

HP StorageWorks Secure Path

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Agenda

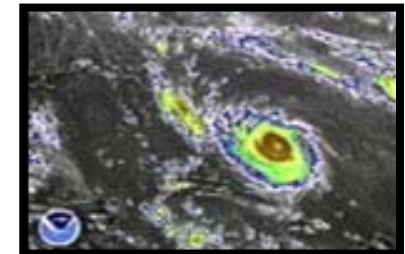
High Availability Storage Software

- Introduction
- HP's multi-path solutions: Secure Path and Auto Path
- Representative Secure Path architecture
- The evolving technology

Why customers care about High Availability and Business Continuity?

- 93% of companies without a recovery plan go out of business within five years of a data loss disaster
- 50% of those businesses who do not recover their data within 10 business days never fully recover
- Critical business functions cannot continue for more than 4.8 days without a data recovery in process
- 32% of all data losses are caused by human error

Source: Info Security News Magazine



High Availability Storage Software

- HP's multi-path solutions help to eliminate any single points of failure between your server and storage system



You Can't Believe It Until You See It Consolidated Stores: A Case Study

- This system administrator required improved availability in a 7x24 environment.
- "The system failed-over to an alternate path without missing a beat," he says.
- "Since then, I have performed several tests and routine upgrades that involved removing a controller in the middle of a processing job. Thanks to Secure Path, no one has ever noticed any kind of service interruption."



More customer comments...

- Down time must not exist at South Devon Healthcare. We provide emergency care all the time. StorageWorks Secure Path ensures that our systems will be running to help patients the second they arrive.”

Terry Davidson, Computer Services Manager
South Devon Healthcare NHS Trust

- “We also use StorageWorks Secure Path software, which gives us two paths to the disk. If one Fibre Channel controller switch or host bus adapter fails, we still have another path. It also enables us to make adjustments with no downtime.”

Information-Technology Team Leader of
a Major Healthcare Organization

- “We are using Secure Path with our Sun systems and it works great. Secure Path puts a layer between your host bus adapters and your operating system, which provides multiple paths to your disk drives. If one of those paths is interrupted for any reason, Secure Path automatically fails over to an alternate pathway. It does all that transparently to the application and users.”

Malcolm Wade, Senior Systems Engineer
Australian Stock Exchange

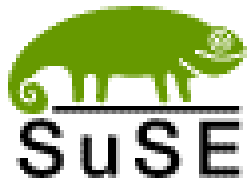
Multi-path software is...

- The host software that works with storage arrays to increase data availability and ensure more uptime.

- Maintains connections to storage
 - Monitors I/O paths and alerts on significant events
 - Assists in load balancing

- Typically, deployed in...
 - Disaster Tolerant Solutions
 - SAN configurations
 - Cluster configurations

HP's multi-path support is heterogeneous



HP's Multi-Path Technology

- Secure Path is the multi-path solution for ProLiant clusters and supports EVA, EMA/MA, and MSA1000.
 - HA/f500
 - HA/f200

- Auto Path is the multi-path solution for XP and VA storage.

Currently Available

- Secure Path V4.0B for Windows
- Secure Path V4.0B for Windows Workgroup Edition
- Auto Path for Windows 2000 V2.01
- Auto Path for Windows NT V2.01
- Auto Path for Windows Server 2003 V1.0
- Secure Path V3.0B for HP-UX (with Service Pack 1)
- Auto Path for HP-UX V2.01
- Secure Path V3.0B for Sun
- Secure Path V2.0C for IBM AIX
- Auto Path for IBM AIX V4.01
- Secure Path V3.0C for NetWare
- Secure Path V3.0C for NetWare Workgroup Edition
- Secure Path V3.0A for Linux
- Secure Path V3.0A for Linux Workgroup Edition
- Auto Path for Linux V1.01

Secure Path Feature Comparison

	Windows	NetWare	IBM AIX	Sun	Linux	HP-UX
Multipath	32/LUN	8/LUN	2/LUN	32/LUN	8/LUN	32/LUN
Autofailback	Yes	Yes	No	Yes	Yes	Yes
Load balancing	Yes	Static	Static	Yes	Yes	Yes
Path Verification	Yes	Yes	Yes	Yes	Yes	Yes
Management via GUI	Yes	Yes	CLI	CLI	CLI	CLI

