

# VSI TCP/IP Stack & VCI 2.0



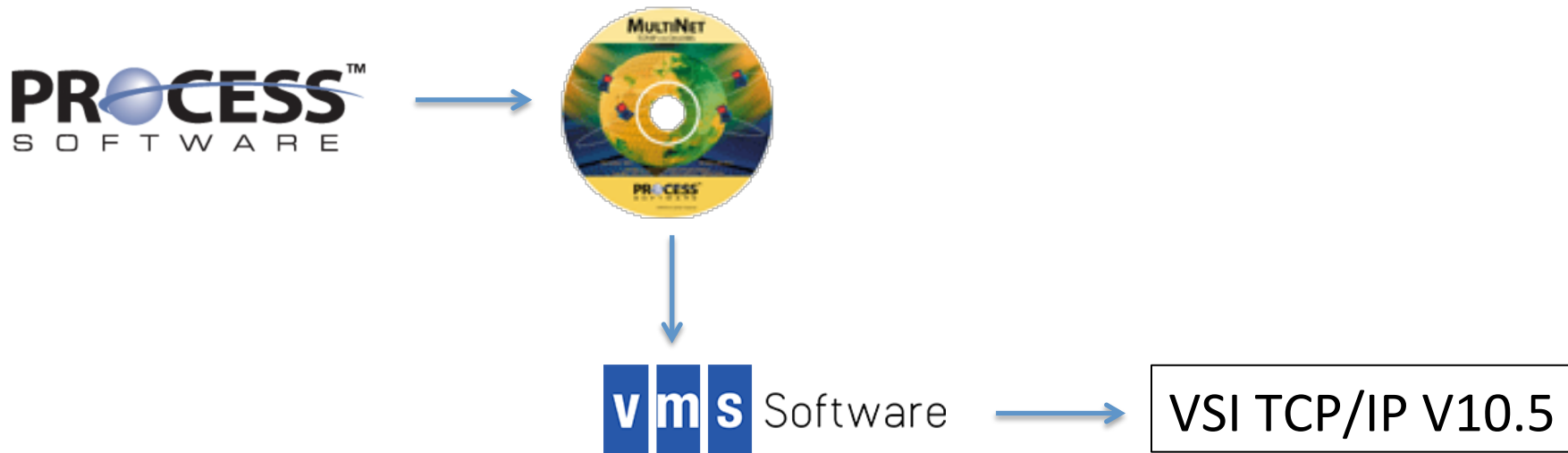
# Agenda

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- What Was Announced
- What Were VSI's Options
- Why Choose This Option
- How Does VSI TCP/IP V10.5 Compare To Current Stack
- What Are VSI TCPIP V10.5 Features
- VSI Work Items
- How Will VSI TCP/IP V10.5 Be Released
- What Does This Mean For Customers
- TCPIP Roadmap
- LAN VCI 2.0

# What Was Announced

- Plans to replace the existing OpenVMS TCP/IP stack with a completely updated stack based on software licensed from Process Software



# What Were VSI's Options

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- Improve VSI TCPIP Services for OpenVMS
  - Huge job, too far out of date
  - Time to market too long
  - Release in phases
- Incorporate Open Source TCPIP stack
  - Time to market too long
  - Release in phases
- Replace with existing stack that runs on OpenVMS

# Why Choose This Option

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- Replace with existing stack that runs on OpenVMS
  - Shorter time to market
  - Available in one release
  - Runs on Multiple OpenVMS platforms
  - Offers more protocols & more up to date standards
    - IPv6 (TELNET, BIND, SSH, NTP, FTP, DNS Resolver, SMTP, POP3, IMAP, LPD and STREAM printing)
  - Offers advanced features
    - Intrusion Prevention System (IPS)
    - Paired Network Interface
    - Improved Network Monitoring

# How Does VSI TCP/IP V10.5 Compare

(to Current Stack)

<u>Feature</u>	<u>VSI TCP/IP V10.5</u>	<u>TCP/IP Services</u>
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## Servers

