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AMD Opteron Technology and x86: Raising the Standard on Industry Standards A Sun Expert Exchange Discussion

Sun and AMD are working together to optimize the Solaris Operating System for AMD Opteron 64-bit processors. This will enable customers to take advantage of the industry's number one UNIX platform as well as binary compatibility between 32-bit and 64-bit environments.

This summary includes highlights of the hour-long Q&A,* organized into the following sections:

- Hardware & Performance Issues Pages 2-8
- Software Issues Pages 9-13
- Java Issues Page 14
- Operating System Issues Pages 15-17
- Cost Issues Page 18

In addition to questions and answers, you'll also find references and links to additional resources provided by Sun.

*Note: The information contained in this transcript, taken directly from a live Sun Expert Exchange event, has been edited for clarity and adherence to trademark guidelines.



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AMD Opteron Technology and x86: Raising the Standard on Industry Standards Hardware & Performance Issues

1. I have heard a lot about the CPU speed/price value of the AMD Opteron processor. Can you address the other components in performance — I/O bandwidth?
2. Does Sun have plans to support mixed CPU (Opteron, SPARC, Intel platforms) and mixed O/S (Solaris OS, Red Hat, Windows) within a next-generation blade server chassis?
3. Will the Sun Fire V20z server support IIS 6.0 Windows server 2003 Web edition, particularly .ASP and .NET? Also, are two processors needed?
4. How do the 64-bit AMDs compare at the limits of loading with the SPARC processors?
5. Will Sun provide 100/1000/10000Mb Ethernet interfaces in workstations and servers as soon as practical?
6. How aggressive is Sun in getting manufacturers to release Solaris OS-compatible device drivers?
7. When will drivers for wireless PCMCIA devices be available?
8. Do you have drivers for wireless Ethernet devices?
9. Interesting question re: F12K. Will there be a ccNUMA AMD Opteron architecture that competes with the SGI Altrix from Sun?
10. Are there any plans to bring parity to device drivers on SPARC and x86 platforms? For example, some PCI cards are only supported on the SPARC platform at this time and others only on x86. Given that Sun controls the source for these drivers, it would be nice to see all Sun-supported cards available for SPARC technology and x86.
11. What about driver support for SAN HBAs? Seems to be a lack of support by some vendors.
12. Will AMD Opteron processors play in the blade space for very high density applications?
13. How will the AMD Opteron processor-based systems be positioned with respect to the APL line? What will be the positioning of low processor count (two and four processors) SPARC systems?
14. Where can I find out more about Solaris OS and V20z/V40z systems?
15. A recent article mentioned Sun supporting the dual core AMD chip that's being developed. Will both the V20z and V40z integrate this new dual core chip?
16. Are there any plans to release a 64-bit Intel platform (Nocona or Itanium)?
17. What is the upper limit on RAM per processor for AMD Opteron processor-based systems? Is it a hardware or Solaris limitation? Will you be extending that in future Opteron systems so that a four-way with greater than 128 GB is available?
18. How would you compare the Sun/AMD partnership with IBM's and HP's AMD relationships?
19. Is Sun working with all the AMD Opteron/Athlon64 motherboard manufacturers to ensure that Solaris 10 OS will recognize all the devices first time for those who have already purchased Opteron/Athlon64 hardware?
20. What are the major performance and software differences between the V20z using the AMD Opteron processor, and Sun Fire V210 server product?
21. Any plans to support AMD Opteron processor-based systems with bigger memory capacity? The V40z only has max 32GB support. In EDA applications, we would like it to go beyond that since we have huge designs.
22. We run an F12K and want to know if we should move off in next two years in favor of AMD Opteron four-CPU commodity servers. Will there be AMD Opteron admin boards for F12K? Should we plan to migrate off the F12K?
23. HP also offers an AMD Opteron four-way processor. What's the advantage of buying from Sun?
24. Given AMD's dual-core plans, does Sun have an expected date for support?



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25. Is memory mirroring an option on these systems with hot swap replacement?
26. Will Solaris OS support memory locality (called “memory placement optimization” on the Sun Fire midrange servers) on AMD Opteron processor-based systems?
27. How suitable is this new hardware for telecommunications network management applications in a Carrier’s NOC environment in terms of reliability, scalability, and availability?
28. Do the AMD Opteron processor-based boxes have built-in raid controllers?
29. Will the Sun Fire V20z server support IIS 6.0 Windows server 2003 Web edition, particularly .ASP and .NET — and are two processors needed?
30. Where is Sun going with the AMD Opteron processor? What if Intel comes up with a better chip for the next 10 years? Bye bye to AMD?
31. I use two Ultra 60s and an UltraSPARC Ili 650 laptop in my business. What are some of the main reasons I would want to move to an AMD Opteron platform?
32. Drivers have always been a problem for Solaris x86. How is this being addressed?
33. Where can I find integer and floating point benchmarks for the Sun AMD Opteron processor-based systems?
34. How do the architectures of the AMD chips versus the Intel chips affect Solaris OS performance? Or is 32- vs. 64-bit more important?
35. How many processors can you currently support per OS instance, and what are the future plans?
36. Is there an in-house AMD box in the works?
37. How do these machines compare in performance to the G5-based Apple Xserve and PowerMac?

