



SUN HPC SOFTWARE – CLUSTERING MADE EASY

New Software

Access

Visualization
Workstation,
Thin Clients,
Remote
Access

Developer

Compilers,
Debuggers,
Optimization
Tools,
Libraries

Management

Workload,
Systems and
Cluster
Management

OS

Linux, Solaris

Interconnect

InfiniBand
or Ethernet

Storage/ Archive

Cluster
Storage,
Backup,
Archive,
File Systems,
HSM

Systems

Racks or
Blades

Variety of
CPU
Architectures



**Sun
Services**



**Sun
Customer
Ready**



Management Software

- Scali Manage – Cluster management
- CMT V2 from Streamline – Cluster management
- LSF from Platform – Workload Management
- PBSpro from Altair – Workload Management
- GridVision from Voltaire - Infiniband management software
- **Sun Grid Engine** provides dynamic resource management with powerful policy engine, resource scheduling, accounting and reporting
- **Sun xVM Ops Center** for cluster management
 - > Provision and patch OS and applications, update firmware
 - > Monitor hardware and OS status

Developer Software

- Scalable Parallel Debuggers
 - > Totalview, Totalview Technologies
 - > DDT, Allinea Software
- Cache-use Performance Analysis
 - > Virtual Performance Expert, Acumem
- **Sun Studio 12** application development
 - > **C, C++, Fortran development:** Compilers support industry and defacto standards to enable portable, maintainable, extensible code
 - > **High performance:** Optimized for target systems: UltraSPARC, X86 and x64
 - > **Multi-core development:** Powerful debugger, auto-parallelizer, advanced perf analysis tools
 - > **Full featured graphical development environment**
 - > **SunPerf lib:** Optimized mathematical libraries
 - > Supports a variety of **MPI choices**
- **Sun HPC ClusterTools 7** for parallel program development based on OpenMPI

The main title "Sun HPC SOFTWARE" is centered on a large, dark blue background featuring a stylized wave. The word "Sun" is in white, "HPC" is in white, and "SOFTWARE" is in a large, bold, yellow font.