- |                              |     |    |
|------------------------------|-----|----|
| • DHCP Server Safe-failover  | YES | NO |
| • FTP Server Access Controls | YES | NO |
| • DHCP v3 Server             | YES | NO |

# How Does VSI TCP/IP V10.5 Compare

(to Current Stack)

<u>Feature</u>	<u>VSI TCP/IP V10.5</u>	<u>TCP/IP Services</u>
<b>Security Services</b>		
• FTP Over TLS	YES	NO
• IPSEC	YES	Limited
• Intrusion Prevention System	YES	NO
• Outgoing access restrictions	YES	NO
• Kerberos 5 Server/Client Authentication & Encryption	YES	NO
• SFTP text file transfer from VMS to non-VMS systems	YES	NO
• SSH, SFTP, and SCP support other OpenVMS platforms	YES	NO
• SSH interoperability w/third-party support for SFTP v3 & 4	YES	NO
• SSH expired password management	YES	NO
• Single sign-on support for Kerberos 5 and PKI certificates	YES	NO
• SSH public key assistant & server	YES	NO
• CERTTOOL utility for X.509 certificate manipulation	YES	NO
• Single sign-on access to LDAP and RSA SecurID authentication	YES	NO

# How Does VSI TCP/IP V10.5 Compare

(to Current Stack)

<u>Feature</u>	<u>VSI TCP/IP V10.5</u>	<u>TCP/IP Services</u>
<b>Printing Services</b>		
• Internet Printing Protocol	YES	NO
<b>Infrastructure &amp; Other</b>		
• Paired Network Interface Load Balancing	YES	NO
• DECnet applications over IP (Phase IV)	YES	NO
• FTP and SMTP accounting & statistics	YES	NO
• Throughput statistics	YES	NO
<b>Compatibility</b>		
• New features available on OpenVMS 5.5-2 and higher	YES	NO
• Support for other OpenVMS platforms	YES	NO



# What Are VSI TCP/IP V10.5 Features

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## IP STACK

- IPv6 Kernel, TELNET, BIND, SSH, NTP, FTP, DNS Resolver, SMTP, POP3, IMAP, LPD and STREAM printing
- IPv6 six to four interface BSD 4.4 Kernel
- CIDR
- Paired Network Interface PPP
- PathMTU Discovery
- GATED
- Stream Control Transfer Protocol (SCTP)

# What Are VSI TCP/IP V10.5 Features

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## **SERVERS AND CLIENTS**

- DHCP Server with Safe-failover DHCP Server v3.0
- DHCP Client
- Dynamic DNS (DDNS)
- DNS BIND v9.9

# What Are VSI TCP/IP V10.5 Features

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## **MANAGEMENT SERVICES**

- SMTP and FTP Statistical and Accounting Reports
- Throughput Statistics Start/Stop Individual Services
- SNMP V2 Subagent
- Agent X
- NTP v4.2

# What Are VSI TCP/IP V10.5 Features

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## **INFRASTRUCTURE**

- DECnet Phase IV over IP
- DECnet Applications over IP
- IP over DECnet Tunneling

## **E-MAIL SERVICES**

- SMTP
- POP3
- IMAP4
- Mailserver Spam Prevention

# What Are VSI TCP/IP V10.5 Features

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## **SECURITY SERVICES**

- Secure Shell v1, v2 (SSH) clients and servers
- Secure Copy Protocol (SCP) client and server
- Secure File Transfer Protocol (SFTP) client and server
- IP Security (IPSEC)
- SSH single sign-on with support for Kerberos and PKI certificates
- Intrusion Prevention System
- Incoming Access Restrictions
- Outgoing Access Restrictions
- Kerberos v5.0
- FTP over TLS 1.2
- Ephemeral Port Randomization

# What Are VSI TCP/IP V10.5 Features

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## **APPLICATIONS**

- NFS V2, V3 over UDP or TCP
- ODS-5 for NFS Server
- “R” Services
- FTP
- TELNET