Q: I have heard a lot about the CPU speed/price value of the AMD Opteron processor. Can you address the other components in performance — I/O bandwidth?

A: In addition to very impressive CPU speed/price value of the AMD Opteron processor, the Sun Fire V20z and V40z offer excellent I/O bandwidth. For example, the V20z supports a 6.4GB/sec. link between the Opteron CPU and the PCI-X tunnel. This I/O capacity is then distributed, based on need, to two PCI-X slots, two 1GB networks and Ultra320 SCSI.

Q: Does Sun have plans to support mixed CPU (Opteron, SPARC, Intel platforms) and mixed O/S (Solaris OS, Red Hat, Windows) within a next-generation blade server chassis?

A: Yes. In our current B1600 blade server, we support SPARC technology and x86 blades, and we support Solaris/SPARC, Solaris/x86, and Linux/x86 technologies on their respective hardware simultaneously in a single chassis. Going forward, we will introduce additional products and will be continuing and expanding our multi-operating system support.

Q: Will the Sun Fire V20z server support IIS 6.0 Windows server 2003 Web edition, particularly .ASP and .NET? Also, are two processors needed?

A: The V20z is certified to run Windows 2000 and Windows 2003. As such, it will run IIS 6.0 and the associated components such as .ASP and .NET. The number of processors needed is at your discretion based on the workload you anticipate.

Q: How do the 64-bit AMDs compare at the limits of loading with the SPARC processors?

A: This is impossible to answer because it really depends on the application. SPARC systems can have much higher numbers of processors and huge memory sizes (up to 576GB, going higher) than can AMD. So if your applications need this, you can’t do it with AMD. However, AMD supports a faster floating point and integer performance today, so numerical analytics are better suited to AMD. Beyond that, it’s hard to answer your question. We have extended our product line with AMD so we can cost



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effectively handle any workload a customer has.

Q: Will Sun provide 100/1000/10000Mb Ethernet interfaces in workstations and servers as soon as practical?

A: We support Gigabit Ethernet built in to a wide range of our products include V20z, V40Z, our workstations, and SPARC products. We are qualified for a number of 10GB cards from companies such as S2IO and expect to also offer our own options in the near term.

Q: How aggressive is Sun in getting manufacturers to release Solaris OS-compatible device drivers?

A: Very aggressive; we are investing heavily here and have well over 250 supported drivers on the hardware compatibility list. See sun.com/bigadmin/hcl

Q: When will drivers for wireless PCMCIA devices be available?

A: PCMCIA is I/O expansion option for notebooks. Today Sun's partners offer SPARC-based notebooks, and PCMCIA drivers for wireless devices are available from those partners.

Q: Do you have drivers for wireless Ethernet devices?

A: Third-party silicon hardware makers provide drivers for their components. If you are looking for a specific PCI-based wireless Ethernet solution, you can find the driver from that vendor's Web site.

Q: Interesting question re: F12K. Will there be a ccNUMA AMD Opteron architecture that competes with the SGI Altrix from Sun?

A: There is at least one company (Newisys) that has disclosed working on a chipset that will allow building of bigger AMD Opteron processor-based systems than eight socket, which is the current limit with existing AMD Direct Connect architecture. There may be others, but these are very difficult technical problems that commonly fail. Remember that AMD is going dual core, so an eight-socket system is really 16 way, which is getting big enough to cover lots of applications. Today, most people are not looking at bigger than eight-way due to the maturity of both the hardware and software, e.g., Windows and Linux.

Q: Are there any plans to bring parity to device drivers on SPARC and x86 platforms? For example, some PCI cards are only supported on the SPARC platform at this time and others only on x86. Given that Sun controls the source for these drivers, it would be nice to see all Sun-supported cards available for SPARC technology and x86.

A: Yes, except that it doesn't apply in every case. Also, the breadth of devices available on x86 is much broader, which is why we are investing here. Please see: www.sun.com/bigadmin/hcl for the certification list

Q: What about driver support for SAN HBAs? Seems to be a lack of support by some vendors.

A: Both V20z and V40z offer SAN HBA support from major vendors on various operating systems. Also, we are working very aggressively with all the major vendors to keep adding driver support for an ever increasing number of HBAs.



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Q: Will AMD Opteron processors play in the blade space for very high density applications?

A: The challenge in blade systems in general is thermal dissipation. A large number of 100w CPUs in a small space is very difficult to cool, but we are working hard on this, as are others. What you will see from blade vendors is a variety of blade-form factors with a variety of power levels. Stay tuned.

Q: How will the AMD Opteron processor-based systems be positioned with respect to the APL line? What will be the positioning of low processor count (two and four processors) SPARC systems?

