

COMPAQ
Inspiration Technology

Advanced Server for OpenVMS & PATHWORKS

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Agenda

- Current and future product overview
- Future directions
- Wrap-up

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3

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Current OpenVMS File & Print Servers

- Advanced Server for OpenVMS V7.2
 - Current Release - V7.3 (mar-2001)
 - V72A-eco4: support ends Q2 / 2002
- PATHWORKS V6 for OpenVMS (Advanced Server)¹
 - Current Release - V6.1 (sep-2001)
 - V6.0D: maintenance support only, ends Q3 / 2002
- PATHWORKS V5 for OpenVMS (LAN Manager)
 - Current Release - V5.0F-ECO2 (feb-99)
 - maintenance support:
only with Prior Version Support on OpenVMS VAX 5.5-2

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Advanced Server for OpenVMS Future Releases (1) AS-V7.3a (shelby)

- Advanced Server V7.3a (Q3-2002, Alpha only)
 - OpenVMS V7.3-1, V7.3, V7.2-2 support
 - PCSI support (available since AS-V7.3)
 - DNS load balancing capabilities (available since AS-V7.3)
 - Increased MS NT support (available since AS-V7.3)
 - Extended character set
 - Alias file names
 - NT print management (SpoolSS) support
 - Windows 2000 interoperability
 - Member server role (available since AS-V7.3)

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Advanced Server for OpenVMS Future Releases (2) AS-V7.3a (shelby)

- Enterprise File and Print server qualities
 - Basis within for future enhancements
 - Scalability, robustness, maintainability
 - Performance enhancements
 - Caches
 - Reduced VMS lock traffic
 - Optimized file-lookup path
 - RMS I/O optimizations
 - opportunistic locking support
 - Fieldtesting NOW !

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Advanced Server for OpenVMS Future Releases (3) AS-V7.3a-next (cobra)

- Advanced Server 7.3a-next (est. H2-2003, Alpha + Itanium)
 - * V7.3a-next might become V7.3b+, V7.4, etc
 - Robustness
 - Scalability
 - Maintainability
- Advanced Server 7.4 (est. 2004 , Alpha + Itanium)
 - VAX support
 - Enhanced W2000 interoperability
 - Active Directory
 - Kerberos
 - Ease of use (spoolss enhancements)

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PATHWORKS for OpenVMS Future Releases

- PATHWORKS V6.1 for OpenVMS
 - Current release - V6.1 (sep-2001)
 - * Updates on VAX and Alpha as needed,
 - * OpenVMS 6.2 supported
 - * untill functionality available in AS V7.#
 - No future updates planned
- PATHWORKS V5 for OpenVMS
 - Current Release - V5.0F-ECO2 (feb-99)
 - maintenance support:
only with Prior Version Support on OpenVMS VAX 5.5-2
 - No future releases

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PATHWORKS 32 Client SW Update

- PATHWORKS 32 V7.3
 - Available est. H2 - 2002
 - Supports Windows XP, Windows 2000, Windows NT 4.0, Windows 95, Windows 98
 - <http://www.OpenVMS.Compaq.com/pathworks32/>
- Contact Information – Product Manager:
 - Barbara.Karten@Compaq.com
 - Telephone #: 978-506-5937

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9

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V7.3 Licensing Tech Tips

- Upgraded license required for V7.3
 - ...CA07.02 won't allow access to V7.3 resources
- Upgraded license required for V6.1
 - ...CA07.02 and CA06.00 won't allow access to V6.1 resources
- V6.1 and V7.3 require ...CA07.03 license

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Future Directions for Advanced Server V7.3a or V7.3a-next

1. Enhanced Integration with Windows 2000
 - W2k / XP-client compatibility
 - Active directory
2. Enterprise level File and Print Services
 - Robustness
 - Reliable
 - Available
 - Scalability
 - Performance

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Enhanced integration with Windows 2000

- Current releases: V7.3, 7.3aFT and V6.1
 - Windows2000 Mixed Mode domain
PW/AdvSer as NT4.0 Domain Controller
 - Window2000 pure Multi-Master configuration
PW/AdvSer as an NT4.0 Member Server
- Servers/Domains
 - PW & AS have same restrictions as NT 4.0
 - Must be BDC to Win2K PDC

