ClearPath® OS 2200
Future Matters

Adam Gallagher, Product Manager

September 11, 2019
“Innovation distinguishes between a leader and a follower.”

- Steve Jobs
Focus Areas

- **Performance & Scalability**
  - Performance
  - Capacity
  - Scaling

- **Reliability**
  - Robust Architecture
  - Reliability built-in

- **Security**
  - Secure by Design
  - Continuous Verification

- **Flexibility**
  - Hardware Integrated
  - Software Series
  - Cloud Ready

- **Build, Manage, Run**
  - Modern Languages
  - Contemporary Paradigms
  - Enterprise Connectivity

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Operating System
This chart was developed by Unisys and represents Unisys’ interpretation of publicly available NIST data in the National Vulnerability Database, which has compiled vulnerabilities since 1997.

Data taken 08/05/19

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<td>Linux</td>
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</tr>
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Security Assessment

“...it is evident that the OS 2200 operating system has had security design principles such as 'deny by default' and 'least privilege' as a foundation throughout its evolution.”

“...Foundstone rated both the OS 2200 operating system and Apex administrative software as highly secure.”
ClearPath® OS 2200 Release Roadmap – 4 Year

Today

Release 19.0

Release 20.0

Q2 2020

Q2 2020

Future dates subject to change
**Release and Support Timeline**

- **Dorado 4400/6400/8400, 4300/6300/8300, 4200, 800**
  - Dorado 4100*
  - Q2 2020
- **Dorado x500, x400, x300**
  - Software Series 2.0
- **Dorado 4200*, 800**
- **Next Dorado, Dorado 8500, 4400/6400/8400**
  - Software Series 2.0
  - Q2 2022
- **Dorado 4300/6300/8300**
  - Q2 2022
  - 19.0
- **Next Dorado, Dorado 8500, x400**
  - Software Series 3.0
- **20.0**

*Last release that supports platform

Future dates subject to change

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Release 19.0

Q2

2020

Future dates subject to change
Release 19.0 Overview

• 100+ Fully integrated and tested products
• Over 50 new features
• ~25 from Client Requests
• Field test underway
Areas of Innovation

- Security
- Simplification
- Optimization
Planned Features

- Encrypted RSS file transfer
- Windows Server 2019 Support
- SHA-2 for password transformation
Release 19.0

Planned Features

Performance of CATFR

TDATE$

NIC UP/DOWN

COMAPI logging/tracing enhancements

SOLAR verification

DTPRA Containerization
Dorado 8500 / 6500 / 4500 Plan

• Multi-server Distributed Architecture
  ▪ High Speed Ethernet replaces InfiniBand between PMMs and ISMs
  ▪ Integrates with client supplied, standards based, network and virtualization infrastructure *No EPPs or Unisys supplied Fabric*

• Dorado 8500 Premium Performance
  ▪ Single Thread Performance ~ 925 MIPS maximum (target)  ➔ 36% improvement
  ▪ Single Image Performance ~12,000 MIPS maximum (target)  ➔ 50% improvement

• Dorado 8500 Memory options
  ▪ 24 GW OS 2200 memory standard
  ▪ 24 GW additional memory for UDS workloads

• Dorado 4500 and Dorado 6500
  ▪ Platform refresh with similar performance profiles as Dorado 4400 and 6400
Deployment

OS 2200 Application Workload

OS 2200 Firmware
PMM

IO Firmware
ISM

IO Firmware
ISM

Operations Server
WIN
Intel

Internal Ethernet

Private Network

Dorado 8500

Workload
QProcessor
ePortal

Linux
WIN
Intel
Intel
Intel
Dorado Systems Performance

1x Single Thread MIPS

- Minimum MIPs
- 4x
- 8x
- 16x
- 32x
- System
- Estimate
- 1x Single Thread Estimate
- 1x Single Thread (top axis)