A: In general, AMD Opteron systems are positioned as multi-operating system solutions aimed at lower end applications (Web serving, application serving, media streaming, file serving, analytics, etc.). They do not support the processor count and memory, nor do they have the high-end reliability features that the APL line does, and thus handle different applications. For two-four processor count systems, the customer can choose.

Solaris/SPARC systems have more than 10,000 applications, which is vastly larger than any other environment with the exception of Windows, so often times choices are influenced by software availability. Finally, SPARC systems will be going aggressively multi-core and multi-threaded, making the definition of “two processors” difficult to determine. With both SPARC and AMD Opteron products, we can solve any workload, price point, or software solution for our customers.

Q: Where can I find out more about Solaris OS and V20z/V40z systems?

A: Use the following links:

- [Solaris OS](#)
- [V20z](#)
- [V40z](#)

Q: A recent article mentioned Sun supporting the dual core AMD chip that's being developed. Will both the V20z and V40z integrate this new dual core chip?

A: Sun and AMD have a strategic relationship that includes close collaboration on technical, marketing, and system development, etc. Sun and AMD have been working together very closely on Sun offering AMD's dual core chips-based server and workstation products when the CPUs become available.

Q: Are there any plans to release a 64-bit Intel platform (Nocona or Itanium)?

A: There are no announced product plans to deliver x86 systems based on Nocona or Itanium. As I wrote earlier, this is not a religious issue at Sun. We are committed to delivering value to our customers, and today, the AMD Opteron processor delivers better price/performance than Nocona or Itanium. Note that Solaris 9 OS runs on Nocona (no modifications required), and Nocona is on the Solaris HCL.

Q: What is the upper limit on RAM per processor for AMD Opteron processor-based systems? Is it a hardware or Solaris limitation? Will you be extending that in future Opteron systems so that a four-way with greater than 128 GB is available?

A: The V20z and V40z currently support 2GB DIMMs which equates to 8GB of RAM per processor. As memory technology scales beyond current limitations, GBs per processor will increase.



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Q: How would you compare the Sun/AMD partnership with IBM's and HP's AMD relationships?

A: Sun's relationship with AMD extends much deeper than a supplier relationship: we co-develop on software; we influence their roadmap; and we co-market and co-sell technology. This is a relationship that extends to the highest levels of the company. It is difficult to know exactly what AMD is doing with other companies, but it is clear that AMD is our primary technical and business relationship as opposed to one of several bets. Also, we have an operating system (Solaris OS) and complete software suite that we are optimizing for the AMD Opteron processor; HP and IBM do not.

Q: Is Sun working with all the AMD Opteron/Athlon64 motherboard manufacturers to ensure that Solaris 10 OS will recognize all the devices first time for those who have already purchased Opteron/Athlon64 hardware?

A: Yes. We have extensive hardware certification programs, and our partnership with AMD includes jointly working with the motherboard manufacturers

Q: What are the major performance and software differences between the V20z using the AMD Opteron processor, and Sun Fire V210 server product?

A: Both V20z and V210 provide solutions to similar customer needs. The V20z uses AMD Opteron CPUs, and V210 uses SPARC CPUs. Both systems offer extended I/O connectivity through PCIX slots. As they use different CPUs, they have different instruction-set architecture (ISA). The V210 is compatible with SPARC Solaris binaries of thousands of applications. The V20z is compatible with thousands of x86 binaries.

Q: Any plans to support AMD Opteron processor-based systems with bigger memory capacity? The V40z only has max 32GB support. In EDA applications, we would like it to go beyond that since we have huge designs.

A: We intend to continue to scale the capabilities of our AMD Opteron systems in terms of number of processors and memory capacity aggressively keeping up with technology advances.

Q: We run an F12K and want to know if we should move off in next two years in favor of AMD Opteron four-CPU commodity servers. Will there be AMD Opteron admin boards for F12K? Should we plan to migrate off the F12K?

A: That's difficult to answer without knowing more about your application and how you want to administer your systems. For some applications, you cannot beat a large number of processors working on a very large memory pool, which you simply can't get by using a collection of smaller boxes.

Also, the management of a large number of separate computers may or may not be more expensive for you, even if hardware purchase is lower. What we see is that there are applications such as Web server, analytics, application server, low-end data base, and media streaming, which are very well suited to systems like the V20z/V40z with great performance. There are other applications, such as big database, CRM, etc., which are much better suited to larger machines. Evaluate the total costs carefully.

Q: HP also offers an AMD Opteron four-way processor. What's the advantage of buying from Sun?

A: The Sun Fire V40z server outperforms HP's AMD Opteron four-way processor-based product (the DL585). The V40z also offers a number of superior features to the DL585; for example, the V40z sup-



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ports faster DDR333 memory, whereas the DL585 only supports older and slower DDR266 memory.

Q: Given AMD's dual-core plans, does Sun have an expected date for support?

