

# Building an OpenVMS web server

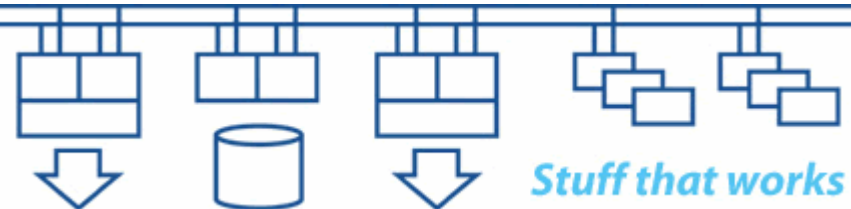
**Colin Butcher, XDelta Limited**



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**A “guided tour” of setting up an OpenVMS web server using live demo equipment. We intend to finish with an OpenVMS Galaxy cluster running as a web server.**

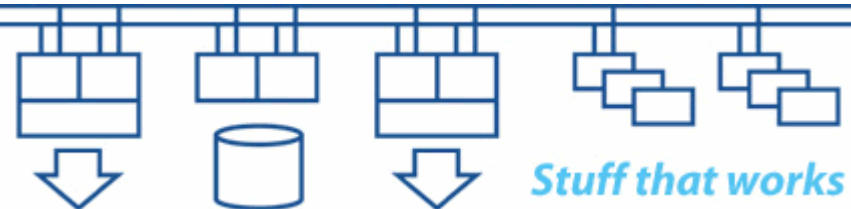
**This seminar is unlikely to answer all of your questions, so please be prepared to contribute and share your knowledge.**



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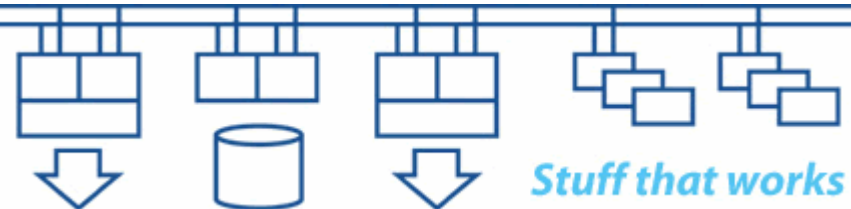
- **Hardware platforms (Alpha and Integrity)**
- **Overview of configuration process**
- **OpenVMS base system requirements**
- **Building an OpenVMS Galaxy cluster**
- **TCPIP configuration**
- **Installing CSWS (based on Apache)**
- **Installing PERL, PHP**
- **Installing JAVA and TOMCAT**
- **Performance and availability**
- **V8.2 update, porting notes etc.**



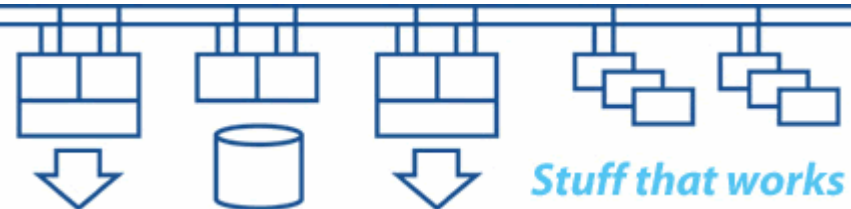
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- **Occam's Razor:**  
*“Pluralitas non est ponenda sine neccesitate”*  
*“Entities should not be multiplied unnecessarily”*  
**“Keep it as simple as possible”**
- **Hanlon's Razor:**  
**“Never attribute to malice that which can be adequately explained by stupidity”**
- **Colin's Caveat:**  
**“Allow for failures, success is one of many possible outcomes”**

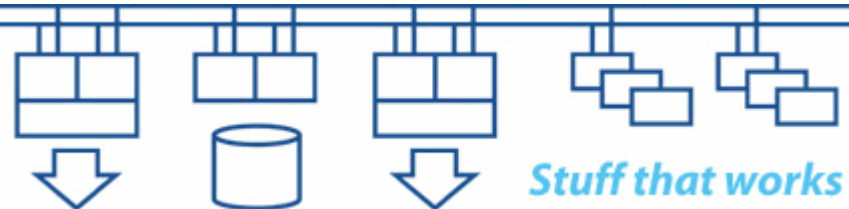


**VAX and Alpha are used interchangeably to refer to system architectures, processors / microprocessors and platforms**

- **VAX VMS was used up to V5.5-2H4**
- **OpenVMS VAX and OpenVMS Alpha are used from V6.0 onwards**

