NEWS BRIEFS

Using Packet Switching for Faster Communication among Chip Cores

An MIT research team is developing a way to improve processor performance by using Internet-like technology to enable faster communications among cores on a chipset.

Associate professor Li-Shiuan Peh is designing a way for cores to send data via packets. Each core would have its own router, which would transmit packets down any of a number of paths, depending on network conditions.

Multicore chips divide tasks into parts and let the cores process the portions simultaneously. This often makes multicore chips faster than single-core processors. Cores working on a task sometimes share data. There are few enough cores on a chip today for a bus to handle the work.

However, buses only enable one pair of cores to communicate at a time, which slows the process.

According to Peh, this works only for chips with up to eight cores. He said today’s 10-core processors, used on powerful servers, need a second bus. Additional buses won’t continue to work in the future, when chips have hundreds of cores.

Moreover, Peh added, buses that use long wires to communicate with multiple cores on a chipset consume large amounts of power.

Packet switching avoids this problem. However, packets moving from one core to another must stop at every router between the two. And if two packets arrive at a router simultaneously, the system must store one in memory until the other is processed. Some experts say these issues could offset packet switching’s advantages.

To overcome these problems, Peh’s team developed a virtual bypassing approach, in which each router signals the next so that it can preset its switch to move an incoming packet without additional computation.

The researchers also developed low-swing signaling. Systems transmit digital binary data as high and low voltages. The MIT researchers designed a circuit that reduces the voltage difference, thereby using less energy.

Peh said her team is working to reduce power consumption even further.

Is LightSquared’s Grand Wireless Plan Nearing the End of the Road?

Not long ago, LightSquared seemed well on its way to implementing its ambitious plan to establish an ultrafast wireless network across the US.

The company had a $5 billion war chest and spent much of it preparing to launch its Long Term Evolution network, which would have been integrated with satellite-network coverage. LightSquared planned to market its low-cost, high-speed services to other carriers, not directly to the public.

The company was only awaiting approval from the US Federal Communications Commission (FCC) and the National Telecommunications and Information Administration to begin setting up its infrastructure.

However, the two agencies denied permission, backing claims by opponents—which include GPS makers and users—that the company’s system would interfere with GPS signals. This could cause problems for navigation systems, as well as important services such as police and air-traffic communications.

At that point, LightSquared, which denied these claims, saw its plan start to unravel.

In February of this year, cofounder, chair, and CEO Sanjiv Ahuja resigned from the firm. The following month, wireless service provider Sprint Nextel—LightSquared’s biggest partner—terminated its $9 billion contract with the company.

And now, majority owner Harbinger Capital Partners says LightSquared is considering bankruptcy.

Two influential US senators, Democrat John Kerry and Republican Lindsey Graham, have said that rather than ruin LightSquared, the FCC should allocate it different wireless frequencies that wouldn’t interfere with GPS signals. The company already owns a considerable amount of valuable spectrum, which made it attractive to investors.

In 2011, pending signal-interference tests, the FCC approved LightSquared’s proposal, saying it would increase competition among wireless providers and thereby make US mobile services faster and less expensive.

During testing, though, government agencies determined that although LightSquared’s signals wouldn’t overlap with GPS’s, GPS}

MIT researchers are developing a system that lets cores on a multicore chip communicate with one another via packet switching rather than buses, thereby improving performance and reducing energy consumption.
receivers couldn’t filter out interference from the service’s nearby cell towers.

LightSquared has said that any interference problems would be caused by GPS systems not operating properly and that it was willing to continue working to eliminate any remaining issues. Proponents contend the company’s plan is a good way to improve wireless service and create competition that would generate new services and lower costs. They say this is particularly important because AT&T and Verizon are increasingly dominating the US wireless industry.

However, the FCC has said it sees no good fix for the potential interference problems.

**Technology Enables Long-Distance Wireless Recharging**

Innovative magnetic technology designed to let users recharge electronic devices wirelessly over a distance of several meters is slated to appear in products this year.

Proponents say WiTricity Corp.’s technology could be very popular because users are working with an increasing number of battery-operated electronic devices that can be difficult and time-consuming to recharge via traditional approaches.

The new technology works via a magnetic coil in a charger that, when an electric current is applied, generates a magnetic field. A second coil in a device picks up some of the magnetic energy, which generates an electric current that enables recharging.

WiTricity’s system uses transmitters and receivers with magnetic loop antennas that have been tuned to the same frequency. This tuning generates a continuous magnetic field that resonates efficiently and induces an electrical charge strong enough to recharge batteries even over several meters.

This is considerably farther than is possible with typical wireless recharging systems that use simple induction. Moreover, WiTricity’s technology lets users recharge objects without having to place them in a specific orientation to the charger.

The company plans to sell its systems to equipment manufacturers, rather than directly to consumers.