A: Yes. Sun plans to support dual core AMD processors when AMD launches them.

Q: Is memory mirroring an option on these systems with hot swap replacement?

A: The Sun Fire V20z and V40z servers do not support memory mirroring with hot swap replacement. The V20z and V40z both run ECC memory and correct single-bit memory errors.

Q: Will Solaris OS support memory locality (called "memory placement optimization" on the Sun Fire midrange servers) on AMD Opteron processor-based systems?

A: Yes

Q: How suitable is this new hardware for telecommunications network management applications in a Carrier's NOC environment in terms of reliability, scalability, and availability?

A: The V20z and V40z include enterprise reliability features such as lights out management, hot swap disk drives, and redundant power (V40z). They are excellent in this type of application, and in fact we already have a number of customers doing exactly this.

Q: Do the AMD Opteron processor-based boxes have built-in raid controllers?

A: The Sun Fire V20z and V40z servers support built-in drive mirroring and the ability to stripe drives.

Q: Will the Sun Fire V20z server support IIS 6.0 Windows server 2003 Web edition, particularly .ASP and .NET — and are two processors needed?

A: The Sun Fire V20z server runs both Windows 2000 and Windows Server 2003. Both of these operating systems have been WHQL certified on the Sun Fire V20z server. The .NET and .ASP development tools run on Windows 2000 and 2003 Servers. The V20z supports both single and dual processor configurations.

Q: Where is Sun going with the AMD Opteron processor? What if Intel comes up with a better chip for the next 10 years? Bye bye to AMD?

A: Sun and AMD have a very strong relationship and are working very closely together. Sun also has a strong relationship with Intel. We are very focused on delivering enterprise value to the x86 platform and delivering value to customers for the long term. Our system architecture design allows us to include Intel processors if that delivers better value to our customers

Q: I use two Ultra 60s and an UltraSPARC Ili 650 laptop in my business. What are some of the main reasons I would want to move to an AMD Opteron platform?

A: In a word, PERFORMANCE! AMD Opteron will blow away either of these platforms (they're kind of old — you should see our upgrade programs!). But even against the best machines from Dell, an AMD Opteron processor-based system is still outperforming. We're also partnering with the leading graphics vendors, so our graphics performance is top of the line, too. You're obviously a Solaris guy, but if you wanted Linux, an AMD Opteron system (Sun Java workstation) would be the way to go.



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Q: Drivers have always been a problem for Solaris x86. How is this being addressed?

A: The situation is greatly improved, with more than 250 devices now supported. This is a major area of investment. See sun.com/bigadmin/hcl for the hardware compatibility list.

Q: Where can I find integer and floating point benchmarks for the Sun AMD Opteron processor-based systems?

A: Our AMD Opteron systems have set many industry record benchmarks. You can find the latest benchmark data on the sun.com site. Specifically, use the following links:

- [V20z](#)
- [v40z](#)
- [w1100z](#)
- [w2100z](#)

Q: How do the architectures of the AMD chips versus the Intel chips affect Solaris OS performance? Or is 32- vs. 64-bit more important?

A: Yes, there are dramatic differences between AMD and Intel architectures. The first is that AMD integrates the memory controller and has one-half the latency to main memory, which makes a huge difference in performance regardless of 32- or 64-bit applications. The second is that AMD has integrated the ability to multiprocessing systems up to eight-way that is very high performance. Both of these are exploited by the Solaris OS to create higher performance systems than with Intel. Which applications are faster varies, but what we see is 30-100 percent faster in most cases.

Q: How many processors can you currently support per OS instance, and what are the future plans?

A: The Sun Fire V20z server supports two AMD Opteron processors, and the Sun Fire V40z server supports four. We currently have plans for eight-socket systems.

Q: Is there an in-house AMD box in the works?

A: Yes. These systems are being developed by Andy Bechtolsheim and the team that joined Sun via the Kealia acquisition. We have not made any public disclosure on the details of the systems, other than we will deliver two-, four- and eight-socket AMD Opteron systems.

Q: How do these machines compare in performance to the G5-based Apple Xserve and PowerMac?

A: It is difficult to compare systems without knowing the application workload. Apple's G5 includes special instructions which help in video processing and related multi-media, so it tends to do especially well with software tuned to that. Outside of these applications, AMD Opteron systems tend to be faster due to lower memory latency and high clock rate, but, again, it will depend on the application.