System MIPS

Dorado 8500
Dorado 8400
Dorado 8300
Dorado 6400
Dorado 6300
Dorado 4400
Dorado 4300
Dorado 4200
Dorado 8500 / 6500 / 4500 Components

- PMM & ISM hardware based on 2 socket server w/ Intel Gold 6154 18C processor
  - Same base server as in the XPC-L-5 and QProcessor 5.0

- High speed Ethernet connections between PMM & ISMs
  - Redundant dual port 100Gb NICs
  - Redundant 100Gb switches and cables

- New Quad Port 16Gb Fibre Channel Adapter

- New Ops Server with Intel Xeon E-2136 6C processor

- New FXIOP s-Par Partition for XPC-L-5 connections (Plateau 2.0 release)
  - Dual 10/25Gb NICs to connect Dorado with XPC-L-5
ClearPath OS 2200 QProcessor 5.0

- Latest QProcessor 5.0 firmware
  - Preloaded for QProcessor 5.0 appliance option on Dorado 4500 / 6500 / 8500
- New Web-based Admin console
  - Streamlined administration
  - Updated format
  - Encryption of SAN Storage
- HA cluster for multiple QProcessors
  - Improved performance & Cluster monitoring
- Data in Motion Encryption
  - Encrypt traffic between Dorado and QProcessor
ClearPath OS 2200 XPC Multi-Host Clustering

- Designed for high transaction volumes, non-stop environments
  - Multiple systems accessing & updating common large data base
  - Provides the next level of redundancy
- High-availability / expanded capacity through horizontal growth.
- XPC-L-5 supports up to six fully-configured Dorado Hosts
  - Dorado 4480, 4490, 6400, and 8400
  - Dorado 4500, 6500, 8500 (Future)

Up to 48,000 MIPS with six Dorado 8400s
OS 2200 XPC-L 5.0 Highlights

• XPC-L Platform refresh
  ▪ 2 Socket Server, Intel Gold 6154 18C Processor
  ▪ Selected processor has extended support

• XPC-Server OS changed from Windows 2012 to Linux
  ▪ Enhanced supportability
  ▪ Common SLES level with Dorado SAIL – SLES 12 SP3

• Updated Control workstation platform with Windows 10

• XPC interconnect moved from Myricom to Ethernet
  ▪ Eliminates dependence on proprietary interface
  ▪ External PCI racks are no longer required
Freedom to Choose

• Choose your platform infrastructure
  ▪ Platform HW resources determine OS 2200 processing performance
  ▪ Change underlying resources as new technologies emerge

• Choose your implementation framework
  ▪ **Bare metal** servers for traditional storage compatibility, less processing overhead
  ▪ **VMware** virtualization for added deployment flexibility and new storage options

• Choose your licensing model
  ▪ Fixed Capacity - based on set number of OS 2200 Instruction Processors (IP)
  ▪ Consumption - pay for use model based on measured OS 2200 workload processed
## ClearPath® OS 2200 Software Series 2.0

<table>
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<th>Developer Studio</th>
<th>Gold</th>
<th>Platinum</th>
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<td>Production Capable</td>
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<td>✓</td>
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</tr>
<tr>
<td>Capacity</td>
<td>Low/Mid</td>
<td>Mid</td>
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</table>
Deployment Options
OS 2200 Software Series 2.0 on VMware®

- **Virtualized Infrastructure**
  - VMware based ESXi servers and supported storage
  - VMware virtual & Ethernet networks
- **VMware support mixed Windows and Linux workloads**
- **VMware specific provisioning and failover features**
  - vSphere vMotion, vSphere HA, VMware Site Recovery Manager
- **Open Virtualization Formats (OVF) files align to Capacity sets**
Storage – Bare Metal