Features vary depending on operating system and storage system

- differences in storage capabilities
- differences in OS capabilities

Secure Path V4 for Windows









- Performance Improvements
 - More load balancing options
- Storage consolidation
 - Partitioned LUNs across multiple hosts
- 7 x 24 support
 - LUN expansion with Windows 2000 dynamic disk support
 - HBA & controller hot plug support
- Improved scalability
 - multi-path support to 32 paths per LUN
 - 128 hosts/128 storage boxes per profile
- Reduced cost of management
 - Secure Path Manager V4
- Microsoft Windows Logo certified



Windows Logo Certification

Windows Hardware Compatibility List - Microsoft Internet Explorer provided by Hewlett-Packard

Address: <http://www.microsoft.com/whdc/hcl/search.aspx>

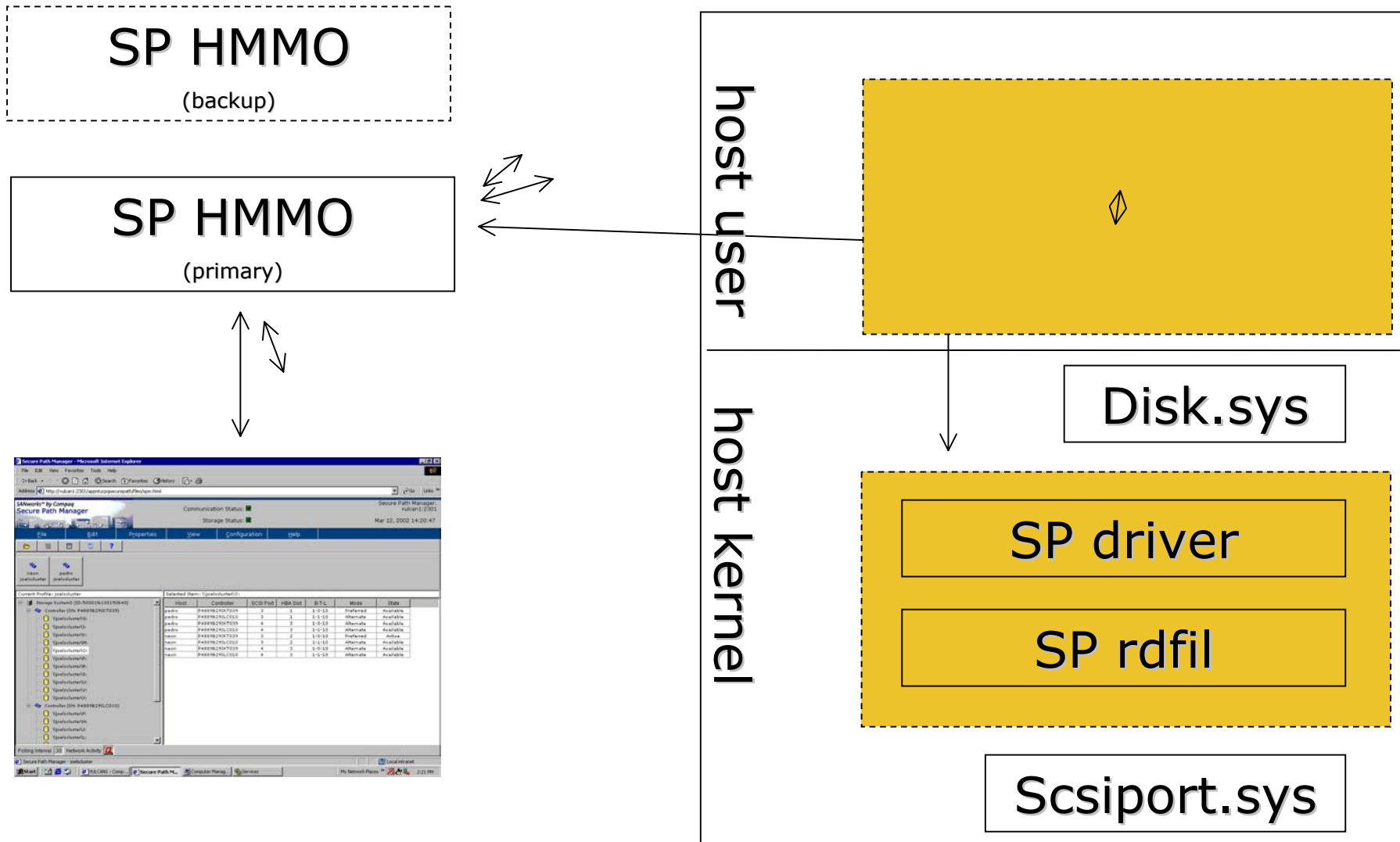
Type	Company Name	Product Name	Windows XP	Windows 2000	Windows Me
Cluster	Compaq Computer Corporation	ProLiant Cluster HA F500 for Enterprise Virtual Array (HSV110); DL760/PL8500 w/Secure Path 4.0, VCS 2.0 and FCA-2101 [N/A]			