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AMD Opteron Technology and x86: Raising the Standard on Industry Standards Software Issues

1. Will Sun be offering OpenExchange on the companion CD when Solaris 10 OS is released? Will there be support for Mozilla/OpenOffice integration and Outlook connectivity? If you do provide OpenExchange, can you provide a reasonable means of archiving and recovering data?
2. Will any of the AMD Opteron processor-based operating systems support iSCSI?
3. When will ESRI products be supported on Solaris 10 OS?
4. Does Sun have a VM alternative to VMware?
5. Is VMware certified with Solaris 9/10 OS?
6. What certifications have there been with VMware workstation and server products? Solaris OS support appears to be lacking. Do you have an alternative?
7. Are BMC Patrol, CA Unicenter, and CA eTrust being certified on AMD Opteron processor-based systems running Solaris OS?
8. Will they work in a SAN environment such as EMC?
9. What is the timeframe for Studio 9 in 64-bit for AMD Opteron processors?
10. Will Sun Cluster 3 be made available/certified on AMD Opteron processor-based systems?
11. Is Sun working with Veritas to get filesystem, volume manager, and cluster certified for Solaris x86 technology?
12. Will GNOME be supported at Solaris 10 FCS? If so, which version?
13. Any time frame for Solaris OS (NOT Linux) support for OpenGL on x86/AMD Opteron systems?
14. Will Sun be announcing at the Solaris 10 OS on AMD Opteron launch, details of those companies that have produced 64-bit ports of their applications? Is it a very long list?
15. What is the status/progress of BEA WebLogic on Solaris x86?
16. What window managers will be supported?
17. My database (DSS) needs large buffer pool memory (9-11GB is ideal). Is there a performance impact from using 32-bit Solaris OS? What's the performance difference with 64-bit operating systems?
18. Will I be able to port apps running on SPARC platforms?
19. Are there plans to certify Oracle 10g on AMD Opteron technology when it becomes available on Solaris 10 OS?
20. Will future AMD Opteron systems support the OBP, either in addition to, or instead of the BIOS?
21. What Microsoft products (SP, 2003, etc.) can be loaded on the new AMD Opteron processor-based systems?
22. Will Sun make a special effort to make open-source multimedia editing tools available for the Solaris 10 operating system?
23. Will Sun provide a high-performance compiler for AMD Opteron technology, like you do with Sun Studio for the SPARC platform?
24. When will OpenGL be fully supported on Solaris 10 OS on AMD Opteron processor-based systems?
25. Will open-source packages be supported?
26. What versions of Oracle are currently certified with the Solaris 9 OS on AMD Opteron processor-based systems?
27. What are you doing to win back the MCAD desktop seats that have been lost over the years?



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Q: Will Sun be offering OpenExchange on the companion CD when Solaris 10 OS is released? Will there be support for Mozilla/OpenOffice integration and Outlook connectivity? If you do provide OpenExchange, can you provide a reasonable means of archiving and recovering data?

A: We're looking at integrating the Java Desktop System tools in the Solaris 10 OS release for the workstations. This would provide this functionality with Sun branded products.

Q: Will any of the AMD Opteron processor-based operating systems support iSCSI?

A: Solaris 10 OS will have iSCSI support. For Red Hat, SuSE, and Windows, you will have to look at their commitment roadmap.

Q: When will ESRI products be supported on Solaris 10 OS?

A: ESRI graphics applications would be gated by OpenGL support. I don't know their schedule. But OGL support for Opteron would be after March, For SPARC it could be December.

Q: Does Sun have a VM alternative to VMware?

Q: Is VMware certified with Solaris 9/10 OS?

A: The Solaris 9 OS is supported as a guest, and we are working with VMware for host support. Also, the Solaris 10 OS includes a feature called "Containers," which offers the ability to partition for applications without paying additional software licensing costs and without any performance penalty. The Solaris 10 operating system allows you to run Solaris OS, Red Hat, and SuSE applications side-by-side on the same host at full speed.

Q: What certifications have there been with VMware workstation and server products? Solaris OS support appears to be lacking. Do you have an alternative?

A: The Solaris OS is supported as a guest OS today, and we are working with VMware for host support.

Q: Are BMC Patrol, CA Unicenter, and CA eTrust being certified on AMD Opteron processor-based systems running Solaris OS?

Q: Will they work in a SAN environment such as EMC?

A: We are working with BMC and CA on ensuring that their products work on Solaris OS for both SPARC and x86 platforms. Both the V20z and the V40z work in a SAN environment.

Q: What is the timeframe for Studio 9 in 64-bit for AMD Opteron processors?

A: 64-bit will be supported in Studio 10 and synchronized with the Solaris 10 OS at the end of this year.

Q: Will Sun Cluster 3 be made available/certified on AMD Opteron processor-based systems?

A: It is available today.



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Q: Is Sun working with Veritas to get filesystem, volume manager, and cluster certified for Solaris x86 technology?

A: Veritas has already committed support for Solaris on x86 platforms

Q: Will GNOME be supported at Solaris 10 FCS? If so, which version?

A: Yes, GNOME will be in the Solaris 10 OS — the version is 2.6.

Q: Any time frame for Solaris OS (NOT Linux) support for OpenGL on x86/AMD Opteron systems?

A: In the first update to Solaris 10 OS, which should be in March 2005.

Q: Will Sun be announcing at the Solaris 10 OS on AMD Opteron launch, details of those companies that have produced 64-bit ports of their applications? Is it a very long list?