**Intel implementations are different:**

- **IA-64 is the Intel architecture**
- **Itanium is the Intel microprocessor family**
- **Integrity is the HP platform**
- **OpenVMS I64 is the HP operating system name**



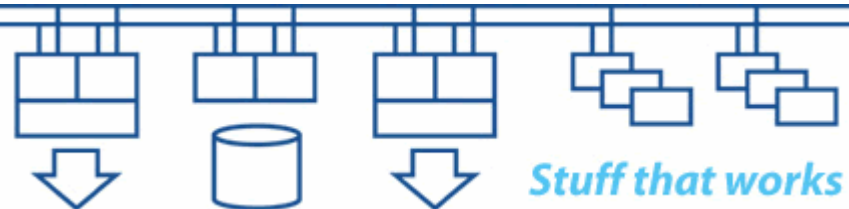
- **AlphaServer 4100:**
  - **4x CPUs, 2Gbyte memory**
  - **SANswitch/16 and KGPSAs (courtesy of MIT Limited)**
  - **HSG80 based disc array (courtesy of Digital Networks)**
  - **Partitioned and Clustered (Galaxy)**
  - **OpenVMS V7.3-2 + current patches**
  - **TCP/IP V5.5-ECO05**
  - **DECnet-Plus V7.3-2-ECO01 + MUP01**
  - **DECwindows/Motif V1.5**



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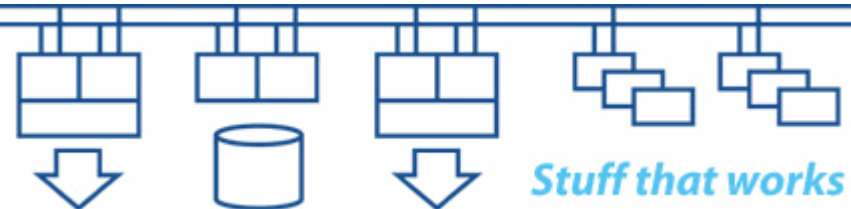
- **Serial consoles for Galaxy**
- **Firmware updates for system and devices**
- **Galaxy setup (LP\* variables in NVRAM)**
- **HSG80 setup (unit identifiers, SCSI\_version etc.)**
- **SANswitch setup (zoning)**
- **WWIDMGR –quickset –udid <ident> (set mode diag)**
- **Booting: boot –flags <root>,<flag\_bits> <device>**



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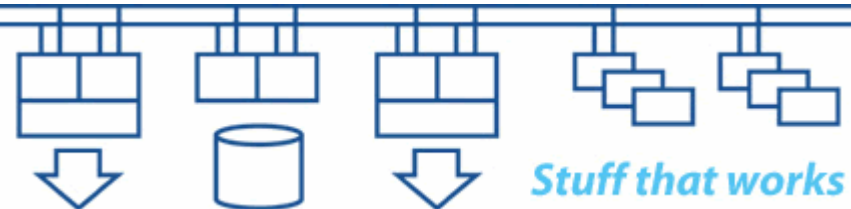
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*Stuff that works*

- **Boot firmware update CD**
- **Install firmware updates**
- **Boot OpenVMS installation CD**
- **Select installation menu (option 1)**
- **Answer installation questions**
  - “yes” to ODS5 and hard links
- **Install O.S. patches and base L.P. patches**
- **Set up system parameters ready for layered product installations (read product requirements)**
- **Startup and login command files**



## Configure base system:

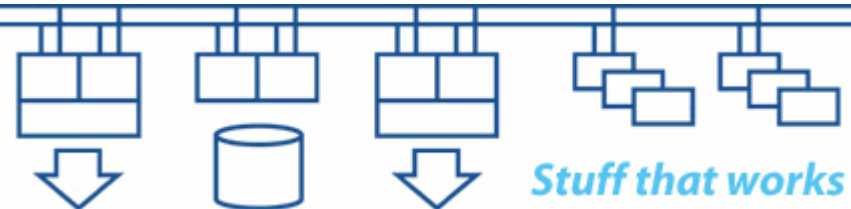
- **Edit / create startup files**
- **Configure network software**
- **Page / swap / dump files**
- **Set up other system components (e.g.: LAT, MOP)**
- **Set up queues and queue manager database**
- **System parameters**
- **Layered products (compilers etc.)**
- **BACK IT UP (and test restore)**



