



Linux host Monitoring Containerization  
**byethost.com**  
git  
CI/CD Cloud Virtualization



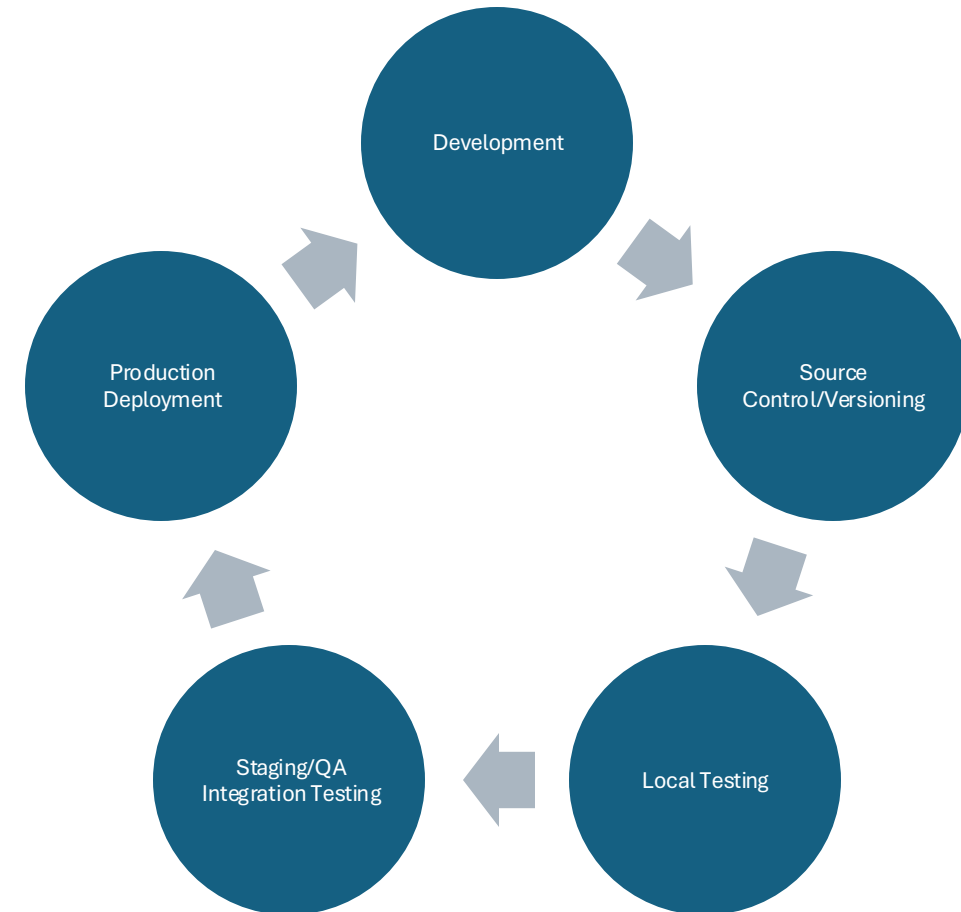
Backend Web Development

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DevOps & Hosting

# Continuous Integration Continuous Development (CI/CD) Pipelines

- Automated scripts are setup for moving and ensuring smooth deployment between development environments
- Development Environments like:
  - Development (Local)
  - Staging (QA)
  - Production (User-facing)