A: Tune in to our NC04Q3 event to find out. You can get more details at [https://see.sun.com/Apps/DCS/mcp?q=ST4DuTTFvAlh\\$X](https://see.sun.com/Apps/DCS/mcp?q=ST4DuTTFvAlh$X)

Q: What is the status/progress of BEA WebLogic on Solaris x86?

A: WebLogic has been supported on Solaris OS for x86 since June.

Q: What window managers will be supported?

A: I suppose you mean in Solaris 10 OS. We're moving to GNOME as the standard window manager for Solaris, but we will also continue to support CDE for some time. Sun will also provide Java Desktop System on both Solaris and Linux environments, and that will be GNOME-based, too.

Q: My database (DSS) needs large buffer pool memory (9-11GB is ideal). Is there a performance impact from using 32-bit Solaris OS? What's the performance difference with 64-bit operating systems?

A: The Solaris OS in 32-bit mode has to segment single address spaces because of the 32-bit addressing limit, even if the total system size can be much larger than 4GB. This does introduce performance impacts. In general, these are the kinds of applications that benefit from running on a 64-bit OS. In terms of comparing 64-bit operating systems, it's hard to compare with Windows right now due to the state of it, but the SuSE and Red Hat Linux versions are very similar. The Solaris 10-64 OS, when it becomes available, will outperform either of these on virtually any workload due to technical features in the Solaris OS from a decade of refinement in 64 bit.

Q: Will I be able to port apps running on SPARC platforms?

A: Yes, especially as we move to the Solaris 10 OS. We'll have the same OS source code running on both architectures. The API will be identical, and this should greatly simplify the "porting" effort. It might not be just a simple re-compile, but it should be very close. The Solaris 10 OS is due out at the end of this year and is available through Solaris Express this fall.



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Q: Are there plans to certify Oracle 10g on AMD Opteron technology when it becomes available on Solaris 10 OS?

A: Yes. Oracle 10g is being certified today on the Solaris 9 OS on AMD Opteron processor-based systems and will also be certified on Solaris 10 OS for both SPARC and AMD Opteron processors.

Q: Will future AMD Opteron systems support the OBP, either in addition to, or instead of the BIOS?

A: Our current AMD Opteron processor-based systems use industry standard BIOS so that we can support a broad base of operating systems. In the future, we will continue to design our systems to support multiple operating systems, including Solaris OS, Linux, and Windows.

Q: What Microsoft products (SP, 2003, etc.) can be loaded on the new AMD Opteron processor-based systems?

A: We support Windows 2000 and Windows 2003 on our systems.

Q: Will Sun make a special effort to make open-source multimedia editing tools available for the Solaris 10 operating system?

A: We already support the broad range of open-source tools on Solaris OS that people commonly use on Linux. Also, the Solaris 10 OS will offer binary compatibility with Red Hat and SuSE applications so that you can run any application built for these environments. The Solaris 10 OS will also include drivers optimized for nVIDIA.

Q: Will Sun provide a high-performance compiler for AMD Opteron technology, like you do with Sun Studio for the SPARC platform?

A: Yes, Studio 9 is optimized for x86 architectures in general. We are in the process of developing a revision that has specific support for AMD64 and has exceptional performance. We are also using this compiler and toolset for our own operating system work. All of the debugging features you get with Studio will be available on AMD64, and they work today in Studio 9 in 32-bit as well.

Q: When will OpenGL be fully supported on Solaris 10 OS on AMD Opteron processor-based systems?

A: In the first update to Solaris 10 OS, around March 2005.

Q: Will open-source packages be supported?

A: Yes. On an operating system level we support Solaris OS, Red Hat Linux, and SuSE Linux. All of these operating systems support a wide variety of open source software such as GNU CC, Apache, etc.

Q: What versions of Oracle are currently certified with the Solaris 9 OS on AMD Opteron processor-based systems?

A: Today, Oracle 9i release 2.0 runs on the V20z and V40z, using either Red Hat Enterprise Linux AS 3 or SuSE Linux Enterprise Server 8. Oracle 10g running on the Solaris x86 10 OS is expected in the



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not too distant future. Oracle specifies exactly what version of certain packages they support in various Linux distributions, so please refer to the Oracle Web site for more details on their Linux support.

Q: What are you doing to win back the MCAD desktop seats that have been lost over the years?

A: Several Things. We have updated our SPARC Sun Blade products and have future performance improvements coming later this year. We're also talking to all the ISVs about Solaris x86 and our new Sun Java workstations, and we're seeing excitement here. Our new boxes are WHQL certified — they run windows, and we're talking with ISVs about qualifying their Windows code on our Sun Java workstation platforms.



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AMD Opteron Technology and x86: Raising the Standard on Industry Standards Java Issues

1. Haven't heard much about Orion lately. How does it play into the SolX86/Linux decision process?
 2. What versions of Java Desktop System can run on AMD Opteron processor-based machines?
 3. Where does JDS fit with Solaris OS on x86 (AMD), if it does fit?
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Q: Haven't heard much about Orion lately. How does it play into the SolX86/Linux decision process?