The firm is partnering with semiconductor designer MediaTek to develop systems for recharging mobile phones, tablet computers, and other devices. WiTricity is also working on wireless technology for charging electric vehicles and implanted medical devices.

**Law Enforcement Warns of Smart-Electric-Meter Hacking**

The US Federal Bureau of Investigation has warned that hackers are attacking smart electric meters and could either reduce or eliminate power bills enough to cost utility companies $400 million annually.

This FBI report has exacerbated long-expressed fears that as utility systems increasingly turn to intelligent meters and smart power grids, they are not providing sufficient security and are thus becoming vulnerable.

**NEW FACEBOOK APP LETS USERS LIST THEIR ENEMIES**

Facebook is typically associated with “friends” and “likes,” but a new application is putting a negative spin on the social-networking application.

EnemyGraph (http://apps.facebook.com/enemygraph) lets users designate individuals, groups, organizations, or pages on Facebook as enemies.

And if a Facebook user likes someone but a friend doesn’t, EnemyGraph sends a dissonance report so that they can discuss it if they want.

Artist and University of Texas at Dallas associate professor Dean Terry, director of the school’s new Emerging Media and Communication program, along with graduate student Bradley Griffith and senior Harrison Massey, developed the app.

By “enemy,” the researchers say, they mean something or someone that a user dislikes, not necessarily hates.

They say there is a need for EnemyGraph because people can connect and communicate based on things they dislike, as well as those they like.

On his website, Terry said his team created EnemyGraph because it would give them a chance to analyze use of a previously unavailable social-networking tool.
vulnerable to hackers who could cause major problems.

The FBI has reported an increase in smart-meter attacks, including those that let hackers get electricity for free.

At a recent Chaos Communication Congress of hackers, a set of presenters showed how some meters could have weak security, in some cases enabling access to private customer information. Others figured out how to disconnect the meters from servers and emulate the transmission of packets to indicate little or no power consumption.

In many cases, security experts say, attacking smart meters requires only moderate hacking capabilities and tools, or a small amount of money to pay someone to do it. The FBI has speculated that former meter-manufacturer or utility-company employees might be doing the work.

The agency says hackers sometimes employ an optical converter to interact with a smart meter via an optical port typically used for diagnostics. They also sometimes attach powerful magnets to a meter, which can interfere with energy-use detection. Hackers typically remove the magnets during the day, when utility employees might detect them.

End of Windows XP Support Could Cause Serious Problems

Industry observers predict security-related and other problems for many PC users when Microsoft stops supporting Windows XP in two years, a timetable the company recently announced.

Beginning 8 April 2014, Microsoft says, it won't offer security patches or other fixes for Windows XP, which the company released in 2001 and which still runs on many consumer, corporate, industrial, and other systems.

Some sources say XP is the world's most widely used operating system. For example, as Table 1 shows, Internet audience-analysis firm NetMarketShare said that as of March 2012, 43.09 percent of computers worldwide used Windows XP. The second most popular operating system was Windows 7, the OS's most current version, with 35.02 percent of the market.

Industry observers say large companies either have migrated or soon will migrate to Windows 7. However, they add, individuals and small organizations are less likely to want to spend the money to do so. Moreover, many Windows 7 features require some users to upgrade their hardware, entailing more cost and inconvenience.

Some experts say that as individuals increasingly work with tablets or smartphones, they might not want to spend the time and money to upgrade less frequently used PCs that run Windows XP.

And there are concerns that many people simply might not know that XP support will end and thus will continue using it.

XP-related problems could also affect systems using OSs that Microsoft will continue supporting. For example, if users experience XP-related security problems, they could accidentally transmit the problems to their work networks and PCs via e-mail, even if the latter run Windows 7. Also, hackers could use botnets consisting of infected Windows XP machines to attack updated corporate systems.

And many industrial-control applications that run power plants and other critical systems still use a modified version of XP. Because the OS differs from basic XP, upgrading it is considerably more work than it is for typical consumer or corporate systems.

Meanwhile, hackers could well develop new attacks on XP systems once Microsoft no longer supports the OS.

Table 1. Global OS market shares

<table>
<thead>
<tr>
<th>Operating system</th>
<th>Global market share (percent)</th>
</tr>
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<tbody>
<tr>
<td>Windows XP</td>
<td>43.09</td>
</tr>
<tr>
<td>Windows 7</td>
<td>35.02</td>
</tr>
<tr>
<td>Windows Vista</td>
<td>7.02</td>
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<tr>
<td>Mac OS X 10.6</td>
<td>2.56</td>
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<tr>
<td>Mac OS X 10.7</td>
<td>2.38</td>
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<tr>
<td>iPad</td>
<td>2.13</td>
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<tr>
<td>iPhone</td>
<td>2.01</td>
</tr>
<tr>
<td>Others</td>
<td>5.79</td>
</tr>
</tbody>
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Source: NetMarketShare