Cluster	Compaq Computer Corporation	ProLiant Cluster HA F500 for Enterprise Virtual Array (HSV110); DL380 G2 w/Secure Path 4.0, VCS 2.0 and FCA-2101 [N/A]			
Cluster	Compaq Computer Corporation	ProLiant Cluster HA F500 for Enterprise Virtual Array (HSV110); DL380 G2/DL580 G2 w/Secure Path 4.0, VCS 2.0 and KGPSA-CB FC HBA [N/A]			
Cluster	Compaq Computer Corporation	ProLiant Cluster HA F500 for Enterprise Virtual Array (HSV110); DL580 G2 w/Secure Path 4.0, VCS 2.0 and KGPSA-CB FC HBA [N/A]			
Cluster	Compaq Computer Corporation	ProLiant Cluster HA F500 for Enterprise Virtual Array (HSV110); PL8500 w/Secure Path 4.0, VCS 2.0 and KGPSA-CB FC HBA [N/A]			
Cluster	Compaq Computer Corporation	ProLiant Cluster HA F500 for MA8000 (HSG80); DL380 G2 w/Secure Path 4.0, ACS8.6-4 and KGPSA-CB FC HBA [N/A]			
Cluster	Compaq Computer Corporation	ProLiant Cluster HA F500 for MA8000 (HSG80); DL580 w/Secure Path 4.0, ACS8.6-4 and KGPSA-CB FC HBA [N/A]			
Cluster	Compaq Computer Corporation	ProLiant Cluster HA F500 for MA8000 (HSG80); PL8500 and DL760 w/Secure Path 4.0, ACS8.6-4 and KGPSA-CB FC HBA [N/A]			