# What Are VSI TCP/IP V10.5 Features

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## **SEVERAL APIs ARE SUPPORTED, INCLUDING:**

- Socket Library (v4.3 BSD)
- DEC C/VAX C Socket Library
- /SRI \$QIO Interface
- UCX \$QIO Interface
- RPC Interface
- DCE for OpenVMS

## **PRINTING SERVICES**

- IPP (Internet Printing Protocol)
- LPD (Line Printer Daemon)
- LPR (Line Printer)
- TELNET/Stream Printing

# VSI Work Items

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- Convert installation kit from VMSINSTAL to PCSI
- Map VSI TCP/IP V10.5 commands to TCPIP Services commands
  - Command file compatibility
  - Command line compatibility
- Read TCPIP Services startup configuration files
  - Easy migration from current stack
- Update VSI TCP/IP V10.5 documentation
- Update VSI TCP/IP V10.5 training course material



# How Will VSI TCP/IP V10.5 Be Released

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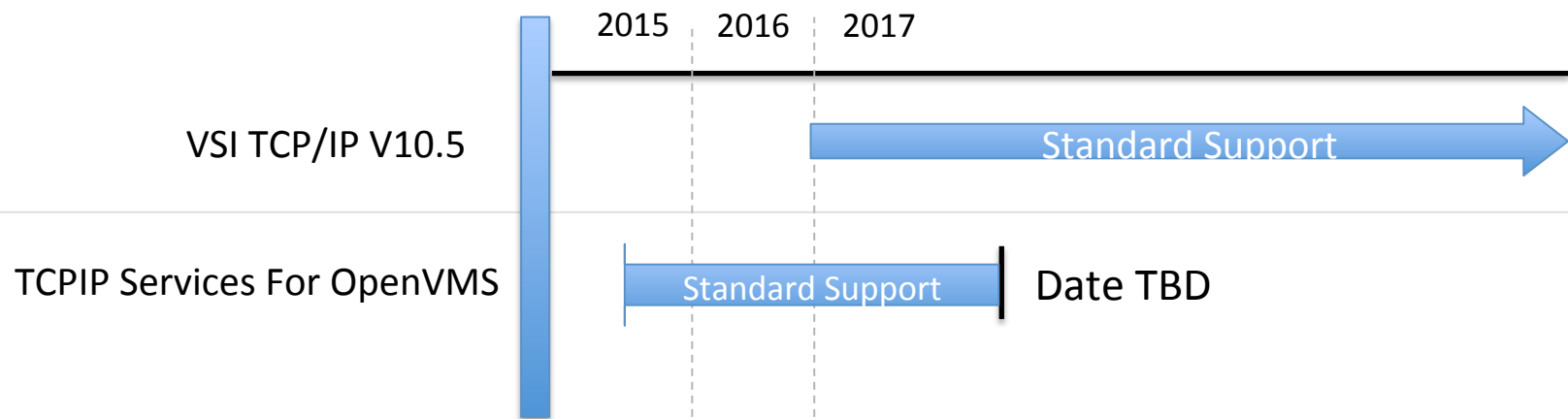
- Initially
  - Independent Kit
- In the future
  - Bundled in OpenVMS next release
  - Default TCPIP stack for OpenVMS installations

# What Does This Mean For Customers

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- Initially
  - Choice of TCPIP stack on OpenVMS
- In the future
  - Default is VSI TCP/IP V10.5 - new OpenVMS installations
  - VSI TCPIP Services for OpenVMS EOL/EOS
  - Timeframe TBD

# TCPIP Roadmap



These roadmaps contain forward looking statements and are provided solely for your convenience. While the information in this roadmap is based on our current best estimates, such information is subject to change without notice.