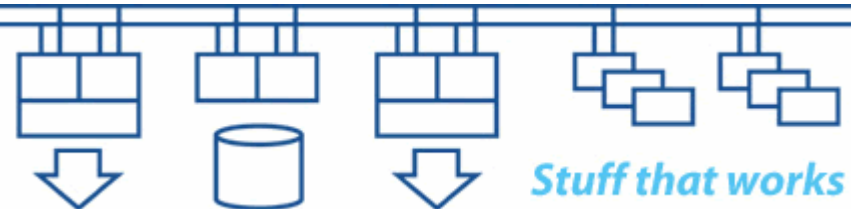
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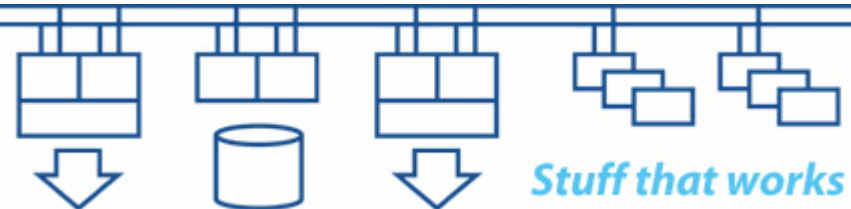
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- **Create primary node**
- **Add second node booted from same system disc – set boot flags appropriately**
- **Page / swap / dump files off shared system disc – use local SCSI disc if possible**
- **Set Galaxy system parameter to use SMCI (shared memory cluster interconnect)**
- **Configure system parameters (votes, quorum disc etc.)**
- **Configure network layers (do not use DECnet, TCPIP, LAT etc. over the SMCI)**



- **First ensure that TCPIP is configured and running**
- **In general discs should be ODS5 (LDdriver is useful)**
- **Install and configure CSWS (APACHE)**
- **Add PERL, PHP, PYTHON etc. if needed**
- **Install and configure JAVA and CSWS\_JAVA (TOMCAT)**
- **Quotas and system parameters**
- **UNIX heritage, so not “traditional” VMS style configuration – uses text files in most cases**
- **Getting good JAVA performance requires attention**
- **Examine your code carefully!**



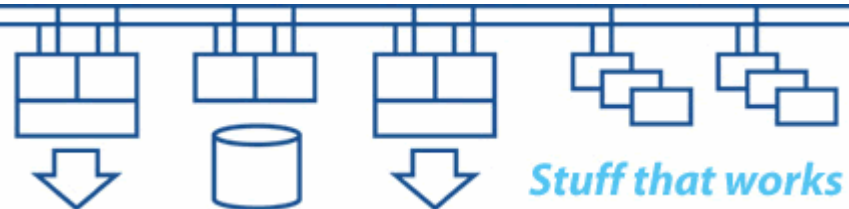
- **Use multiple addresses – private ones for management and published ones for access to services**
- **Consider using failsafe IP for access to services – addresses are no longer “tied” to interfaces**
- **Load Broker and Metric Server**
- **Scalable kernel and dedicated CPU on large multiprocessor systems**