954 Items, 478 Unread

Secure Path V4 for Windows supports...

- Windows Server 2003 -- 32 bit, Windows 2000 or Windows 2000 Advanced Server SP3, SP4, Windows NT 4.0 with SP6
 - Enterprise Storage Array with VCS 2.0, 3.0
 - Modular Array/Enterprise Modular Array with ACS 8.6 or 8.7
- Upgrade for existing V3.x installed base available for low cost or via subscription services
- Version 4 also available with ProLiant F500 cluster kits
- Secure Path V4 for Windows Workgroup Edition supports same Windows versions for the MSA1000 V2.
- Also available with ProLiant F200 cluster kit

Secure Path for Windows Architecture



Secure Path 4.x Driver Architecture



■ 2 Drivers:

– Bus Driver

• Raidisk.sys

Enumerates PDO's for each virtual disk

Creates "Virtual Disks" and "VirtualBus"

Claims real physical LUNS (paths) so Disk.sys cannot see them

Creates a picture of the SAN and manages paths/failovers

Upper level drivers (Disk.sys) attach to virtual disk

– Upper filter over scsiport

• Rdfil.sys

Traps QueryID's

Traps IOCTL_STORAGE_BREAK_RESERVATION and BUS_RESET and informs bus driver

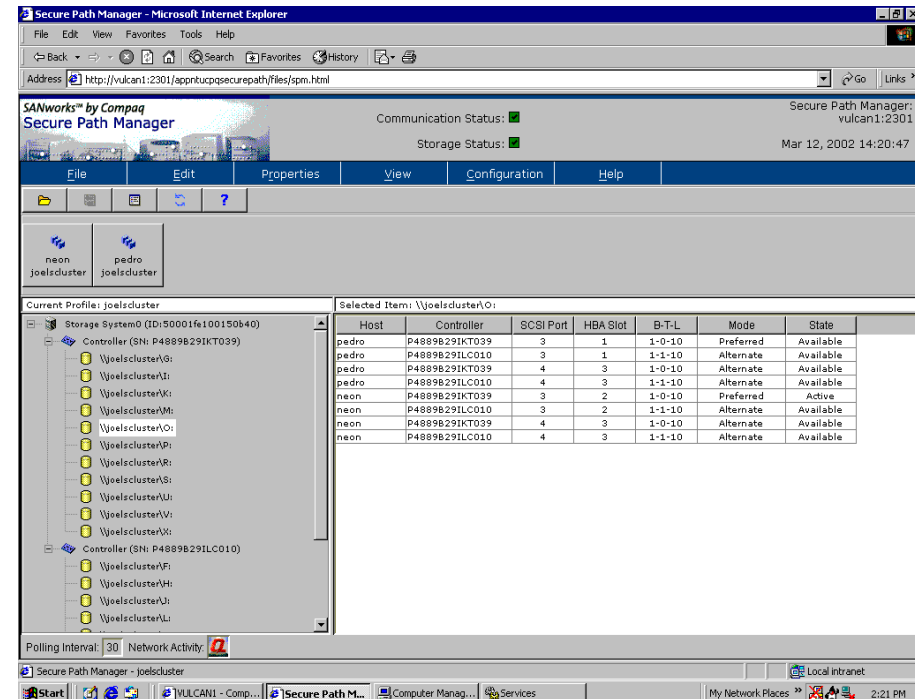
Management Profiles

- A profile is a collection of servers and storage arrays that can be managed as an entity.

- Profile guidelines:
 - A maximum of 128 servers (host systems) per profile
 - Connected to and sharing up to 128 storage systems
 - Configured for multiple-bus failover mode

Secure Path Manager

- New web-based GUI to manage paths from hosts to storage.
 - Change preferred paths, off line paths, alternate paths
 - Change policies for auto fail back, load balancing, background check
- Monitors and alerts path states
- Redundant management
- Seamless migration from previous SPM
 - Can use V3.x agents and drivers with V4.0 web GUI
- Runs on OpenView Storage Management Appliance or on Windows 2000 server



Secure Path V4.0B for Windows



- Maintenance release available June 2003
- Download from the web
- Support for Windows Server 2003, 32 bit version
- One Secure Path for Windows product that supports EVA, EMA/MA, and MSA1000 from the same host

Secure Path V3 for HP-UX

- Multi-path for failover for HP StorageWorks arrays attached to HP-UX hosts
 - Currently include:
 - EVA5000, EVA3000
 - EMA, MA
- Features:
 - Automatic failover, failback
 - Load balancing
 - Support for 32 paths/LUN
 - Management via HP-UX CLI
- Supports: HP-UX 11.0, 11.11
- Also supports: HP Serviceguard



Secure Path V3 for Linux

- Multi-path failover for Linux hosts connected to EVA, EMA/MA or MSA1000 hosts.
- Features:
 - 8 paths/LUN
 - Load balancing
 - Auto failover and failback
 - Management via Linux CLI
- Supports:
 - Redhat 7.2
 - Redhat Advanced Server 2.1
 - SuSe SLES 7
- Also supports
 - Steeleye clusters
 - Oracle 9iRAC
- Available also as Workgroup Edition product for only MSA1000 support

Secure Path for Netware support for EVA

- Multi-path failover for NetWare hosts connected to EVA
- Secure Path V3.0C for NetWare
 - Look for service pack 1 to download
- Supports:
 - NetWare 5.1 and 6.0
 - 6 node Netware clusters with EVA and MSA1000 (with Service Pack 1)
- Also supports
 - VCS V2.0, V3.0
 - MSA 1000 V2
- Available with support for EVA and MSA1000 and as a “Workgroup Edition” for only MSA1000.