Sun HPC SOFTWARE

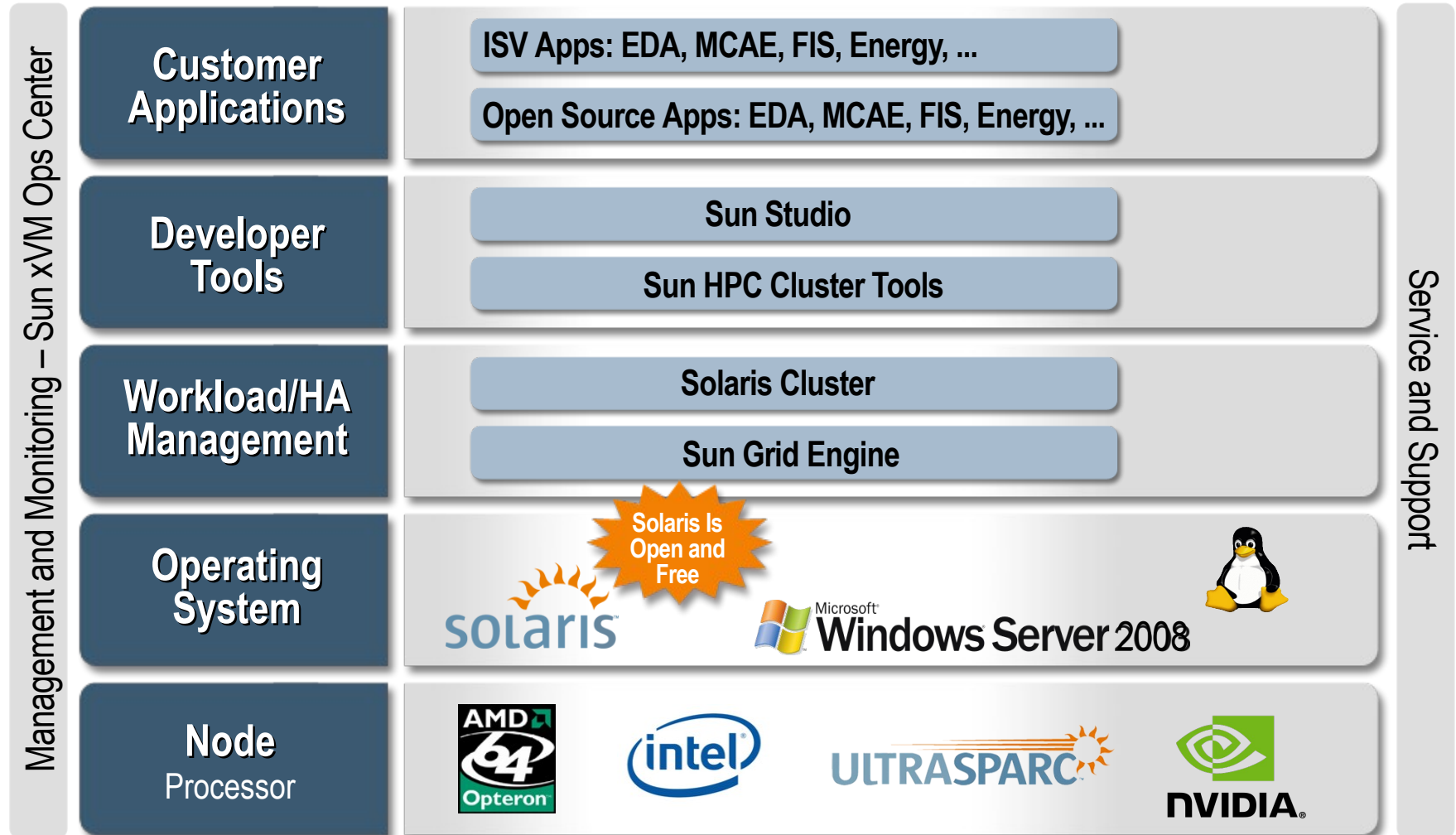
Sun xVM Ops Center

Ops Center Provides an Amazingly Easy-to-Use Interface to Manage Rapid Growth in Your IT Environment

DISCOVER	Scan and identify servers across your network, even when powered off
PROVISION	Hands-off installation of Linux and Solaris onto both bare metal servers and virtual environments
UPDATE	Stay secure and up-to-date with patch management tools for RedHat, SUSE and Solaris
MANAGE	Securely manage users and assets with the best knowledge about your Sun gear
REPORT	Assure compliance with the industry's first compliance auditing solution