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**INITIALIZE <disc> -**

**/STRUCTURE=5 –**

**/VOLUME\_CHAR=(HARDLINKS)**

**SET VOLUME <disc> -**

**/STRUCTURE=5 –**

**/VOLUME\_CHAR=(HARDLINKS)**

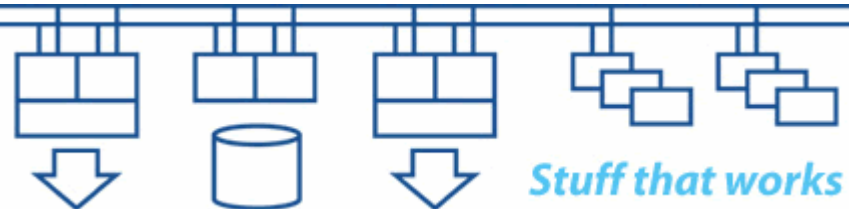
**SET PROCESS /PARSE=EXTENDED**



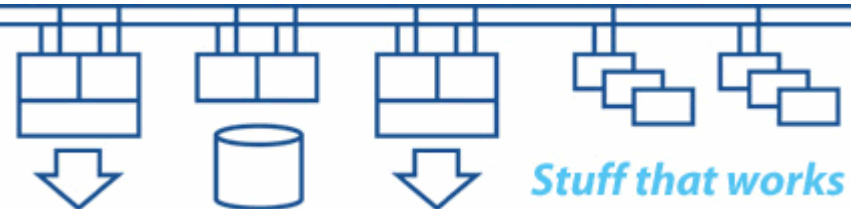
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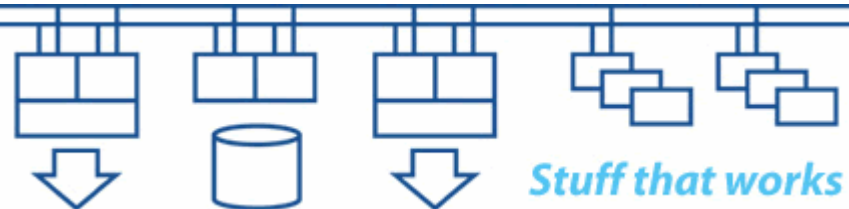
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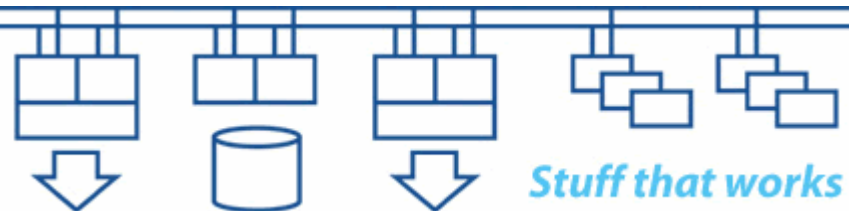
- **Must have TCPIP installed and configured first**
- **Install with PCSI**
- **Configure via HTTPD.CONF**
  - **Can have multiple web server configurations (each on a different TCPIP port, default is TCPIP port 80)**
  - **Consider how many processes to start for each web server – increase on big systems**
  - **Consider where to place files**
  - **File ownership and access control**



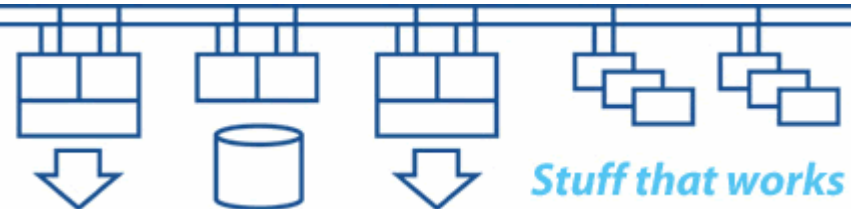
- **Must have CSWS running first – these are “modules” that hook into APACHE (eg: MOD\_PERL) so that they run as “server side” processes**
- **Install PHP with PCSI**
- **Install PERL with PCSI first**
  - **Doesn’t come with a startup file**
  - **Define PERL\_ROOT and PERLSHR logicals**
  - **Install the images**
- **Install MOD\_PERL once PERL is installed and configured**
- **Consider writing your own APACHE “modules”**



- **Use the JAVA FastVM wherever possible**
- **Check your process quotas (and system parameters) – PGFLQUO is one of the key ones**
- **It uses LOTS of memory**
- **Read the User Guide carefully – there are many options that can be controlled by logical names, some of them can make a big difference to performance**
- **Also see the C run-time library logical names – they too can have a big effect on performance**
- **JAVA is horribly case sensitive**



