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THE EDITORIAL VIEW

SUN FADES INTO ORACLE'S ORBIT

By Tom R. Halfhill {2/22/2010-01}

It's not sunset yet. Now that Oracle's \$7.4 billion acquisition of Sun Microsystems has closed—with regulatory approval from governments in the U.S. and abroad—Oracle has made a public commitment to keep Sun's most important products and technologies

shining. Those technologies include the SPARC microprocessor architecture and Java software platform.

The acquisition quiet period is over, and Oracle isn't dodging or hedging. In late January, hundreds of customers, industry analysts, and reporters gathered at Oracle's headquarters in Redwood Shores, California, to hear Oracle and former Sun executives describe their plans for the merged company.

To be sure, the presentations were glossy and often lacked detail. However, the following messages were clear: Sun will not be drastically downsized in a quest for quick profits; Oracle is reinvesting in Sun's key product lines, including SPARC, Solaris, and Java; and Sun's hardware completes Oracle's evolution into a vertically integrated enterprise-technology company, much like IBM in the 1960s. Oracle didn't acquire Sun solely for the software, as some observers speculated.

At the Redwood Shores event, Oracle personnel wore bright-red badges that exclaimed, "We're Hiring!" Although Oracle will lay off 1,000 Sun employees, 2,000 people will be hired. Most

will be sales reps, because Oracle is building a unified sales force to market its unified product lines. Also, Oracle plans to work more directly with Sun's customers than Sun did, which requires more reps. (Their first assignment: prevent defections.) However, some of those 2,000 new hires will be engineers, including chip designers for SPARC projects.

Oracle's research and development budget will surge to \$4.3 billion this year. It's an impressive sum that far surpasses last year's \$2.8 billion. At the time of Oracle's last major acquisition—PeopleSoft, in 2005—Oracle was spending \$1.5 billion on R&D. The Great Recession hasn't stunted Oracle's ambitions.



IBM's advertising for new POWER7-based servers unmistakably shows a sun in eclipse, but Oracle is fighting the FUD.

SPARC Roadmap Remains Vague

We attended the Redwood Shores event mainly to learn about the futures of SPARC and Java. Unfortunately, the SPARC roadmap was rather vague. The Java roadmap was better.

There was no mention of Sun's Rock project, a next-generation SPARC design that was supposed to carry chip multithreading to a level beyond UltraSPARC. Rock's conspicuous absence wasn't a surprise, of course. The project was widely rumored to be on the rocks since Oracle made its bid for SPARC last spring. Rock had been in development since 2003 and evidently became an immovable object. (See [MPR 8/2/04-02](#), "SPARC's New Roadmap," and [MPR 3/8/04-02](#), "Sun Rolls Forward With Rock.")

Beyond UltraSPARC T3, Oracle disclosed no project code-names and no introduction dates. Pre-acquisition roadmaps leaked from Sun mentioned three future UltraSPARC projects: Rainbow Falls, due in 2010; Yosemite Falls, due in 2011; and Yellowstone Falls, due in 2012. None of those code names or dates made it onto the new SPARC roadmap released by Oracle.

Instead, an abbreviated roadmap was presented by Mike Splain, Sun's former senior vice president for microelectronics, who now holds the same position at Oracle. The only named product is the UltraSPARC T3, scheduled to debut later this year. It will have twice as many processor cores as the UltraSPARC T2 (16 vs. 8), larger caches, a faster FPU, better security, and faster memory I/O. It will be fabricated in 40nm technology, an upgrade from the 65nm process in which Texas Instruments manufactures the UltraSPARC T2 for Sun.

Beyond UltraSPARC T3, the amount of detail on the roadmap rapidly tapers off. The next chip will introduce new processor cores and boost clock frequencies while still being manufactured at 40nm. Nothing was disclosed about these new cores. Perhaps Oracle can salvage some work from the Rock project. As for the delivery date, the roadmap says only "TBA" (to be announced).

Transition From 40nm to 28nm

The generation that follows will use the same new cores but will raise clock speeds and improve power management. Manufacturing will move to a 28nm process. Again, delivery is TBA. And the generation beyond that one will boost performance still further while using the same cores and the same 28nm process. Delivery: TBA.