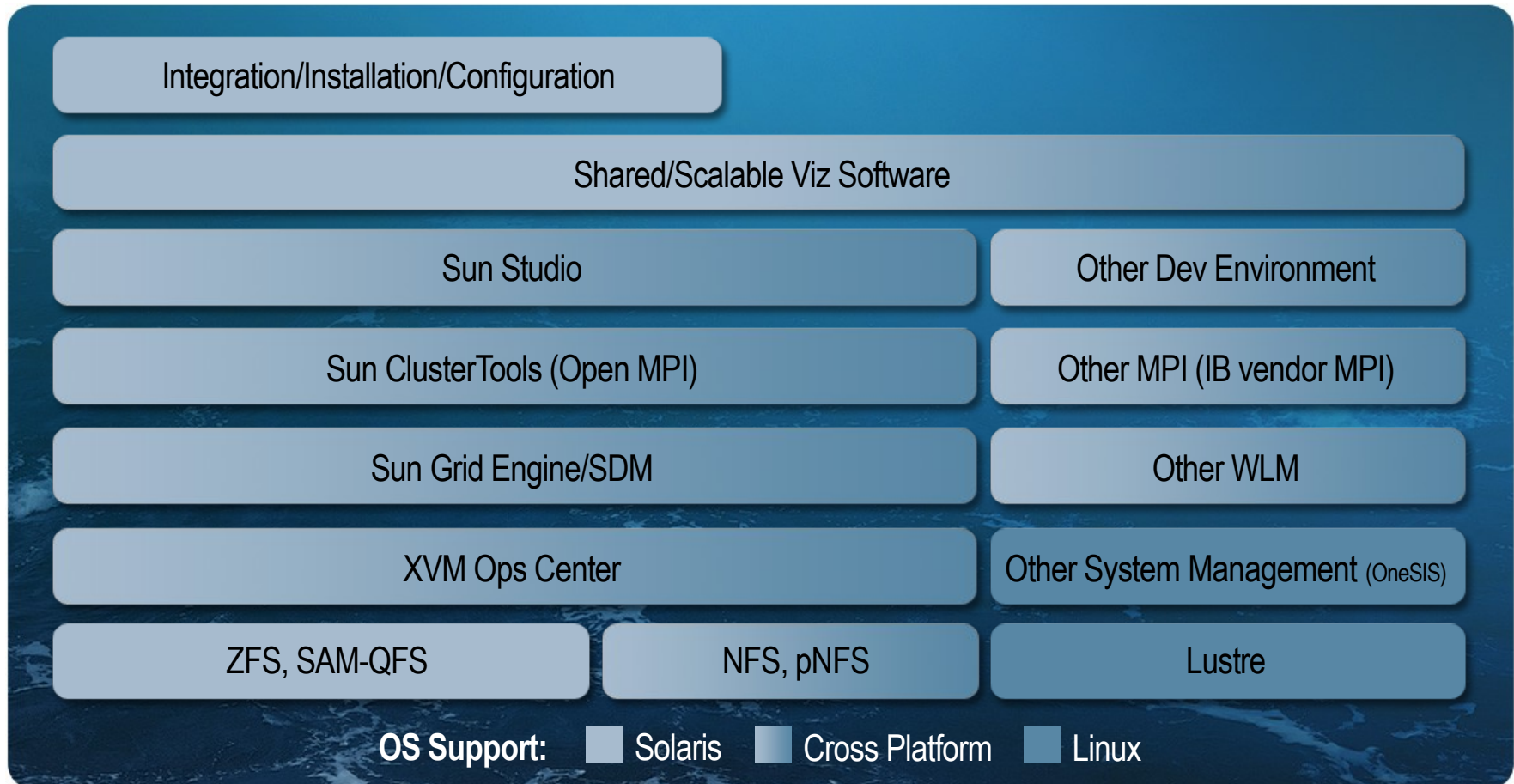
The Sun HPC Software Stack

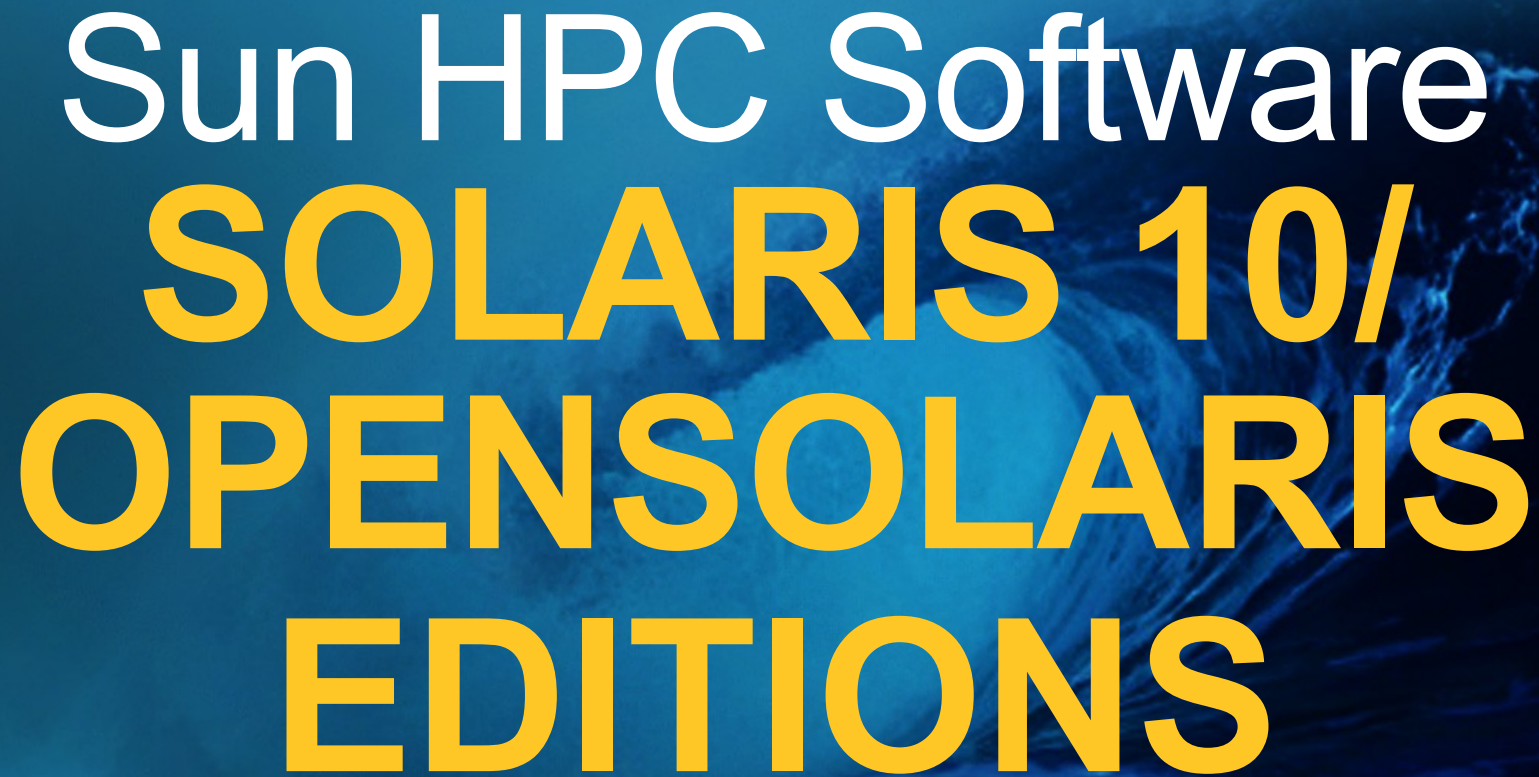
A Full Deck



Solaris and Linux HPC Alignment

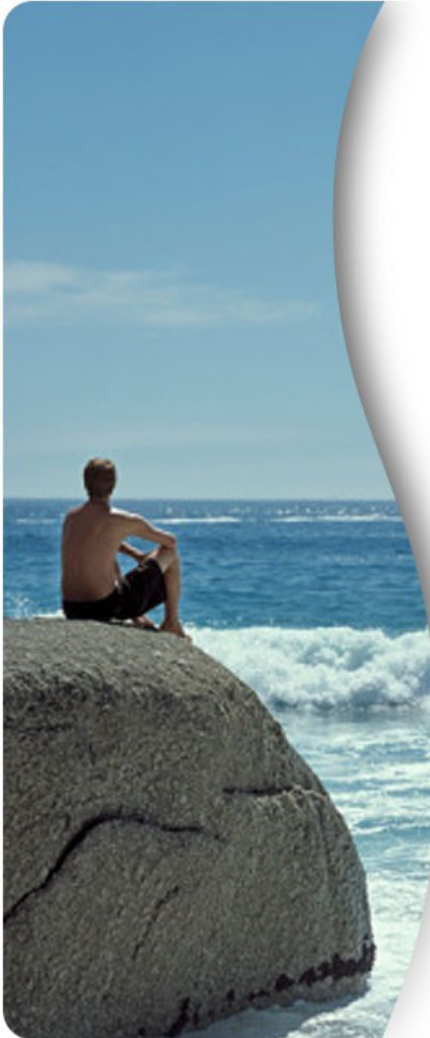
Many Similarities – Few Differences; Converge Over Time (e.g., File System Story, System Management)



The slide features a dark blue background with a subtle, abstract pattern of light blue and white, resembling a stylized wave or a network of connections. The text is centered and uses a clean, sans-serif font. The word 'Sun' is in white, while 'HPC Software' is in a smaller white font. Below this, 'SOLARIS 10/' and 'OPENSOLARIS' are written in a large, bold, yellow font. 'EDITIONS' is also in a large, bold, yellow font, completing the title.

Sun HPC Software
**SOLARIS 10/
OPENSOLARIS
EDITIONS**

Goals



- Sun HPC Software – Solaris 10/OpenSolaris Edition
 - > Simple, scalable provisioning of bare-metal system into running HPC cluster
 - > Validation of configuration
 - > Dramatically reduce time-to-results
