
Can run commands	❌ No	✅ Yes
Human-readable	✅ Very high	❌ Depends
Used for	Configurations	Applications

👉 Think of YAML as **data**, not **behavior**.

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5. Where YAML is Used

- Configuration files
- Kubernetes manifests
- Docker Compose files
- CI/CD pipelines
- Logs and cache definitions

YAML answers **“what should exist”**, not **“how to do it”**.

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6. Core YAML Syntax Rules

6.1 Indentation

- Indentation is **mandatory**
- Only **spaces**, never tabs
- Similar to Python

```
server:
  port: 8080
```

6.2 Case Sensitivity

YAML is **case-sensitive**.

```
apple: fruit
Apple: company
```

These are treated as different keys.

6.3 Comments

- Only **single-line comments**
- Written using #

```
# This is a comment

port: 8080
```

6.4 Multi-Document Files

Multiple YAML documents can exist in one file:

```
---

document1: value

---

document2: value

...
```

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7. YAML Data Types

7.1 Strings

```
name: DevOps

message: "Hello World"
```

Multi-line strings:

```
description: |

  This text

  stays on

  multiple lines
```

7.2 Primitive Data Types

```
integer: 10
```

```
float: 3.14
boolean: true
null_value: null
```

YAML also supports:

- Binary
- Octal
- Hexadecimal
- Infinity (.inf)
- Not a Number (.nan)

7.3 Collections

Key-Value (Map):

```
app:
  name: myapp
  version: 1.0
```

List (Sequence):

```
servers:
  - nginx
  - apache
```

Set (Unique values):

```
unique_values: !!set
  ? a
  ? b
```

7.4 Type Casting

Explicit type declaration using !!:

```
port: !!int "8080"
price: !!float "99.99"
```

8. Advanced YAML Feature: Anchors & Aliases

Used to **avoid repetition**.

```
defaults: &default_settings
  replicas: 2
  region: us-east

service1:
  <<: *default_settings
  name: api
```

- & → Anchor (define)
- * → Alias (reuse)

This is heavily used in **Kubernetes and CI/CD pipelines**.

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9. YAML vs JSON vs XML

Format	Readability	Verbosity
XML	Low	High
JSON	Medium	Medium
YAML	High	Low

YAML is preferred in DevOps because it is **clean, readable, and maintainable**.

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10. Tools That Help with YAML

- **Datree** – Validates YAML and Kubernetes configs
- **Monokle** – Manages large Kubernetes YAML files
- **Lens IDE** – GUI for Kubernetes that generates YAML automatically

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11. Simple Analogy to Understand YAML

Programming language → Recipe (instructions)
YAML → Grocery list (ingredients)

YAML clearly tells **what is needed**, not **how to cook it**.

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12. Final Summary

- YAML is a **core DevOps skill**
- It is used everywhere in modern infrastructure
- It is simple, readable, and powerful
- Mastering YAML makes learning Kubernetes, Docker, and CI/CD much easier

If DevOps is a language, YAML is its alphabet.