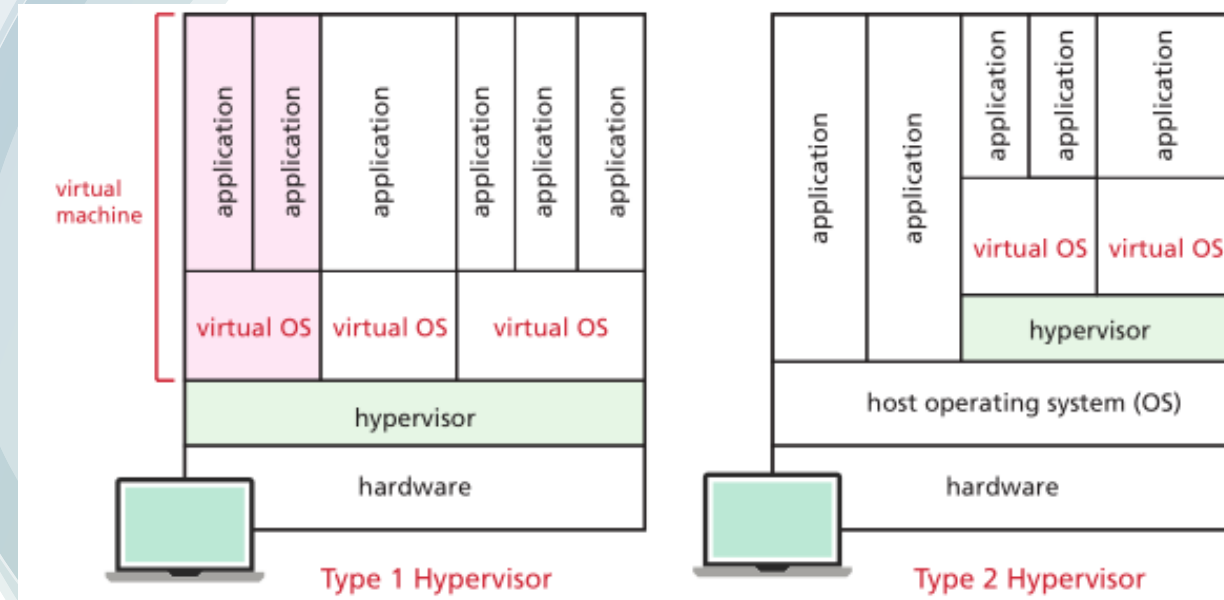


# Git: Source Versioning/Control

- Have you ever tried to manage source versioning yourself?
- Start a project with test.php
- Then by the end of the project you have
  - test1.php,
  - test1111.php,
  - test\_final.php,
  - test\_final\_with\_fixes.php?
- Git as a name means stupid, it's a very simple command-line tool that you can use to manage the mess of source versioning.
- Explore it and try making commits and branches!

# Virtualization

- Virtualization is the process of creating multiple simulated environments or virtual machines (VMs) on a single physical hardware system.
- It enhances resource utilization, scalability, and flexibility.
- **Types of Hypervisors**
- **Type 1: Bare-Metal Hypervisor**
  - Installed directly on physical hardware.
  - High performance and security.
  - *Examples: VMware ESXi, Microsoft Hyper-V, Xen.*
  - **Key Benefits:**
    - Minimal overhead.
    - Direct access to hardware resources.
- **Type 2: Hosted Hypervisor**
  - Runs on top of an existing operating system.
  - Easier to set up and use for personal applications.
  - *Examples: VMware Workstation, Oracle VirtualBox.*
  - **Key Benefits:**
    - Simplified installation.
    - Ideal for development and testing.



# Containerization & Cloud-based Virtualization

## Containerization

- Lightweight, portable environments for running applications.
- Share the host OS kernel but are isolated from each other.
- **Key Advantages:**
  - **Efficiency:** Faster startup times and lower overhead than VMs.
  - **Portability:** Run consistently across development, testing, and production.
  - **Popular Tools:** Docker, Kubernetes, Podman.
  - **Comparison with Hypervisors:**
- **Hypervisors:** Full OS for each VM.
- **Containers:** Share the host OS kernel, reducing resource usage.

## Cloud-based Virtualization

- Virtualization at scale, hosted in data centers accessible via the internet.
- Powering Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS).
- **Key Features:**
  - **Elasticity:** Scale up/down resources on demand.
  - **Global Reach:** Access from anywhere.
  - **Cost Efficiency:** Pay only for what you use.
- **Examples:** Amazon Web Services (AWS), Microsoft Azure, Google Cloud Platform (GCP).

# Hosting Types

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Hosting Type	Cost	Control	Performance	Security	Best For	Scalability
Shared Hosting	Lowest	Minimal	Variable (shared CPU/RAM)	Low (shared risks)	Small personal or hobbyist websites	Limited
Virtualized Hosting	Moderate	Moderate (root access)	Better than shared	Improved over shared	Developers and small-to-medium businesses	Moderate to High
Dedicated Hosting	High	Full (OS and server)	High (dedicated resources)	Better than shared/vhost	High-traffic or specialized business sites	Low to Moderate
Collocated Hosting	High (initial setup)	Complete (custom hardware)	Very High (custom hardware)	High	Companies needing full data control	Moderate
In-house Hosting	High (initial & ongoing)	Complete	Variable (depends on setup)	Variable (depends on setup)	Development, sandbox environments	Low
Cloud Hosting	Variable (pay-as-you-go)	Moderate (virtualized control)	High (distributed network)	High (redundancy)	Scalable apps and modern business sites	Very High (dynamic)



# Byethost Lab Exercise