 - > Integrated management and monitoring of cluster
 - > Community-driven
- Solaris HPC Developer Preview
 - > Simplify the process of HPC application development
 - > Run on laptop, deploy on cluster – seamless experience
 - > Community-driven

Community



- Hosted on OpenSolaris.org
 - > HPC Developer Community
 - > Pre-existing community we've coopted
 - > HPC Deployer Community
 - > Main project home
- All work will be open
 - > Need community input on tools/focus
 - > Products included as binary distributions
- Vertical stack communities
 - > EDA, MCAE, FIS, etc.

Solaris HPC Developer Preview



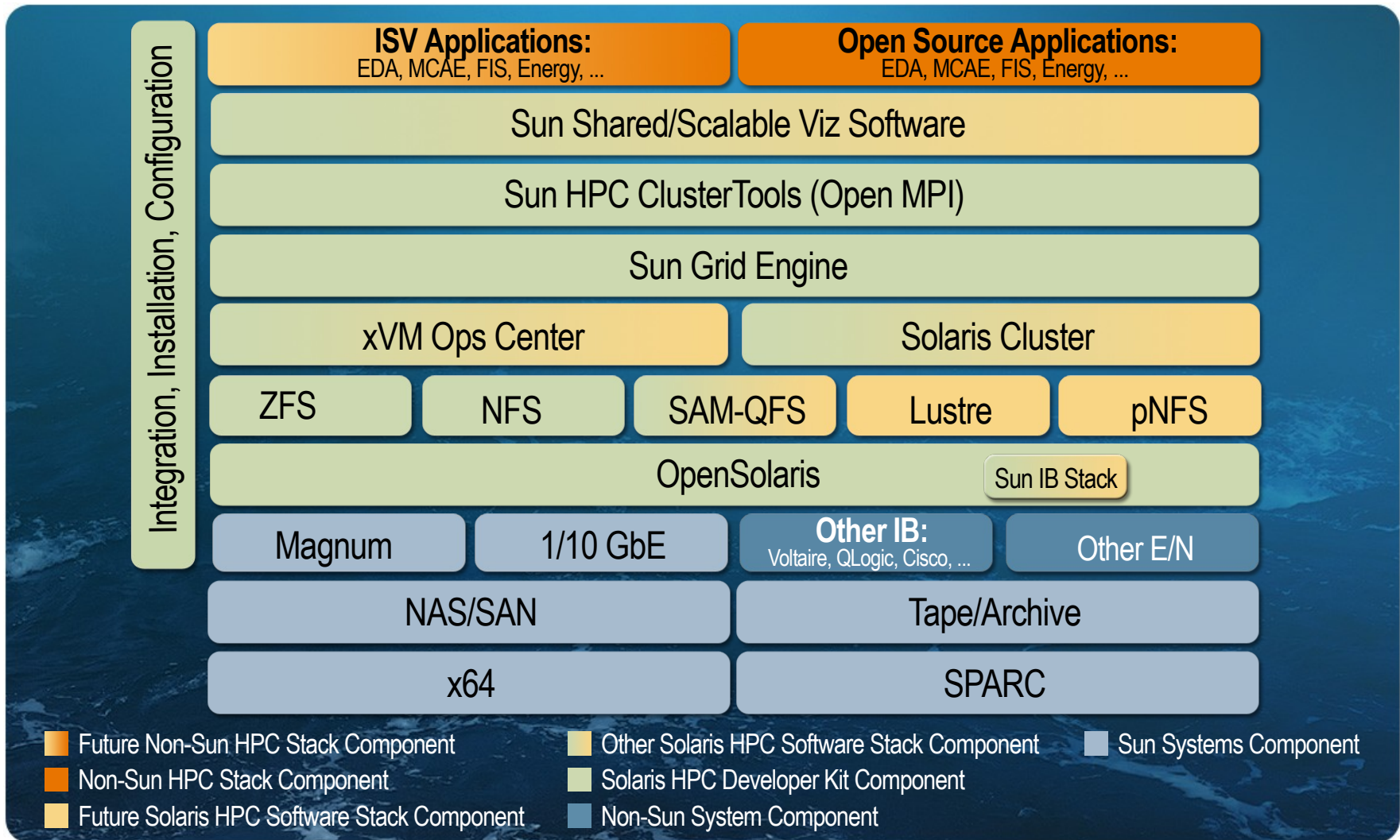
- Single-node, install-and-go, dev pack
- Release 1 – May '08
 - > Sun Grid Engine, ClusterTools, Sun Studio
 - > Integrated installer – script
 - > Studio plug-ins
- Release 2 – November '08
 - > More products and tools
 - > Shared Visualization, xVM Ops Center, etc.
 - > Linux stack coordination
 - > Tighter/cleaner/better integration
 - > Simulated multi-node