A: Orion was the code name for a product which is now shipping — called the Java Enterprise System — so we are talking about it a great deal, but not under that name. You can learn about it on sun.com. JES ships for Solaris/x86 systems, so it runs great on our AMD Opteron processor-based systems, and it also ships for Red Hat ES — also qualified for our AMD Opteron systems. We have announced our intent to ship on Windows, and you can also expect that to be shipping on AMD Opteron processor-based systems.

Q: What versions of Java Desktop System can run on AMD Opteron processor-based machines?

A: The Java Desktop System 2.0 will work. There is an update scheduled for fall that will include Java Desktop System running on Solaris OS in addition to Linux.

Q: Where does JDS fit with Solaris OS on x86 (AMD), if it does fit?

A: The Java desktop will be integrated into the Solaris 10 OS and will support all hardware platforms (SPARC and x86)



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AMD Opteron Technology and x86: Raising the Standard on Industry Standards Operating System Issues

1. Any benchmarks comparing the Solaris OS to Linux on AMD Opteron processor-based systems?
2. For those who are used to Windows machines and related software, would getting a Sun/AMD Opteron processor-based system be practical?
3. Will SRSS support Red Hat 64-bit/Fedora AMD64 on the V20z/V40z?
4. Will Sun be working with Checkpoint to provide Solaris OS/AMD Opteron support?
5. When you say the Java Desktop System (which I understand to be your SuSE Linux) will be integrated into Solaris OS, does that mean bye-bye to Sun's Linux offering?
6. Why did Sun move to SuSE, being initially available on Red Hat? Any advantages to SuSE?
7. You say that 64 bit will be supported with the release of the Solaris 10 OS at the end of the year. Will that be the first beta release or an FCS?
8. Is the 64-bit version of Red Hat Linux available on the AMD Opteron processor-based systems?
9. Will the Solaris OS and Windows 64 have compatible software as well as price?
10. When will the Solaris 9 OS offer 64-bit support?
11. What percentage of your AMD-based sales are installing Linux vs. Solaris OS?
12. I've read which operating systems are supported, but Netware is not listed. Will it work? If so, are there any issues surrounding that?
13. What special security features are provided on platforms running on the AMD Opteron processor-based systems?
14. What versions of the Solaris OS can run on current AMD Opteron processor-based offerings?
15. What are the benefits of 64-bit x86 Solaris OS vs 32-bit x86 Solaris OS on a vV20z?
16. Are any Linux operating systems ready to run native 64-bit today (on AMD Opteron-processor-based systems), and is it currently available and supported?
17. Will Sun support mixed environments, e.g., Microsoft and Linux?
18. Will you port Solaris compilers to Linux? We need the ability to optimize HPC applications for AMD Opteron processor-based systems. The ability to develop under Solaris and deploy to Linux would be a bonus.
19. What OS are you recommending for AMD Opteron processor-based systems? Have you convinced any EDA vendors to port their design apps to it?

Q: Any benchmarks comparing the Solaris OS to Linux on AMD Opteron processor-based systems?

A: We are submitting benchmarks to a variety of sources, and in these we specify the operating system. In general, the latest version of the Solaris 9 OS and Solaris 10 OS are faster than Linux on the same hardware. For example, we just submitted a new SPECjAppServer number in which the results with Solaris/AMD Opteron were \$82/TTOP — the next closest were Red Hat and Windows at \$151 and \$150/TTOP. Beyond that, it's hard to generalize. We will test and report every chance we get.

Q: For those who are used to Windows machines and related software, would getting a Sun/AMD Opteron processor-based system be practical?



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A: Yes. All of our systems are certified to run Windows. There is a promotion designed for Windows Certified Professionals at www.sun.com/mcse.

Q: Will SRSS support Red Hat 64-bit/Fedora AMD64 on the V20z/V40z?

A: Yes, we will support these; in fact, we showed this at Linux world. You can look in our press center to see the press announcement. We'll be shipping this product in the fall, giving you the choice of Solaris/SPARC and Solaris/x86 technologies, JDS, and Red Hat as SRSS hosts.

Q: Will Sun be working with Checkpoint to provide Solaris OS/AMD Opteron support?

A: Yes. I met with them personally last week.

Q: When you say the Java Desktop System (which I understand to be your SuSE Linux) will be integrated into Solaris OS, does that mean bye-bye to Sun's Linux offering?

A: JDS will continue to support Linux and Solaris OS going forward and we will continue to offer choice

Q: Why did Sun move to SuSE, being initially available on Red Hat? Any advantages to SuSE?

A: We fully support both Red Hat Linux and SuSE Linux for our systems. We sell and provide support for both. Our Java ES system is only available on Red Hat due to demand factors.