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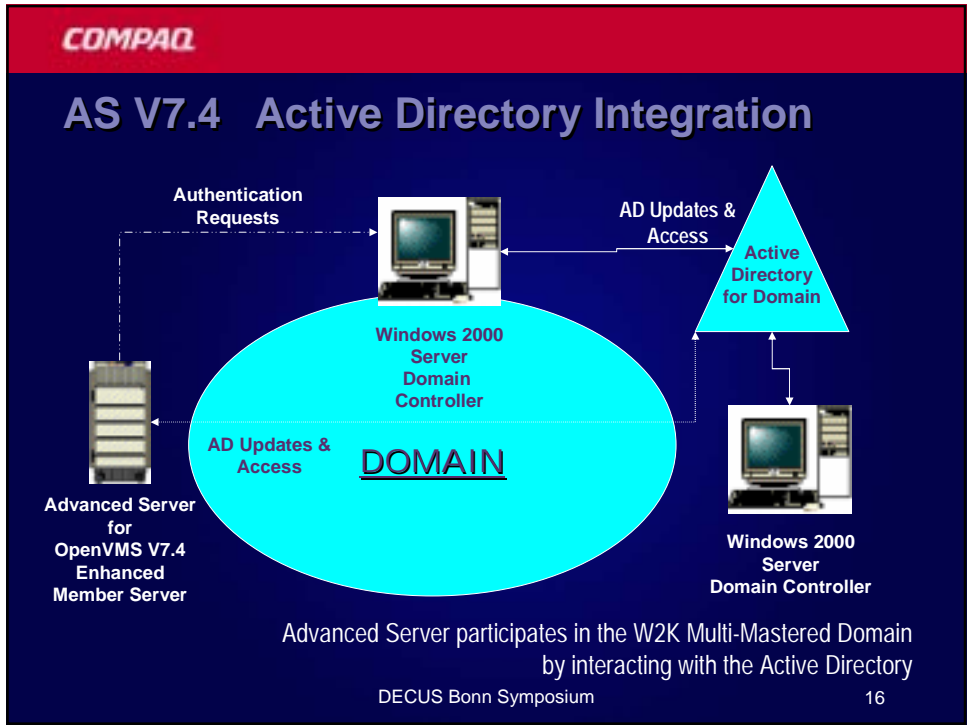
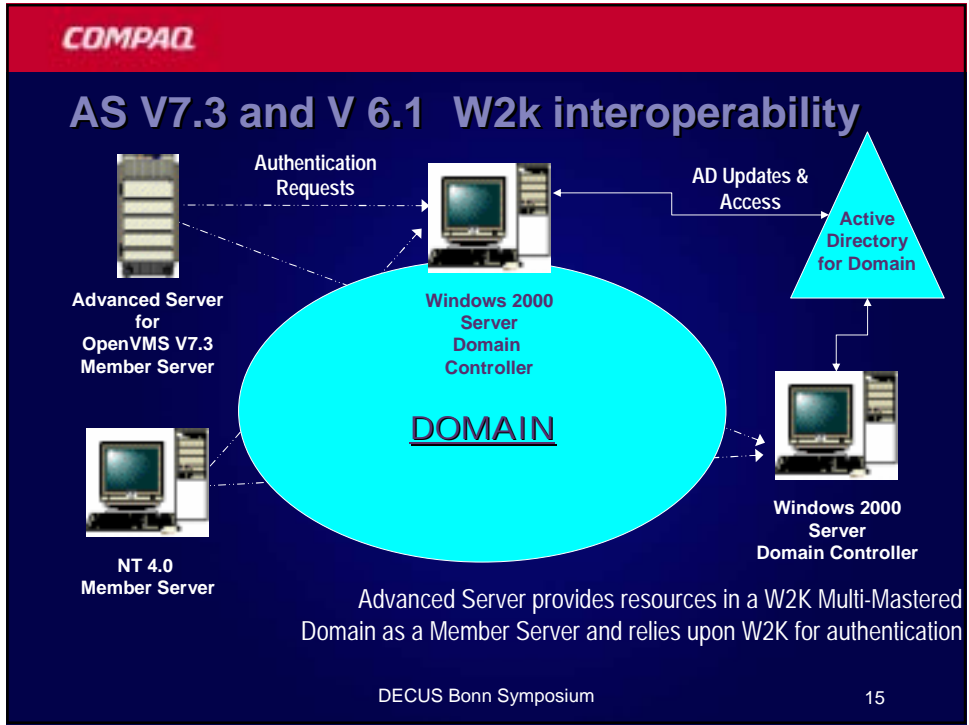
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Further Windows 2000 Integration Plans

- Advanced Server V7.4
 - Active Directory Integration
 - Make OpenVMS resources available in AD

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Enterprise level File and Print Services Robustness