# LAN VCI 2.0

# LAN VCI 2.0 (Next Generation VMS LAN Drivers)

	10 Gb/Sec		10 Gb/Sec FullDuplex	
PkSize	Pk/Sec	MB/Sec	Pk/Sec	MB/Sec
64	14.8 m	952	29.7 m	1904
1518	812743	1233	1.62 m	2467
9018	138304	1247	276608	2494

- Current LAN devices – 1,10 gbit.
- Future LAN devices – 20 (now), 40 (now), 100 gbit, on x86 systems.
- 2 gbyte non-paged pool limit is a real problem.
- x86 systems - More cores, more NICs, more memory.

# LAN VCI 2.0 Features

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- Buffers in S2 space:
  - More buffering, more devices.
  - Better buffering (receive chaining avoids using a 9k byte buffer to store a 64 byte packet, now it is a chained set of 2k byte buffers to describe a 9018 byte receive packet).
- Multiple transmit and receive queues per device bound to available CPUs.
  - Hardware normally distributes packets to receive queues based on TCP/IP data or by source MAC address.
- Adaptive transmit and receive ring sizing.
  - Similar to existing ability to set number of receive buffers, but applies to transmit and receive ring sizes and buffering).

# LAN VCI 2.0 Features (Offload)

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- Support for hardware offload features:
  - Send checksum offload (Send CKO).
  - Receive Checksum Offload (Recv CKO).
  - TCP Segmentation Offload (TSO).
  - Large Receive Offload (LRO).
- Support for NIC driver offload extensions:
  - TCP Segment Offload (TSO) can be applied to non-TCP/IP applications in software, then called Large Segment Offload (LSO) or Generic Segmentation Offload (GSO).
  - Large Receive Offload (LRO) can be applied to non-TCP/IP applications in software and provided for NICs that don't include native LRO support.

# LAN VCI 2.0 Features (Other)

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- Compatible with LAN VCI 1.0 applications.
  - Can run PEDRIVER, TCP/IP, VCI 1.0 or 2.0 (not at same time).
  - Existing QIO requests won't be affected (sensemode, etc).
- Driver improvements:
  - Parameter changes without needing device reset (and link bounce):
    - MAC address.
    - Promiscuous mode.
    - Jumbo/standard size selection, per application.
  - Enhanced interrupt moderation through polling.
  - Counters, messages, and tracing improvements.
  - Better flow control information.
  - Driver reload without reboot (applies to actively worked drivers, won't retrofit legacy drivers). Primary motivation is to ease debug.
- LANCP / LANACP utility:
  - Displays additional counters, statistics, messages.
  - Changes to set / display additional driver settings.



# LAN VCI 2.0 Pseudo Drivers (Existing)

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- LAN Failover driver:
  - Re-implemented to disconnect device handling from the LAN Common Routines, each driver is responsible for device init, device reset, maintaining device status.
- Test driver:
  - Used for performance testing.

# LAN VCI 2.0 Pseudo Drivers (New)

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- **UDP Pseudo Device driver:**
  - Used for Clusters Over IP, and any other non-IP applications where both sides are connected via this UDP tunnel device.
- **Monitor Pseudo Device driver:**
  - Used for packet monitoring/tracing (LIBPCAP support and other), QOS support (to apply characteristics such as maximum bandwidth, packet delays) where a pseudo device acts as a tunnel adapter. Could be extended for encryption.

# LAN VCI 2.0 Status (LAN)

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- LAN VCI 2.0:
  - Much of the basic functionality is operational.
- LAN drivers:
  - Broadcom (Qlogic) BCM57711E, supports multiple queues, driver reload, VCI 2.0 interface, many improvements and much cleanup.
  - Emulex BE3, TBD
  - X86 devices TBD
- LANCP / LANACP:
  - Counters changes in progress, lot of cleanup being done as well.

Release *target* is x86 release timeframe.

# LAN VCI 2.0 Status (Users)

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- PEDRIVER:
  - Conversion to C (largely done, but code review and validation is much more work to go).
  - VCI 2.0 interface to be done.
  - Offload features to be done.
  - Performance / validation work to be done.
  - Test tools in progress.
- TCP/IP:
  - VCI 2.0 interface to be done.
  - Offload features to be done.
  - Performance work to be done.

Release *target* is x86 release timeframe.