Sun HPC Software - Deployer



- HPC vertical deployer software
 - > Complete HPC stack
 - > Sun HPC products
 - > Binary distributions
 - > Vertical and general-purpose ISV applications
 - > Binary distributions
 - > Open source tools

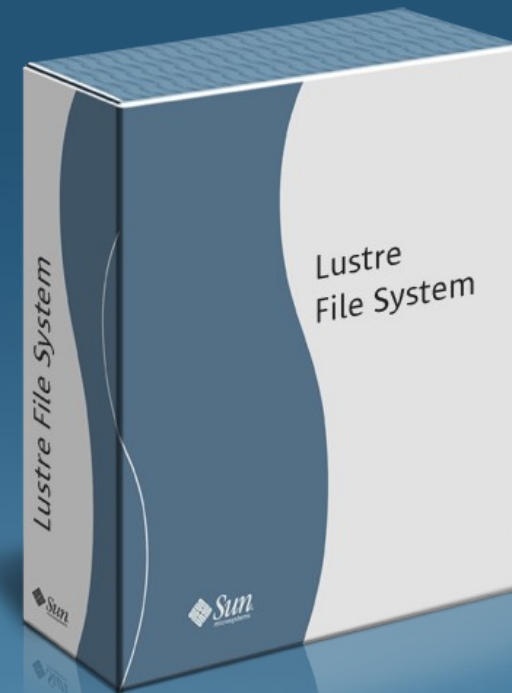
Sun HPC Software – Open Solaris



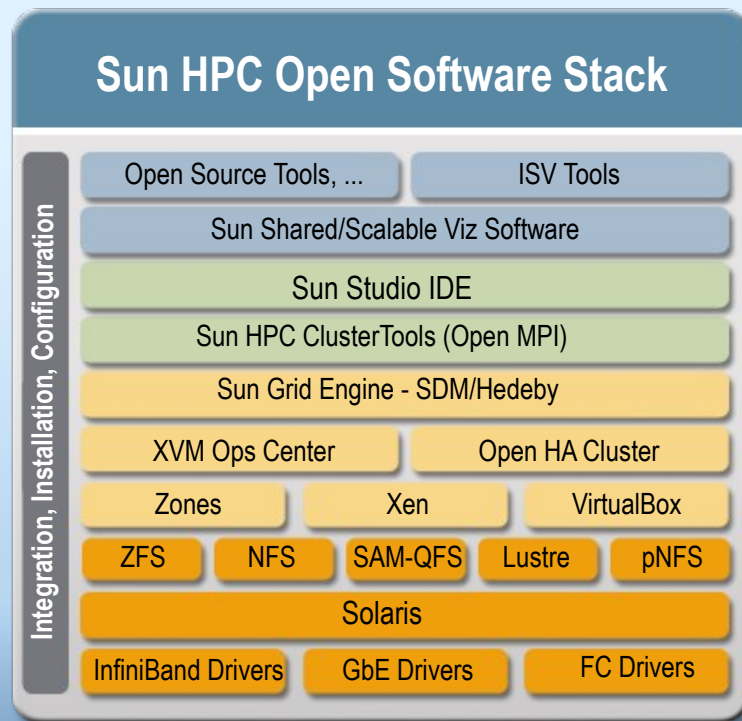
Lustre™ File System

World's Largest Network-Neutral Data Storage and Retrieval System

- The world's most scalable parallel filesystem
- 10,000's of clients
- 50% of Top 30 run Lustre
- 15% of Top 500 run Lustre
- Open Source, multi-platform