Latest web updates

- Secure Path V3.0B for Sun Service Pack 1
 - Improved Solaris 2.9 support
 - Qlogic 4.x driver support

- Secure Path V3.0B for HP-UX Service Pack 1
 - Addresses LUN reconfiguration issue

- Secure Path V3.0C for NetWare Service Pack 1
 - 6 node NetWare clusters for EVA and MSA1000

Secure Path and Auto Path Integration



- As a result of the HP & CPQ merger, we have 2 multi-path products:
 - Secure Path for Enterprise Virtual Array, EMA/MA, MSA100
 - Auto Path for XP and VA

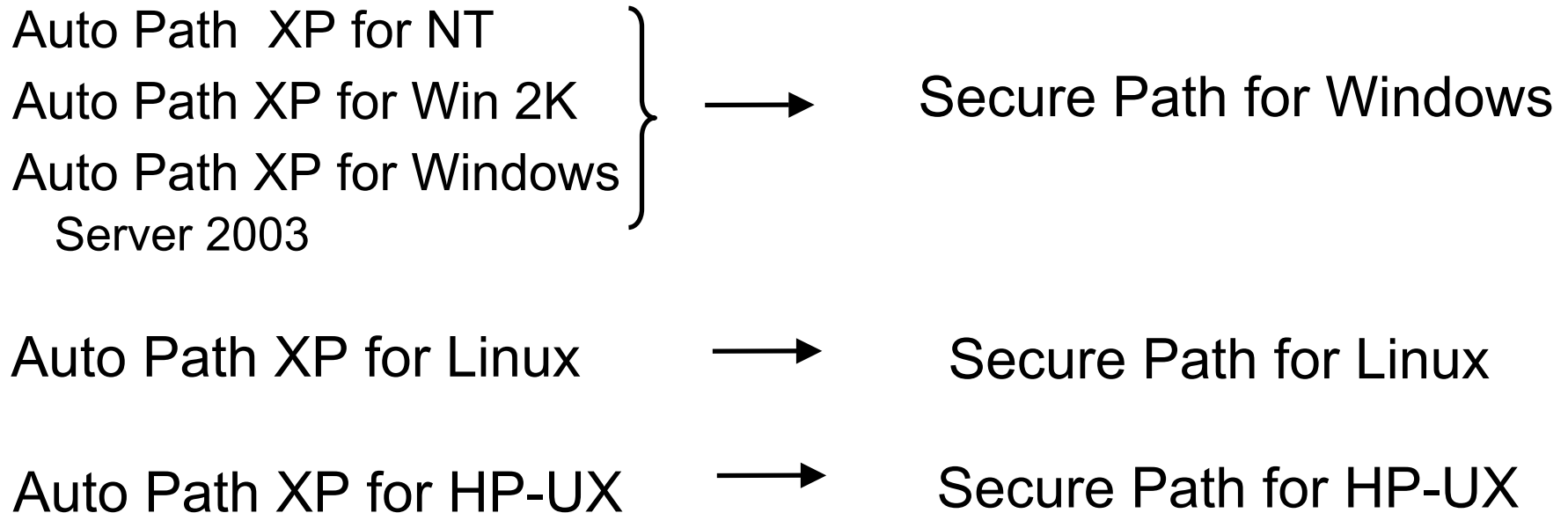
- What's the plan?

- Auto Path functionality will migrate to Secure Path in 2nd half of 2003 on HP-UX and Windows first. Auto Path customers will receive Secure Path as part of new version subscription service.

- Do I lose any Auto Path functionality?

- No, Auto Path customers can expect the same functionality available today, including:
 - Performance view
 - CLI for Windows
 - Persistent reserves

Auto Path Migration



Customers receive Secure Path as an upgrade to your existing Auto Path product and be licensed to use it on any host with a valid Auto Path license.

Microsoft Multi Path I/O

- What is it?
- The ability to use more than one physical path to access a storage device, providing improved system reliability and availability via fault tolerance and/or load balancing of the I/O traffic
- Why is Microsoft doing this?
- Microsoft's Multi Path I/O delivers a standard and interoperable path for communication between storage products and Windows Servers.
- What does it mean to HP?
- HP is working closely with Microsoft to develop an MPIO solution for HP arrays. Secure Path will adopt this technology in future releases.

Novell NetWare Multi Path I/O



- What is it?
- Basic failover capabilities built into the NetWare OS
- What does this mean to HP?
- Today, XP failover for NetWare supports this technology. EVA and MSA1000 failover require Secure Path.