• Currently supported Dorado OS 2200 devices and interconnects
  Plug compatible with Dorado Systems
  ▪ Quad port 8Gb & Dual port 16Gb Fibre Channel HBAs
  ▪ LTO tape devices (DSI, Oracle)
  ▪ DSI 420, 520 VTL via Fibre channel
  ▪ EMC Disk Storage: DMX, VMAX, VNX
  ▪ EMC DLm via 8Gb FICON

• Server based disk drives with OS 2200 Soft Disk format
  ▪ Appears as Linux file structure on the disk
  ▪ Multi-disk RAID support
  ▪ Disk access limited to single OS 2200 server
OS 2200 Software Series on VMware® - Storage Options

**VMware supported devices**
- DVD – as presented by VMware, read-only for OS 2200
- Disk – OS 2200 Soft Disk appears as Linux file
  Any VMware supported storage - Internal / external storage, or VMware vSAN

**DSI 520 Series VTL Family**
- Multiple hardware offerings – Small through Enterprise
- Connects VMware OS 2200 Software Series host via iSCSI on Ethernet
- Simplifies OS 2200 data migration to VMware storage devices

**DSI 520 Restore VTL Instance**
- DSI compatible VTL deployed to VMware virtual machine
- iSCSI connection to OS 2200 Software Series host via virtual NIC
VMware® Solutions Tested with OS 2200 Software Series 2.0

- VMware vSphere vMotion, vSphere Storage vMotion
  - Allows workloads in a VMware environment to be dynamically moved to different ESX physical servers or underlying storage without any service interruption.
  - Minimize downtime due to maintenance, allow upgrade of underlying infrastructure
  - Should not result in a restart of OS 2200 Software Series processing

- VMware vSphere High Availability
  - Leverages multiple ESX hosts configured as a cluster to provide rapid recovery from ESX server outages for applications running in virtual machines.
  - Will result in a restart of OS 2200 Software Series processing

- VMware Disaster Recovery using VMware Site Recovery Manager
  - Business continuity and disaster recovery solution that manages the recovery of virtual machines between separate vCenter Server sites.
  - Will result in a restart of OS 2200 Software Series processing
Multiple OS 2200 Software Series Host Instances

- Each OS 2200 Software Series host is independent processing element
  - Supports a mix of development and production workloads

- Up to 10 OS 2200 host instances can be supported with a single Operations server
  - Redundant Operations Servers recommended – especially on Bare metal
  - Operations server deployment must match OS 2200 Software Series hosts
OS 2200 Software Series Licensing Options

• OS 2200 Software Series is licensed by Capacity
  - **Fixed Capacity License options**
    • Use up to license capacity without additional expense
    • Based on number of OS 2200 Instruction Processors
  - **Pay for use Consumption**
    • Measures IP seconds used each month
    • CVUs (Cloud Value Units) replace MIPS as reporting metric
• Change hardware infrastructure without re-licensing
  • New calibration software designed to maintain consistent CVU usage with Consumption model
ClearPath® OS 2200 Software Series 2.0

ClearPath® OS 2200 Platinum Capacity Sets
- Fixed Capacity based in 6, 7, 8, 9, 10, 11 IP offerings
- Consumption based with 11 IP ceiling

ClearPath® OS 2200 Gold Capacity Sets
- Fixed Capacity based in ¼, ½, ¾, 1, 2, 3, 4, 5 IP offerings
- Consumption based with 5 IP ceiling

ClearPath® OS 2200 Developer Studio Capacity Sets
- Development and test environment for OS 2200 applications
- Fixed Capacity based in ¼, ½, ¾, 1 IP offerings
- Consumption based with 1 IP ceiling
Consumption - CVU Usage and Reporting

Like Metering, Consumption measures IP Seconds to determine how much OS 2200 work has been processed

- IP Second = amount of time a process spends executing in an IP
- Intel processor speed impacts a given workload’s IP Seconds measurement

The Calibrator – designed to normalize CVU usage for any execution environment

- Calculates a unique Calibration Ratio for each workload in the client infrastructure
- Adapts to changes in bare metal platform or VMware instance deployment