Q: You say that 64 bit will be supported with the release of the Solaris 10 OS at the end of the year. Will that be the first beta release or an FCS?

A: The Solaris 10 OS is already in beta, and we have been releasing the latest builds via the Software Express program since Sept. 2003.

Q: Is the 64-bit version of Red Hat Linux available on the AMD Opteron processor-based systems?

A: Yes, Sun's AMD Opteron-based products support the 64-bit version of Red Hat Linux today.

Q: Will the Solaris OS and Windows 64 have compatible software as well as price?

A: The Solaris OS will continue to offer both lower acquisition and TCO compared to Windows. We will offer a broad application portfolio.

Q: When will the Solaris 9 OS offer 64-bit support?

A: The Solaris 9 OS offers 32-bit support today. The Solaris 10 OS, being released at the end of this year will support 64 bit.

Q: What percentage of your AMD-based sales are installing Linux vs. Solaris OS?

A: We ship every system with Solaris OS, and we also sell Red Hat Linux as well as SuSE Linux. However, customers can install whatever they want, including dual booting, so it's difficult to know what they are running. We know we have significant customers on all four operating systems,



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although there are many more people on Red Hat Linux than on SuSE Linux.

Q: I've read which operating systems are supported, but Netware is not listed. Will it work? If so, are there any issues surrounding that?

A: There are no known technical reasons why Netware would not work, but it is not an officially supported platform at this time. We do not have plans to certify it at this time.

Q: What special security features are provided on platforms running on the AMD Opteron processor-based systems?

A: Sun's AMD Opteron-based products offer secure remote login through greater than 64-bit encryption.

Q: What versions of the Solaris OS can run on current AMD Opteron processor-based offerings?

A: Both Solaris 8 and 9 operating systems.

Q: What are the benefits of 64-bit x86 Solaris OS vs 32-bit x86 Solaris OS on a vV20z?

A: Generally, 32-bit apps see immediate performance improvement. The main benefit is the larger memory size and address space

Q: Are any Linux operating systems ready to run native 64-bit today (on AMD Opteron-processor-based systems), and is it currently available and supported?

A: Yes, both Red Hat and SuSE have 64-bit Linux implementations available and supported.

Q: Will Sun support mixed environments, e.g., Microsoft and Linux?

A: Sun sells and supports Red Hat Enterprise Linux and SuSE Linux Enterprise server. All of our AMD/Intel-based hardware supports Solaris OS, Linux, and Microsoft.

Q: Will you port Solaris compilers to Linux? We need the ability to optimize HPC applications for AMD Opteron processor-based systems. The ability to develop under Solaris and deploy to Linux would be a bonus.

A: The Solaris OS already supports GCC and other open source tools and will continue to do so going forward.

Q: What OS are you recommending for AMD Opteron processor-based systems? Have you convinced any EDA vendors to port their design apps to it?

A: The Solaris OS/AMD Opteron processor combination is recommended for the ability of the Solaris OS to take best advantage of the AMD architecture. Linux is a good option, too. We are working with all of the EDA ISVs, and they have plans to support the Solaris OS.



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AMD Opteron Technology and x86: Raising the Standard on Industry Standards Cost Issues

1. Will Sun's licensing and pricing change for multi-core CPUs?
2. Pricing has been a major obstacle in the academic space where clusters can be made from "good enough" white boxes. Are any changes afoot in pricing or marketing?
3. Here in Europe, we struggle with V20z pricing. Is there going to be a low-cost version of the V20z, trying to reduce costs on all non-vital components? The "V10z" often comes out as a code name for this future server.
4. Can I buy direct from Sun?
5. What tier will these systems be assigned to (i.e. Will I be able to trade UE450 systems for them)?

Q: Will Sun's licensing and pricing change for multi-core CPUs?

A: We plan to continue to license per physical processor (or socket) for multi-core CPUs.

Q: Pricing has been a major obstacle in the academic space where clusters can be made from "good enough" white boxes. Are any changes afoot in pricing or marketing?

A: Sun is constantly looking for better ways to serve our academic customers. We have free pricing for virtually all of our software, including middleware and tools. We also have substantial discount schedules for hardware, as low as cost or below cost. One of our issues is that academic customers frequently do not need or want some of the reliability features that we build into our systems, and thus the cost is too high. We are working on variations of our products to better address this, specifically for the academic and research marketplace. Please stay tuned.

Q: Here in Europe, we struggle with V20z pricing. Is there going to be a low-cost version of the V20z, trying to reduce costs on all non-vital components? The "V10z" often comes out as a code name for this future server.

A: Sun is aggressively pricing the V20z for all segments on of the market. Please feel free to work with your local sun representative (or point them to me) for more information.

Q: Can I buy direct from Sun?

A: Yes you can; these systems are available for purchase at the Sun Store.

Q: What tier will these systems be assigned to (i.e. Will I be able to trade UE450 systems for them)?

A: Yes, you would be able to upgrade.