HP-UX PVlinks and Auto Path

- PVlinks is a part of HP-UX and offers basic failover capabilities.
 - Use with XP, VA, not supported by EVA
 - PVlinks load balances across configured paths, but doesn't do "dynamic load balancing"
 - All performance attributes must be "manually configured" for each path

- Auto Path
 - Is completely Self-Configuring, while offering manual configuration options
 - Offers Dynamic Load Balancing across all (mixed) supported storage devices
 - Performance Tuned to work better with the supported storage devices

Secure Path Services

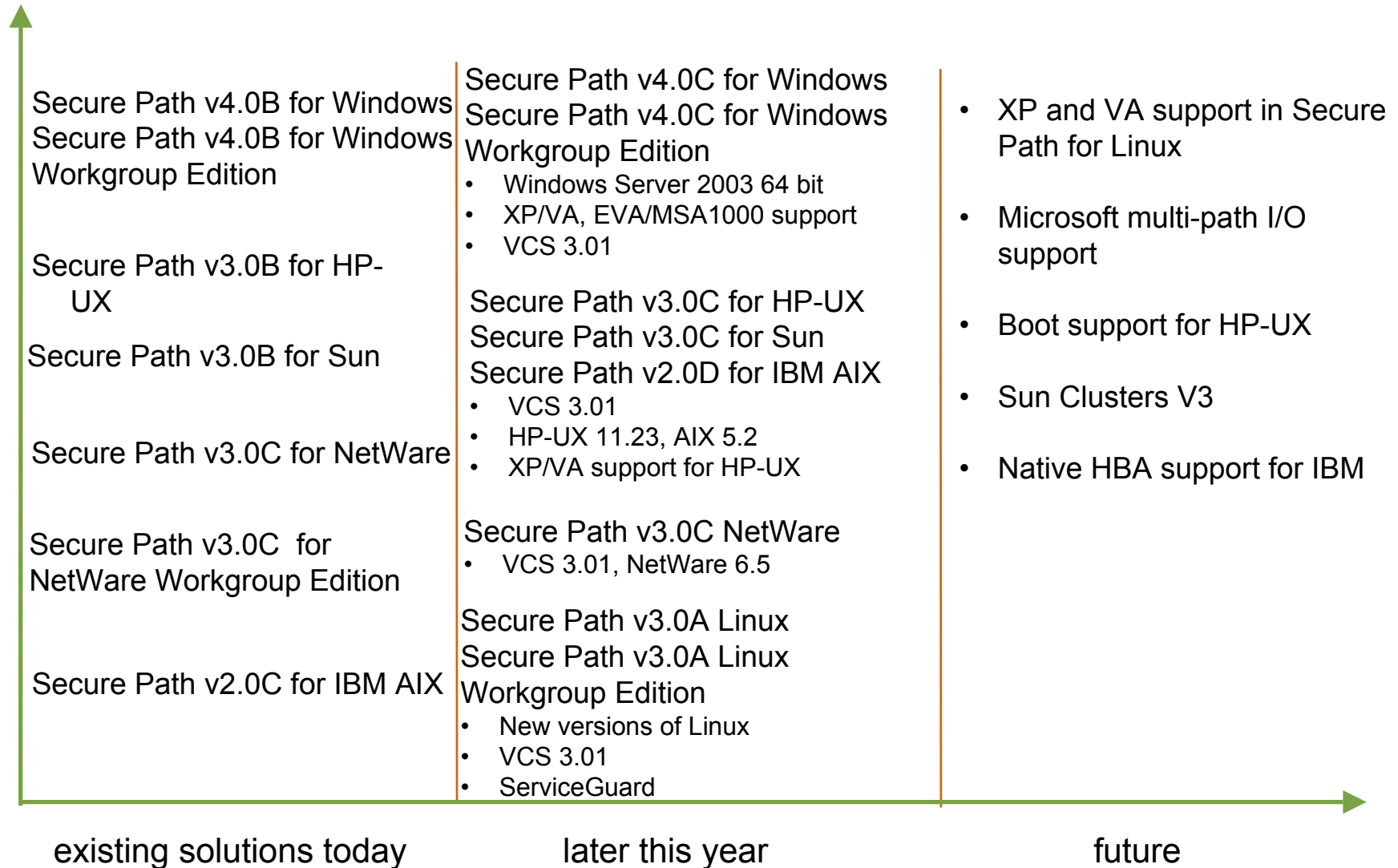
- Software Support
 - Stand-alone software advisory and remedial software telephone support

- Software Product Subscription
 - New version license rights, and Media and documentation distribution service