Meanwhile, SPARC engineers will continue their cooperative relationship with Fujitsu to help keep that company's SPARC64 variation of the architecture on track. The SPARC64 roadmap for the next 12 to 15 months includes higher clock frequencies, larger caches, and faster I/O. No new cores were mentioned.

All told, the new SPARC roadmap isn't much to go on. The important point, however, is that SPARC still has a roadmap. During the long process of this historic

acquisition, rumors flew that Oracle would extinguish SPARC to cut costs and unload the significant burden of keeping a CPU architecture alive. By making a public commitment to SPARC through at least four more generations of processors, Oracle is putting those rumors to rest. If IBM had acquired Sun—IBM's earlier offer of \$7 billion was outbid by Oracle—it's unlikely that SPARC would have survived alongside IBM's POWER.

Of course, it's still possible that Oracle will snuff out SPARC someday. It's equally possible that someday Intel will pull the plug on Itanium, and IBM will give up on POWER. The only server-processor architecture that seems certain to survive is the x86. (See [MPR 1/25/10-01](#), "Server Processors: Chapter 2009 [Part 1]," and [MPR 2/1/10-01](#), "Server Processors: Chapter 2009 [Part 2].")

Pessimists may recall that DEC's Alpha architecture survived only about five years after Compaq acquired it in 1998. (See [MPR 7/16/01-02](#), "So Long Alpha.") However, an important difference between Alpha and SPARC is that the former architecture relied heavily on a speed-demon strategy. Dan Dobberpuhl's design team at DEC skillfully optimized the critical paths of Alpha processors for the fabrication process, pushing the chips to higher clock speeds than contemporary architectures reached. That strategy became more difficult after DEC sold its only fab to Intel in 1997. (See [MPR 11/17/97-01](#), "Digital Sells Its Chip Business.")

Sun has always outsourced the fabrication of SPARC processors and doesn't rely on high clock frequencies to gain a competitive edge. Instead, SPARC emphasizes chip-level multithreading, high integration, clustering, and other features. With Sun's engineering team largely intact at Oracle, SPARC has a better chance of remaining viable.

Oracle Likes the Aroma of Java

Oracle was an early adopter of Java in the 1990s and is writing all its new applications in Java, so it's no surprise that Oracle's commitment to Java is as strong as Sun's was. At the Redwood Shores event, Oracle set three goals for its Java strategy: extend the Java programming model for emerging applications; simplify the various Java platforms; and promote Java community standards.

From our perspective, the biggest news was that Oracle will merge the APIs for the Java desktop and mobile platforms. That's huge. It reinforces our long-held position that mobile devices like smartphones are the true personal computers, superseding (though not entirely replacing) conventional PCs.

Sun introduced Java in 1995 as the "write once, run anywhere" solution for software development on multiple platforms with different CPU architectures and operating systems. Despite numerous obstacles, Java has done a respectable job of living up to that promise on PCs, servers, and conventional cellphones. But the model is breaking on the new wave of smartphones and tablets. It's not all

Java's fault. Apple forbids users to run Java and other virtual platforms and emulators on the iPhone—and will almost certainly extend that ban to the iPad, too.

Apple isn't the only contender in this arena, however. Android, Chrome, GNU/Linux, and Moblin threaten Apple's dominance. Although ARM is the leading microprocessor architecture in this market, Intel's x86 wants in, too. The MIPS architecture remains popular in consumer electronics, and MIPS Technologies has ported Android to its embedded-processor cores. Not since the frontier days of personal computing in the 1980s has the industry seen such platform diversity.

Sun invented Java to bridge those kinds of gaps. Originally, Java was a single virtual platform with a single API. Over the past 15 years, Java has evolved into multiple flavors: Java SE (Standard Edition) for desktops and servers; Java ME (Micro Edition) for mobile devices; Java EE (Embedded Edition) for other embedded systems; and Java FX, an extension for rich Internet applications that runs a poor third behind Adobe's Flash and Microsoft's Silverlight. Sun spawned all these variations of Java to cope with the vastly different requirements and capabilities of the systems on which they run.

Today we're seeing desktop applications migrating to smartphones, tablets, and clouds. "Personal computing" used to mean a computer for every person. Now it's beginning to mean a computer carried by every person—with universal Internet access. In response to these trends, Oracle plans to merge the APIs of Java SE and Java ME, creating a single programming model that spans the wider spectrum of personal computing. Ideally, software developers will be able to write a single program that runs on desktops, laptops, netbooks, tablets, and smartphones. It's a big step, but the time has come.