- **Must have JAVA and APACHE installed first**
- **Configure to use APACHE “modules”**
- **Configure to use the APACHE\$WWW account**
- **Configure TOMCAT to use the JAVA FastVM via the “.TOMCATRC” file**
- **Check the APACHE\$WWW process quotas (and system parameters) – PGFLQUO is one of the key ones**
- **TOMCAT uses TCPIP port 8080 by default**
- **TOMCAT makes extensive use of threads (see DECthreads)**
- **Threads on Galaxy (CPU migration) and the MULTITHREAD system parameter**



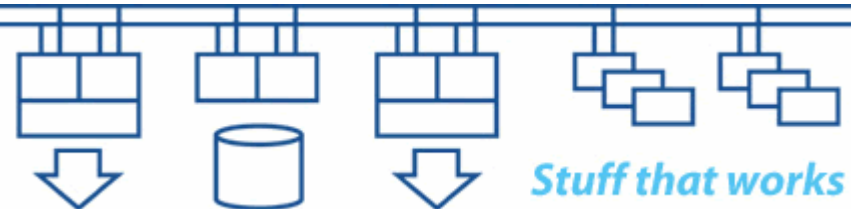
- **Build cluster (partitioning, HSG80 shared discs, system roots, network configurations, startup command files, parameters, quotas etc.)**
- **Test cluster and back it up (save example files)**
- **Install web server components**
- **Configure web server components and test**
- **Performance**



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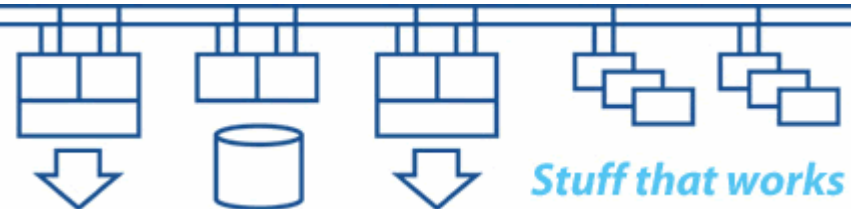
- **Most changes are related to the port of OpenVMS to Integrity Servers**
- **Use standard mechanisms – don't “roll your own”!**
- **Image layout for Integrity Servers (ELF / DWARF)**
- **Calling standard for Integrity Servers (register usage etc.)**
- **Linker / debugger changes for Integrity Servers**
- **System services**
- **DCL lexical functions**



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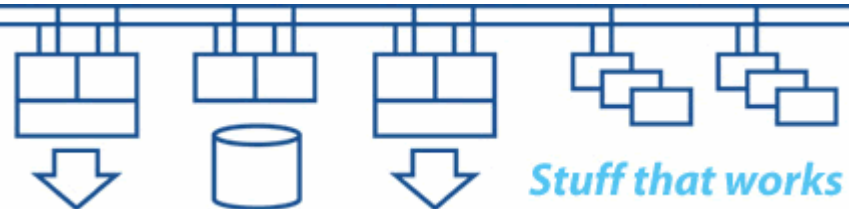
- **Host-based mini-merge (HBMM) – also back-ported to V7.3-2 with TIMA kit**
- **Internals and data structures changes**
- **System service logging**
- **SDA extensions**
- **Performance features such as finer granularity of locks**
- **Extended lock value blocks**
- **Revised system parameter defaults**
- **DCL command line length and parse token length**
- **DCL mailboxes**



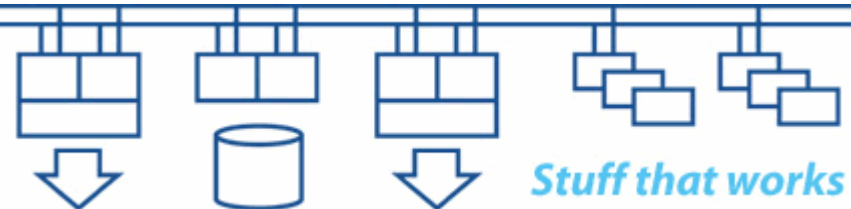
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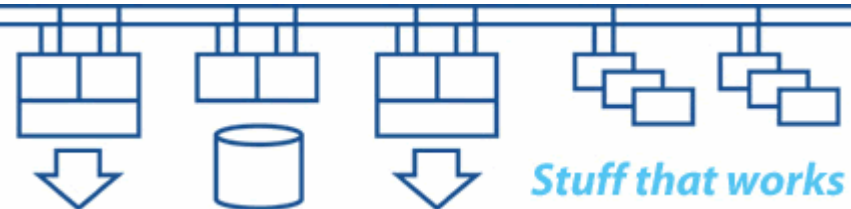
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- **VAX and Alpha are supported in the same cluster**
- **Alpha and Integrity are supported in the same cluster**
- **VAX and Integrity are not supported in the same cluster**
  