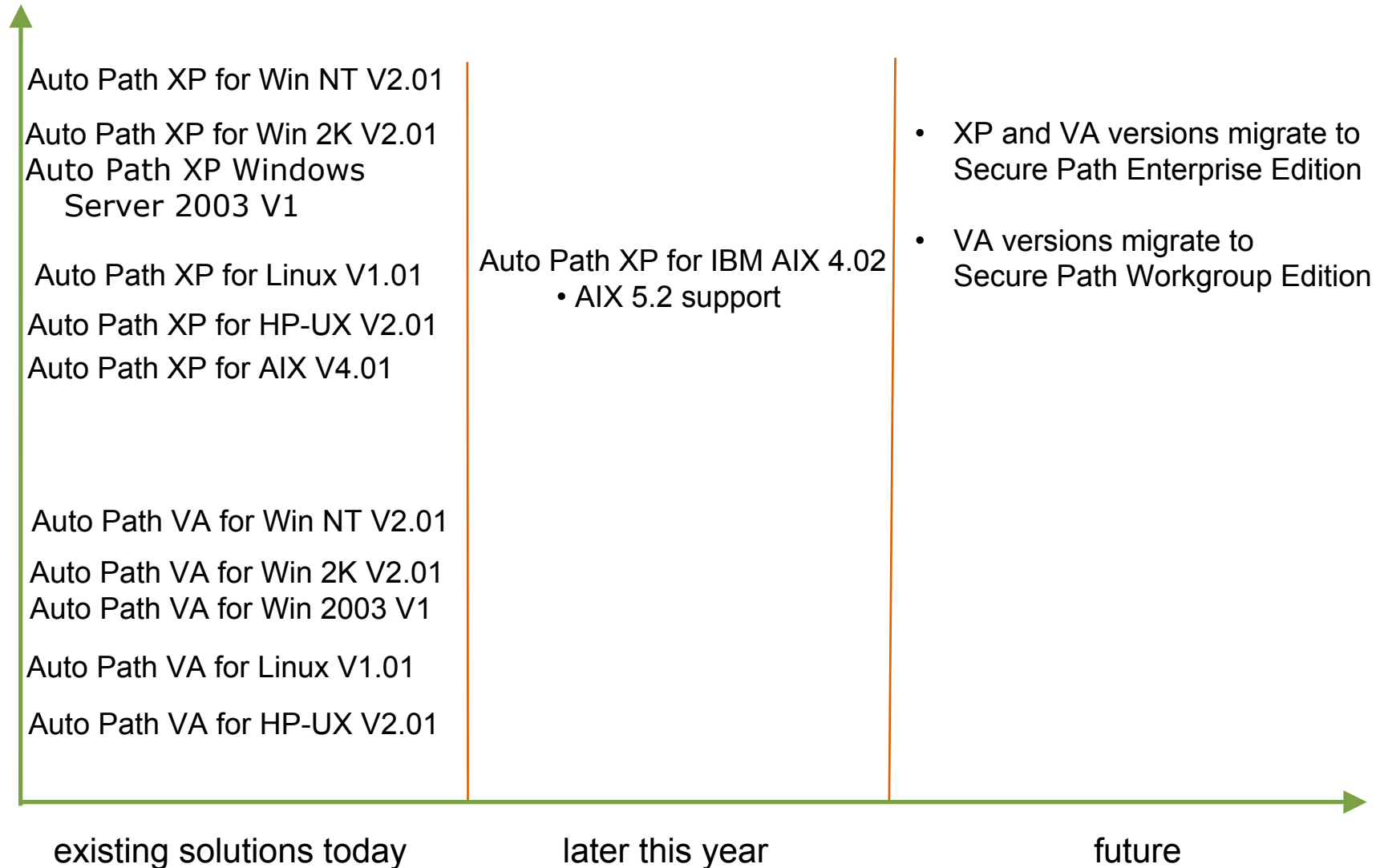
- Installation services

1 year support included with
Secure Path licenses
coming soon

Roadmap: Secure Path



Roadmap: Auto Path



Secure Path Ordering Information

- Available in license increments of 1, 5, 10, 25 and 50
- See the following url for part numbers:
- <http://h18006.www1.hp.com/products/sanworks/software/drivers/securepath/index.html>

Auto Path Ordering Information

- Available in license increments of 1, 5, and 10 for XP and 1, 5 for VA
- Contact your authorized HP sales representative for ordering information.



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