

# Ember lands funding as ZigBee nears debut

The ZigBee wireless control and monitoring technology market passed a significant milestone in September when one of the front-runners in the field, Ember, received US\$25 million in funding in a round led by Vulcan Capital, the investment group of Paul Allen. The deal was secured just before the release of the IEEE 802.15.4 ZigBee standard, scheduled for Oct. 27, around which Ember and others hope to consolidate what has become an increasingly proprietary industry.

Oiling the wheels of the deal with Vulcan was Ember's appointment of Bob Metcalfe, the inventor of Ethernet, as chairman and crusader for the company. With more than 200 million new Ethernet connections still being shipped three decades after he invented the technology, the kudos he brings to the company is no small boost to Ember's prospects and those of ZigBee in general. Metcalfe is a partner at Polaris Venture Partners, an existing Ember investor that also took part in the latest funding round.

## Passing Ethernet

"Ethernet is shipping more than 200 million units per year after 31 years," says Metcalfe. "ZigBee will get to 200 million next year." That's still a small chunk of the 8 billion microprocessors shipped every year for a variety of purposes, but ZigBee will make them more valuable by giving them the intelligence to communicate with others, he adds. ZigBee promoters offer some convincing reasons why the home and industrial control standard will take off, not least increasingly strict requirements

and government incentives around the world to reduce energy consumption in industrial and other settings.

"I expect exponential growth out of ZigBee but it remains to be seen when," Metcalfe told *PW*. "The proliferation of proprietary solutions is the biggest danger to ZigBee just as it was with Ethernet. Both technologies faced a similar problem in that they are relatively low-level standards and uptake will be paced by the development of higher-level software."

## Efficiency drive

There are signs of increased software activity as companies like Philips Lighting, Sensitech and Eaton work with PC vendors to develop applications on the ZigBee standard to control energy consumption. Oil company Chevron/Texaco, a new strategic investor in Ember, is trying it out as a way to improve the efficiency of its oil refineries.

Bob Heile, chairman of the ZigBee Alliance, says that Pacific Gas and Electricity, the main energy utility in California, which went bankrupt as a result of the energy crisis there in 2000, could have stayed in business by reducing its energy consumption by as little as 2%.

"ZigBee is not a myth, it's not coming out in the future, it's a reality," says Jeffrey Grammer, Ember's president and CEO. The company is developing an integrated IEEE 802.15.4-compatible ZigBee chip and micro-controller system, which is due to be released in mid-2005, using the radio-frequency silicon it bought from British partner Cambridge Consultants.

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### Wireless control

ZigBee vendors say the key initial markets for the technology are light switches and sensors, on-off load controls and alert controls such as smoke alarms for residential and light-commercial lighting-controls systems; sensors for industrial applications like security, energy management and process control; and gateway devices that connect ZigBee devices to the fixed and wireless Internet for remote control.

In future, the wireless control of heating, ventilation and air-conditioning systems will be another major market, analysts say.

This will build on the EM2420 two-chip solution it developed with Chipcon of Norway, which will have sold 700,000 units by the end of the year, Ember says.

Grammer says Ember will use its new funds to expand geographically. The company, which has raised US\$53 million to date (*PW*, October 2004), has just opened an office in Hong Kong and plans to expand its U.S. facilities.

### ZigBee handsets?

Despite Metcalfe's efforts at a recent presentation in London to get a little of Ethernet's success to rub off on ZigBee, the fledgling wireless mesh technology is still very much at the starting gates and its prospects remain untested.

According to Heile, the standard is now complete and won't change from its present format before publication. The question is how quickly ZigBee will take off. Ember says it has 100 customers in various stages of trialing and deploying its EM2420, including Philips Lighting, Tyco Thermal Controls and Go Microsystem. They are testing ZigBee as a way to do anything from maintaining a constant temperature in seafood pallets on container ships to capturing medical data.

Ember says it's also seeing interest from mobile phone service companies in Japan and Korea, among other Asia-Pacific countries, in integrating ZigBee with mobile phones as a way of generating extra revenues. For example, operators could use ZigBee to identify when subscribers are in their homes, in order to charge a lower usage rate. Several other technologies already going into mobile phones could

support this type of application, however, including Bluetooth, RFID/NFC and Wi-Fi. Ember says that it and three other companies – Freescale, Chipcon and Open Compxs – are developing 2.4GHz ZigBee products for PC and cell-phone makers.

### Shipments and prices

Ember estimates that 500,000 nodes compatible with 802.15.4 will be shipped this year, mostly for closed networks, rising to somewhere between 5 million and 50 million devices in 2005, the group says, citing forecasts by Harbor Research, a consultancy in Ember's home town of Boston. Ember is more specific, saying it hopes to ship close to 20 million devices in 2005. Grammer says Ember's goal is to keep the cost of making the chips to below US\$5 and to break even by end-2005. At the moment its chips cost US\$10-12 to make, he says.

In theory, ZigBee could be used in future for everything from wireless key fobs to open people's front doors to controlling heating and ventilation in hotels and office buildings. If the chips were eventually integrated into mobile phones, this would be a significant boost for the technology, Heile says. But whether its success will parallel that of Ethernet remains an open question. On Metcalfe's reckoning, it's possible: "Why has Ethernet been so successful?" he says. "Because it's distributed, organized around data packets and aware of the fact that it exists in a protocol hierarchy. And it's not a static thing, it's been evolving."

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