HPC Stack- Download, Join, Succeed



- We need your input!
 - > What tools do you need?
 - > What features do you need?
 - > What applications do you have to get integrated?
 - > What platforms do you need?
 - > What support model do you need?
- Participate with us ...
 - > Port applications
 - > Test
 - > Get the word out

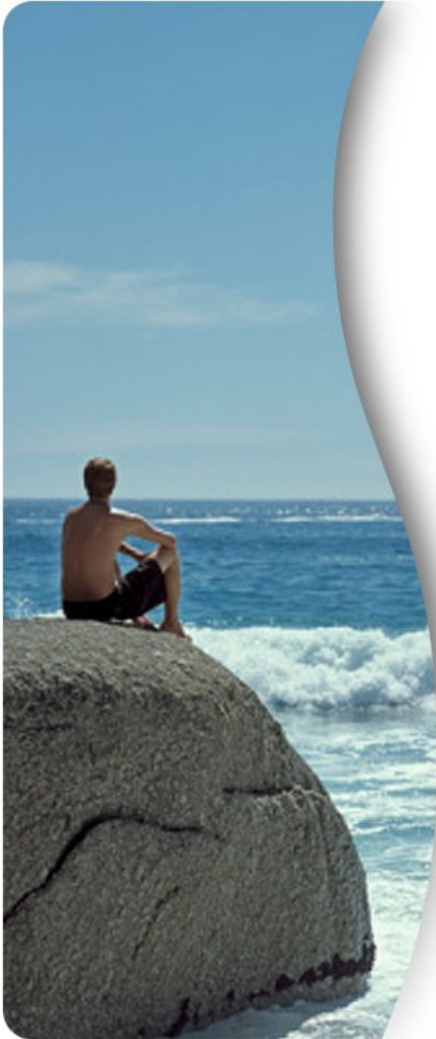
opensolaris.org/os/community/hpcdev/

opensolaris.org/os/project/hpc-stack/

The background of the slide is a dark blue, high-contrast image of a large ocean wave crashing, with white foam visible. The text is centered over this image.

Sun HPC Software **LINUX EDITION**

Project Goals



- Develop integrated software stack for Linux-based HPC solutions based on Sun HPC hardware
- Provide a complete set of tools and well-defined processes for configuring and provisioning an HPC cluster
- Design the stack to be scalable
- Include tools for verification, management and administration, and monitoring

About the Project



- “Open” and community-driven
 - > “Open” project
 - > Using as much open source as possible
 - > Disseminating information (community style)
 - > Looking for community input on how to handle things better
- Built on existing Linux distributions
 - > HPC options are modular on top of the OS
- Includes a verification suite

