Virtualization

Part 1 - Terminology

Jedidiah Bartlett
Schweitzer Engineering Laboratories
Virtualization

- Virtualization Overview
- Virtual Machines and Containers
- Technologies and Industry Trends
What is Virtualization?

Creating a virtual (rather than actual) version of something.

This virtual version can be used and interacted with as though it were the real thing.
Why Virtualization?

Flexible, (but complex) deployments without the cognitive complexity.

Reduce real-world maintenance.
Software Deployments

- **Hardware**
  - BIOS / UEFI / AMT
  - CPU / Memory / Motherboard / Storage

- **Operating System**
  - Kernel
  - System Libraries

- **Installed Software**
  - Libraries / Dependencies
  - Software
Virtual Appliances

- Installed Software
  - Software
  - Libraries / Dependencies
- Operating System
  - System Libraries
  - Kernel
- Hardware
  - Virtual Machine
Type 1 Hypervisor

Hypervisor

Virtual Machine Runtime

Kernel

BIOS / UEFI / AMT

CPU / Memory / Motherboard / Storage

Virtual Machine

Kernel

System Libraries

Dependencies

Virtual Appliance

Virtual Appliance

CPU / Memory / Motherboard / Storage

BIOS / UEFI / AMT

Kernel

System Libraries

Dependencies

Virtual Machine
Type 2 Hypervisor

Hypervisor

Virtual Machine

Virtual Machine Runtime

System Libraries

Kernel

BIOS / UEFI / AMT

CPU / Memory / Motherboard / Storage

Virtual Appliance

Dependencies

System Libraries

Kernel

Virtual Machine

Dependencies

System Libraries

Kernel

Virtual Machine

Dependencies
Containers

Installed Software
- Software
- Libraries / Dependencies
- System Libraries
- Kernel

Operating System
- BIOS / UEFI / AMT

Hardware
- CPU / Memory / Motherboard / Storage
Containerization Deployment
Application Virtualization

Installed Software
- Software
- Libraries / Dependencies

Operating System
- System Libraries
- Kernel

Hardware
- BIOS / UEFI / AMT
- CPU / Memory / Motherboard / Storage

App Container
Virtualized Application Deployment

Container Runtime

App Container
- Software
- Deps

App Container
- Software
- Deps

App Container
- Software
- Deps

SW
- Dependencies

App Runtime
- Dependencies

System Libraries
- Kernel
- BIOS / UEFI / AMT
- CPU / Memory / Motherboard / Storage
Technology Providers

Virtual Machines
- VMware
- Microsoft Hyper-V
- VirtualBox
- QEMU

Containers
- docker
- rkt
- LXC
- kata containers

Applications
- FLATPAK
- AppImage
- snappy
Orchestration & Control Planes

- Azure AKS
- Amazon EKS
- Google
- Rancher
## Data Challenges

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Cloud, Edge, and IoT
Questions?