Oracle's Other Plans for Java

There's more. Oracle says Java SE will support additional programming languages, not just Java. Microsoft's .NET languages (C#, C++, Visual Basic) are obvious candidates. Like Java, they're popular, they're object oriented, and they run on an abstraction layer.

Actually, it's always been possible for programs written in other languages to run on a Java virtual machine (JVM). All that's required is a compiler that converts the source code into Java bytecodes, which are the "assembly language" of a JVM. It has been done. Now, apparently, Oracle will make it easier.

Another intriguing plan will allow Java SE to run natively on hypervisors. The meaning of "natively" in this context is unclear, because Java programs aren't native executables. Perhaps it means that JVMs will run directly on hypervisors without a heavyweight operating system as the intermediary. If so, Java applications can gain important advantages in performance, task isolation, reliability, and security.

Oracle wants to integrate Sun's HotSpot JVM and just-in-time (JIT) compiler with Oracle's JRockit JVM (acquired

with BEA Systems in 2008). That makes sense. Oracle is also promising faster garbage collection, shorter JVM startup times, and new optimizations for power consumption. Java ME will support more emerging platforms, such as Blu-ray DVD and IPTV. User-interface APIs will be more abstract to support new types of user-input methods, such as multi-touch screens and gestures.

Sun's NetBeans integrated development environment (IDE) will survive as the lightweight Java development tool, while Oracle's JDeveloper IDE and Eclipse plug-ins will be the enterprise-level tools. Java FX tools will emphasize the visual assembly of components and will get a richer library of components. Java FX will interoperate with JavaScript, HTML5, and Dynamic HTML.

Sun's JavaOne, the leading conference for Java developers, will survive as a stand-alone, open event—though the next one will share dates (September 19–23) and venue (Moscone Center) with Oracle's annual OpenWorld conference in San Francisco this year. Oracle says JavaOne will go global, expanding to Brazil, Russia, India, and China for the first time.

Overall, it's plain that Oracle is making a firm commitment to continue developing Java and to promote it as a universal solution for emerging applications and platforms. That's good news for Java developers and for any developers looking for new cross-platform tools.

Oracle Resurrects IBM's Model

Oracle presented much more information at the Redwood Shores event, but the futures of SPARC and Java matter most to *Microprocessor Report* readers. Of the other announcements, the most interesting was Oracle's boast that it has resurrected IBM's business model from the 1960s. By acquiring Sun's server hardware, storage systems, microelectronics, and Solaris operating system, Oracle has become a complete vertically integrated company for enterprise computing. T.J. Watson has been reincarnated as Larry Ellison. (Theologians can debate whether he's making progress toward nirvana.)

Oracle says vertical integration will have several benefits. Customers can buy the complete "Oracle stack" of hardware, middleware, and application software, or they can buy individual components to integrate with those from other vendors. Oracle's unified sales force will market a unified product line and guarantee that everything works together. SPARC engineers will work with Oracle's software engineers to tune future microprocessors and servers for the best possible application performance. (One possibility: instruction-set extensions like ARM's Jazelle that accelerate Java interpreters and compilers.)

Perhaps most important, customers will have a "single point of accountability" if something in the integrated Oracle stack goes wrong. No more finger-pointing from one vendor to another. That's a promise sure to be welcomed by downsized, overworked corporate IT departments.

If vertical integration is so wonderful, why haven't other companies done it? Others have tried, but it's costly and difficult to build and manage such a large, diverse company. In particular, maintaining a high-end microprocessor architecture has become so costly and difficult that only a few companies still make the attempt. Since Hewlett-Packard abandoned PA-RISC for Intel's Itanium, the only vertically integrated companies making this effort were IBM and Sun. Now it's IBM and Oracle.

Either company could shed its chip business and remain vertically integrated from the board level up. Intel would be happy to supply the microprocessors. For various reasons, neither Oracle nor IBM is ready to surrender that turf—at least, not yet. Sun is fading into Oracle's orbit, and IBM is a shadow of its former self, but SPARC and POWER cling to life. It will take another historic divestiture or acquisition to alter the alignment of these stars. ♦

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