- Reliability /Stability
 - Always the top priority
 - Further SAM replication issues resolved (V7.3)
 - Directory cache problems resolved (V7.3)
- Availability (NonStop) is the goal
 - Minimize reboots (V7.3)
 - Rolling upgrades

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Enterprise level File and Print Services Scalability

- Multi-process server is the basis

EXTSMB> pwshow

```
OpenVMS V7.2-1 on node EXTSMB 20-MAR-2001 14:23:22.75 Uptime 18 00:13:23
```

Pid	Process Name	State	Pri	I/O	CPU	Page flts	Page
2020073A	NETBIOS	HIB	5	78	0 00:00:00.05	71	4
2020074B	PWRK\$ADMIN_0	LEF	6	51	0 00:00:00.11	126	8
2020073F	PWRK\$KNBDAEMON	HIB	11	137	0 00:00:00.43	240	28
20200742	PWRK\$LICENSE_R	HIB	11	160	0 00:00:00.53	453	19
20200747	PWRK\$LM MCP	HIB	11	1229	0 00:00:00.55	457	30
202004CD	PWRK\$LMSRV_0	HIB	11	999	0 00:00:03.34	1263	42
202004CF	PWRK\$LMSRV_1	HIB	11	1680	0 00:00:02.41	1143	20
20200745	PWRK\$MASTER	HIB	6	242	0 00:00:00.35	358	6
2020073D	PWRK\$NBDAEMON	HIB	11	33	0 00:00:00.10	110	13

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18

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Enterprise level File and Print Services More Robustness

- Multiple server processes
- Automatic server restarts on failure
- Improved error handling, tracing and reporting
- Pro-Active and Active configuration tools
- Eliminating single points of failure

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19

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Win2K & PATHWORKS V5

- PATHWORKS V5 - Best Effort only
 - No plans for official support
- Clients
 - Customers tell us they work
 - Patches Available
- Servers/Domains
 - PW V5 is an LM 2.2 Server
 - Expect restrictions for W2K and LM 2.2 Servers

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Enterprise level File and Print Services Performance Enhancements

1. General Performance Enhancements

- Reduced VMS locking (7.3a)
- Faster directory cache (V7.3a, V6.1)
- Faster data-cache (V7.3a)
- Opportunistic Locking (V7.3a)

2. Major Enhancements

- Multi-process server (exp. 7.4)
- Galaxy based improvements (exp. 7.4)

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Performance Enhancements Reduce Open VMS locking

Threadlocks instead of VMS Locks

- Threadlocks are 12 times faster
- Use threadlocks for non-shared resources
- When a resource becomes shared, promote to VMS lock

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Performance Improvements Faster directory cache

- Focus on reducing BUFIO
 - Improve FID and directory cache hit rates
 - Improve file lookup algorithms
- Directory cache is now write through
- Fix cross-cluster invalidation of the directory cache
 - Improved local node too!
- Increase FID cache capacity from 8K to 16K files
 - Increases hit rate

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File Lookup description

- File Lookup: Any attempt to access a file header
 - Optimized thru the FID cache
- Lookups can be by name or by FID (File ID)
- The flow is as follows:
 - First try to 'hit' the fid cache
 - If alias (short) name, convert to FID, try to hit again.
 - Do a wildcard lookup against the XQP to get the FID.
 - Do a XQP lookup to get the file header contents, and store the results in the FID cache.

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File Lookup optimizations in V7.3A

- If we have a filename but not a FID, lookup in the directory cache to get the FID.
 - Very likely to succeed, unless its a short name.
- Alias short name processing improved.
- Fixed several problems which could result in unnecessary 'misses' in the FID cache
- Results: 20-25% higher hit-rates in the FID cache, much less Buffered I/O's against the XQP

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Performance Improvements Observations¹

- Directory Enumeration of 5000-file directory
 - FID cache sized for 8K files
 - Elapse time went from 52 seconds to 13 seconds
 - I/Os went from 21,000 to 300 (100% hit rate on caches)
- UNZIPing large .ZIP file (2500 files)
 - Elapse time went from 70 minutes to 6 minutes

¹ Laboratory observations, actual results will vary

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Performance Improvements Observations¹

- Cross-cluster activity
 - Create/delete files in same directory from multiple cluster nodes
 - Before – 50% hit rate single node, 13% cross cluster
 - After – 87% hit rate single node, 80% cross cluster

¹Laboratory observations, actual results will vary

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Opportunistic Locking (OpLocks)

- 3 types of Locks
 - Exclusive (Level I)
 - Client opens file for exclusive access, free to do arbitrary buffering and caching on the client, free to write
 - Server breaks the OpLock when another client requests access
 - Can break to Level II or None
 - Level II
 - Multiple readers, no writers
 - Client doesn't request level II, server converts Exclusive or Batch to level II
 - Must be broken to none to write.