Project History



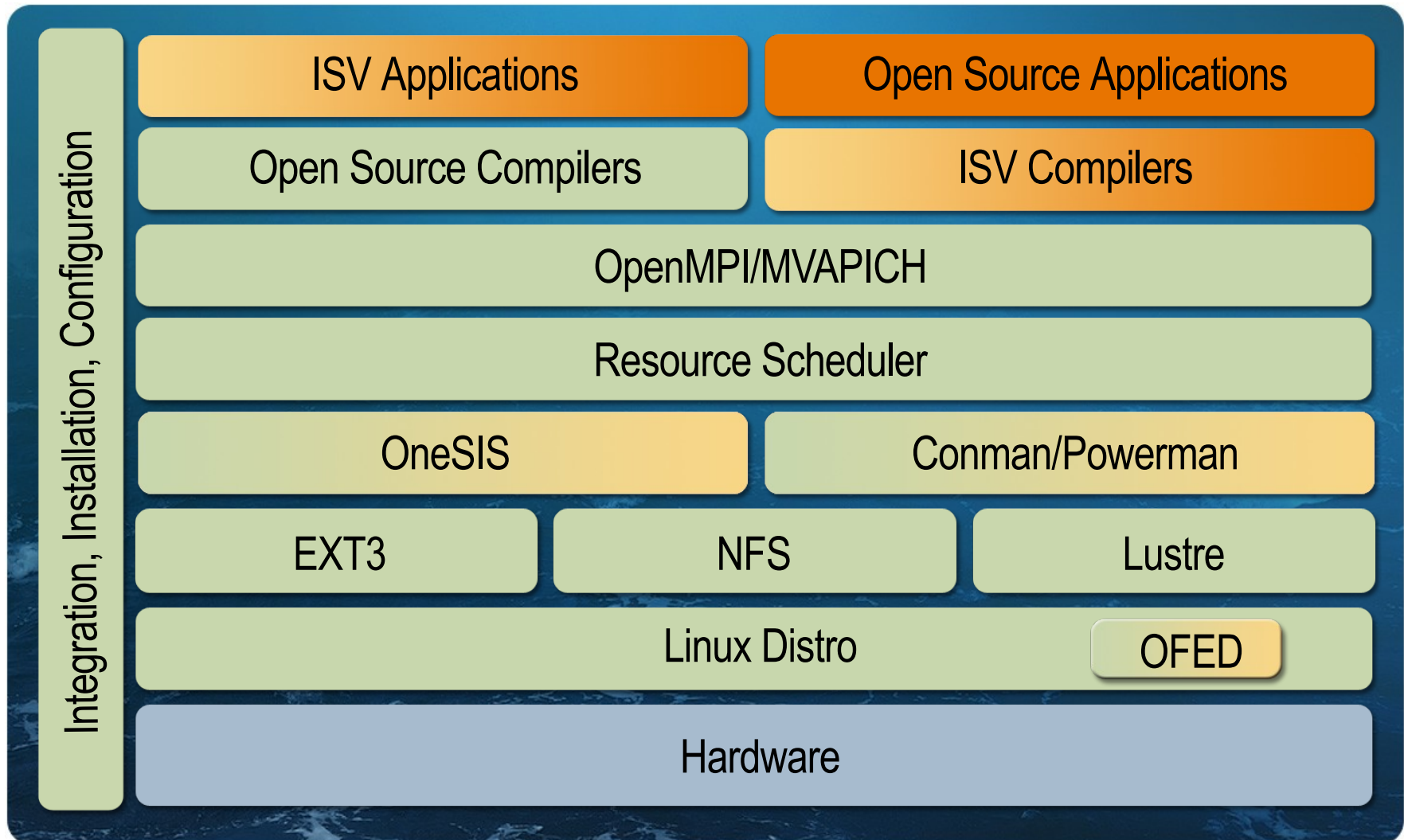
- Project announced at SC07 in November 2007
- Team rapidly formed in January 2008
- Project officially launched mid-February 2008
- Preview release deployed internally Mid-May
- 1.0 announced June, 2008

About the Stack



- Base distro choice based on community input
- Verification suite helps ensure interoperable 3rd party software
 - > License may be required to include 3rd party software in stack
 - > Verification suite will be enhanced with new tests as issues are resolved to ensure old bugs stay dead and new ones are flushed out
- Delivered as a complete solution.
 - > Contains the component framework needed to start turning a bare-metal system into a running HPC cluster

Sun HPC Software – Linux Edition



Linux Edition Components

Management	IPMITool	FreeIPMI	Powerman	Conman	pdsh	OpenSM	IBSRM	xVM OPC		
Monitoring	Ganglia	Lustre (LMT)	HP (collectl)							
Provisioning	OneSIS									
Schedulers	<u>Slurm</u>	<i>MOAB</i>	<u>SGE</u>	<u>PBS</u>	<u>LSF</u>					
OS/ User space/ Apps/ Verification Modules	lozone3	IOR	NetPipe	HPCC Benchmark	IOkit	LNET Self Test				
OS/ User space/ Compilers & Debuggers	<i><u>Intel Compilers</u></i>	<i>OpenMPI</i>	<i>PGI</i>	<i>Totalview</i>	Gnu Debuggers	<u>SunStudio</u>	<u>Modules</u>	<u>Heartbeat</u>		
OS/ User space/ Libraries	OFED Libraries	Open MPI	OFED 1.2.x	<u>LaPACK</u> , <u>Atlas</u>	<u>AMD's ACML</u>					
OS/ Kernel space	CentOS	Lustre	OSS/MDS	<u>Sam-QFS</u>						

* Bold and Italics means licensed software, validated but not included. Underlined item is an option a customer may wish to add.