- **Be careful with mixed version clusters. Older versions of OpenVMS can restrict overall cluster performance and functionality.**
- **OpenVMS VAX V7.3 does not include full support for HBMM bitmaps, ODS5 extended file naming etc.**



- **Binary translation (VAX to Alpha, Alpha to Integrity)**
- **Implicit assumptions, eg: (if .not. vax)**
- **Synchronisation and serialisation of access to data structures**
- **Performance features**
- **Platform independent interfaces (system services, lexical functions etc.)**
- **IEEE floating point format for best performance**
- **Privileged code may require additional work**



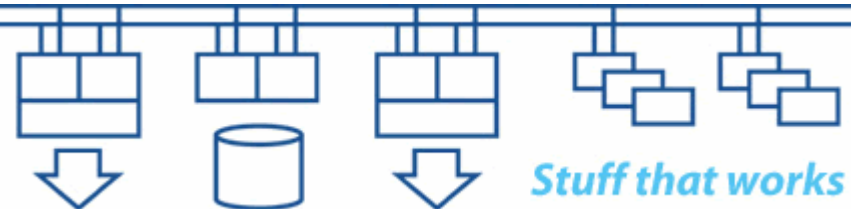
- **Make a thorough audit and analysis of what you're doing at the moment**
- **Consider taking advantage of new features and new ways to do things**
- **There may be no direct equivalents**
- **Direct 'bug for bug' port?**
- **Opportunity to re-implement application?**
- **Plan for expansion & growth**
- **Are you going to have to continue to support non-migrated systems as well?**



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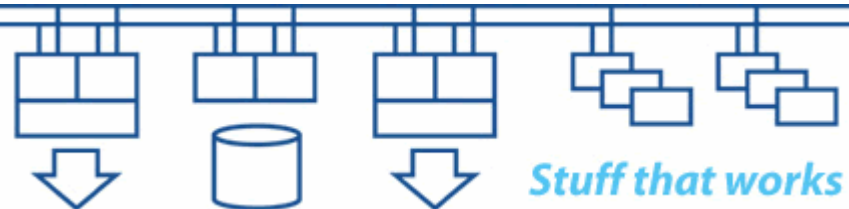
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- **Technical Journal** (<http://www.hp.com/go/openvms/journal>)
- **FAQ** (<http://www.hp.com/go/openvms/wizard>)
- **Ask The Wizard** (<http://www.hp.com/go/openvms/wizard>)
- **Integrity Servers** (<http://www.hp.com/go/integrity>)
- **Alpha Servers** (<http://h18002.www1.hp.com/alphaserver/>)
- **HP DSPP** (<http://www.hp.com/dspp>)
- **Intel Itanium 2 systems**  
(<http://www.intel.com/design/itanium/documentation.htm>)



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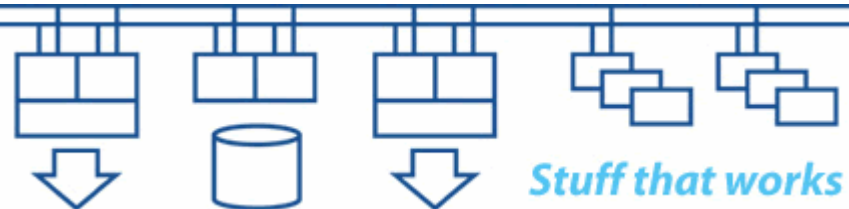
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**Week of May 19<sup>th</sup> 2006 at Sheraton Tara hotel, Nashua (next door to OpenVMS Engineering building ZKO)**

- **An “Ambassadors” style week for non-HP staff.**
- **An intense week of learning, information gathering and meeting people. Well worth going to.**
- **Contact Sue Skonetski ([susan.skonetski@hp.com](mailto:susan.skonetski@hp.com)).**
- **See <http://www.hp.com/go/openvms/bootcamp>**



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