Consumption usage emails and reports as with Metering

- Monthly email to report IP Seconds used and average Calibration ratio
- Client Usage reports to show CVUs used and remaining each month
Pay for use Concepts

• MIPS is a measure of Capacity over time
  - ( Million Instructions per Second)

• Dorado systems provide known performance levels since we control hardware “engine”

• Software Series allows the client to select the hardware “engine”

• CVUs measure the Capacity of the workload to be processed - not the speed needed to process it

• Change in platform engine does not impact CVU usage reported
ClearPath® OS 2200 Software Series 2.0 Licensing

• ClearPath® OS 2200 Gold, Platinum and Developer Studio
  • **Fixed Capacity licenses**
    - Licensed upper limit on percentage or number of OS 2200 IPs allowed
    - Short term capacity increase via Capacity on Demand CER
  
  • **Consumption CVUs Licensing**
    - Conceptually similar to Dorado Metering prepaid offering
    - Ceiling determines max number of OS 2200 IPs in instance
    - Periodic reporting to Unisys on actual processor usage via OS 2200 URU
    - Multi-license Pooling available for similar Capacity Set instances

• Capacity limits controlled through Image Enabler Key (IEK) mechanism
  - Not determined by OS 2200 Software Series firmware
OS 2200 Software Series Host Configuration Elements

• **Intel® processor cores**
  - Licensed OS 2200 Instruction Processors
  - Additional cores for OS 2200 Software Series firmware

• **Platform or virtualized memory**
  - OS 2200 environment memory goal
  - Additional memory for OS 2200 Software Series firmware

• **Storage requirements**
  - OS 2200 application workload support
  - OS 2200 firmware and memory

• **Network connections**
  - Management LAN to connect with Operations servers
  - OS 2200 client networks
Required Software Levels

- **Operations Server**
  - Windows 2016 Server - Client supplied license

- **OS 2200 Release 18.0**
  - Available through Unisys Download Center

- **QProcessor 5.0**
  - WebSphere MQ for ClearPath OS 2200 Version 9.0
  - CIFS 9R1

- **VMware®**
  - Unisys has tested following levels of VMware with OS 2200 Software Series 2.0
    - VMware ESXi 6.0
    - VMware ESXi 6.5
Innovation

Enable Modernization
- ePortal, AB Suite, and Data Exchange for modern front and back ends

Run Anywhere
- Software Series and Cloud

Expand
- Modern languages on ClearPath Forward
Cloud – Run Anywhere

ClearPath® Financial Server
ClearPath® MCP Software Series
ClearPath® OS2200 Software Series
ClearPath® OS 2200 Software Series - Clustered

Microsoft Azure
vmware
Dell EMC
amazon web services
Innovation

Enable Modernization
• ePortal, AB Suite, and Data Exchange for modern front and back ends

Run Anywhere
• Software Series and Cloud

Expand
• Modern languages on ClearPath Forward
OS 2200 Modern Languages Overview

- ClearPath® OS 2200 Python and related infrastructure
- Execution environment (e.g. Python) runs in conjunction with Dorado / Software Series firmware
  - Initiated, terminated and managed from and controlled by OS 2200
  - “Looks like” running a native OS 2200 program
- Current focus on scripting (SSG, ECL like usage) use case
- Ultimate goal – Python for transaction and batch processing as peer to COBOL
- Tech preview completed Q1 2019, early adopter access Q4 2019
Architecture

Standard OS 2200 Execution + ML Execution Environment

@'python
CIFS
ML Execution Environment
Process Control
Exec
SAIL
Release Roadmap

2020 Q2

1.0
- Industry standard scripting
- Access user files via Python & Java
- Java access to RDMS
- Eclipse support

1.1
Minor Release Content

2020 Q4

2.0
- TIP support
- Python access to RDMS

2.1
Minor Release Content

2021 Q2

3.0
- Java and Python access to DMS
Thank You