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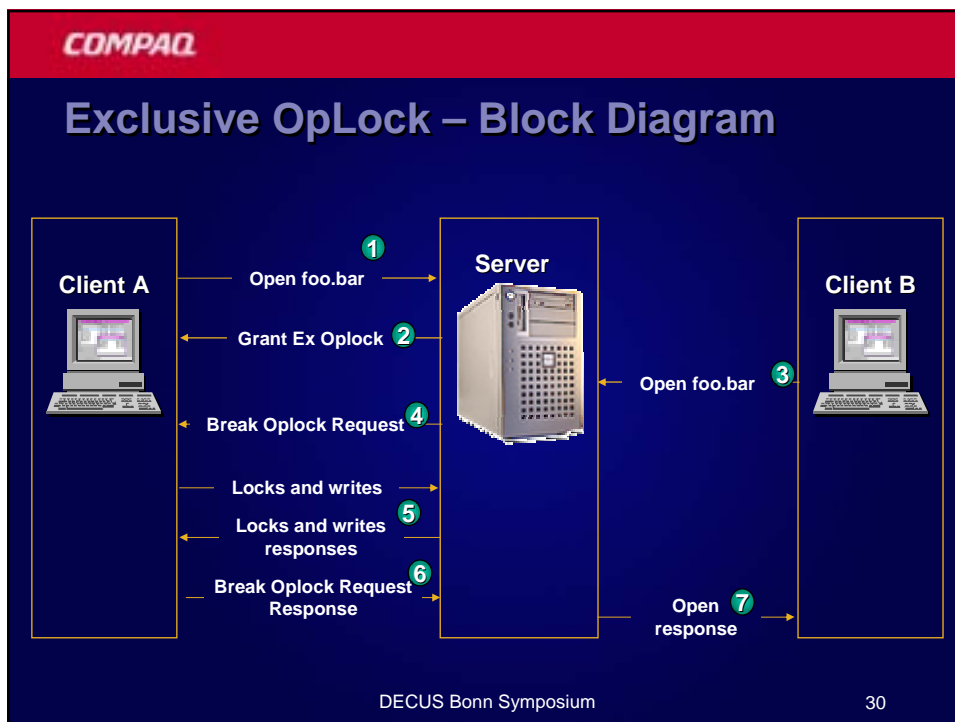
28

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Opportunistic Locking (OpLocks)

- 3 types of locks (continued)
 - Batch
 - Client keeps file open on the server, even though its closed from the client application perspective
 - Typical of batch file processing: Open file, read a line, close file, process line, etc until done
 - Similar to Exclusive, server will break to Level II or none

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OpLock Deliverables

- Advanced Server V7.3A will provide Exclusive and Batch OpLocks
- Level II comes later
 - No requirement to support Level II
 - When breaking OpLocks, break to Level II or none

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Performance Improvements Observations¹ LabTest (SQE95)

Metric	V7.3	Shelby (7.3a)
Elapse time (min)	~70	~35
Buffered I/O (*1000)	~40	~20
FIDcache hitrate%	~70	~85

¹ Laboratory observations, actual results will vary

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Enterprise file and print

2002 2003 2004 2005

Adv Server V7.3a (Q3'02) (Alpha only)
•Opportunistic Locking support
•Performance Enhancements
•Support VMS V7.3-1, V7.3, V7.2-2

Adv Server Itanium (H203) (Alpha and Itanium)

Cobra (CY04) (Alpha & Itanium)
•VAX support
•Enhanced Windows 2000 Interoperability including Active Directory
•Kerberos support
•Scalability
•Robustness

PATHWORKS for OpenVMS V6.1
•Support OVMS releases on VAX and Alpha as needed

DCPS V2.1 (H1 CY'02)

PATHWORKS 32 - V7.3 to ship in H2CY02 with support for WinXP. Continued Support for Microsoft Service Pack releases for Win95, 98, NT4.0 and Win 2000

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Contacts and web sites

Key Contacts

- Product Manager:
 - Barbara.Karten@Compaq.com
- Engineering Project Manager:
 - Brad.McCusker@Compaq.com

Web Sites

<http://www.OpenVMS.Compaq.com/PATHWORKS/>
<http://www.OpenVMS.Compaq.com/AdvancedServer/>

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35

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Advanced Server for OpenVMS and PATHWORKS

Thank you for attending

? Questions ?

After 15:00h we will attend further
questions in room "Hauptmann"

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36