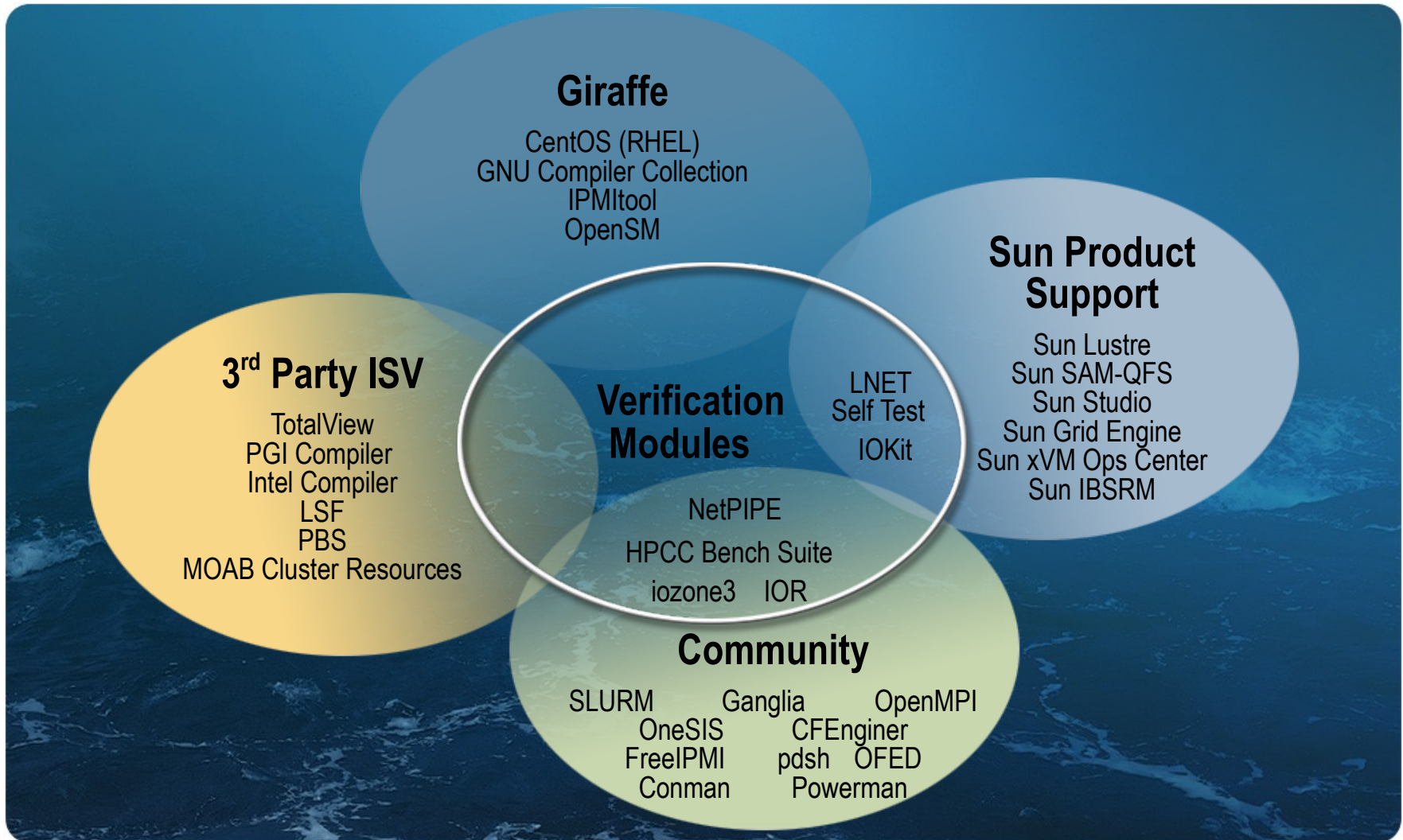
	HPC SW Stack components
	Beta
	V1.0 (under consideration, includes Beta components)

Version 1.0

What You Get

- * Lustre 1.6.5
- * SLURM 1.2.25
- * MUNGE 0.5.8
- * OFED 1.2.5.5
- * Open MPI 1.2.6
- * MVAPICH 1.0.1
- * MVAPICH2 1.0.3
- * Ganglia 3.0.6
- * OneSIS 2
- * FreeIPMI 0.6.2
- * Conman 0.2.1
- * Powerman 1.0.32
- * Ishw B.02.12.01
- * Modules 3.2.6
- * Env-Switcher 1.0.13
- * pdsh 2.14
- * HPCC 1.2.0
- * NetPIPE 3.7.1
- * IOR 2.1
- * rrdtool 1.2.26
- * genders 1.9
- * Cfengine 2.2.6
- * Heartbeat 2.1.3

Component Support



Linux Edition Support

- Community based support for Linux Edition from Sun and partners
 - > Community wiki site
 - > Mailing lists
 - > Bugzilla
- Sun Professional Services offers consulting services that can help you plan, develop, deploy, and optimize your Sun HPC Software solutions
- Sun support for Lustre available today

Communication Paths

Email

linux_hpc_swstack@lists.lustre.org

Blog

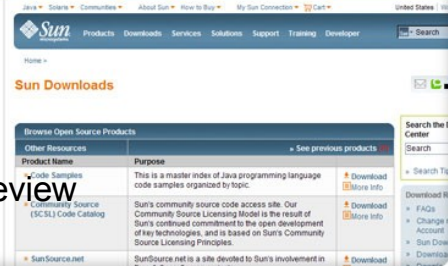
<http://blogs.sun.com/giraffe>

What's Next

Download

Download and try out:

- Lustre
- Sun Grid Engine
- Sun HPC Software Linux Edition 3.0 **TBD**
- Sun HPC Developer Preview
- Visualization Software



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