WIBREE TECHNOLOGY

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What is Wibree?

- Wibree is a short range (10 metres/30 feet), wireless technology featuring ultra-low power consumption, a lightweight protocol stack and simple integration with Bluetooth.
- This specifically target connectivity between mobile devices such as smart phones or PCs and small battery-powered devices such as watches, wireless keyboards, toys and sports sensors.
- The main purpose for introducing wibree was to create a wireless technology that consumes less energy, more efficient and cheaper than Bluetooth.
• Wibree technology complements close range communication with bluetooth like performance within 0-10 m range and data rate of 1 Mbps. Wibree is optimized for applications requiring extremely low power consumption, small size and low cost.

• Wibree is the first wireless technology to solve the following needs in a single solution.
  1. Ultra low peak, average & idle mode power consumption
  2. Ultra low cost & small size for accessories & human interface devices
  3. Minimal cost & size addition to mobile phones & PCs
ORIGIN & DEVELOPMENT

- Around 2001; the Nokia Research Center was looking at options for future personal wireless networking.
- They thought of low power devices such as sensors, but realized that there was no suitable technology connecting those to larger devices such as a mobile phone.
- It made them to develop a technology called Wibree to meet the requirements of low power consumption, small size, and low cost with interoperability based on open specification.
- Nokia decided to create a new open wireless protocol along with its partners Broadcom Corporation, CSR, Epson, and Nordic Semiconductor, is working to bring it to market.
Nordic Semiconductor is a key player in Wibree architecture. The company will continue to work with the group on the development of Wibree and its extension to a range of exciting new applications.

Wibree specification has been in modes namely
1. Dual mode
2. Stand alone mode
• In the dual mode implementation the Wibree functionality is an add-on feature inside Bluetooth circuitry sharing a great deal of existing functionality resulting in a minimal cost increase compared to existing products.

• The Wibree-Bluetooth dual-mode chips would probably be implemented in mobile phones, allowing users to benefit from both worlds – Bluetooth 2.0 high speed and Wibree's low power and extended ability to communicate with a new generation of smaller wireless devices.

• Stand-alone Wibree chips would be implemented in small, low cost devices such as wireless mouse and keyboards, sensors, toys, and human HID product categories.
Wibree Specifications

- Wibree radio specification enables dual-mode implementations to reuse Bluetooth RF part but also to guarantee ultra low power consumption for devices with embedded stand-alone implementation of the Wibree specification. Wibree operates in 2.4 GHz ISM band with physical layer bit rate of 1 Mbps and provides link distance of 5-10 meters.

- Wibree link layer provides ultra low power idle mode operation, simple device discovery and reliable point-to-multipoint data transfer with advanced power-save and encryption functionalities. The link layer provides means to schedule Wibree traffic in between Bluetooth transmissions.
Is Wibree a Bluetooth killer?

- No, absolutely not. It has its own advantages and disadvantages over Bluetooth. Likewise Bluetooth also.
- It’s up to 10 times more energy efficient than Bluetooth but can easily be integrated with the existing technology.
- This wireless system can transfer data at speeds of up to 1 mbps.
- This system has longer battery life and more compact devices When Wibree has become a standard.
- Like Bluetooth—used to link cell phones with headsets, computers and printers to transfer calls, calendar items, documents, songs and pictures.
• While Bluetooth is looking for ultra high frequencies above 6 gigahertz for new faster connections, Wibree will operate in the 2.4 gigahertz band.
• Bluetooth uses fixed packet length. This increases power usage as unnecessary transmission occurs. Wibree has a variable packet length and transmits only when necessary.
• Bluetooth drains your cellphone battery as it needs quite a lot of power to remain active. Wibree aims to survive for a full year on a button sized battery. In contrast to Bluetooth, Wibree goes into sleep mode when not transmitting. In sleep mode the radio will be off and will save a lot of power. Wibree devices wake up only when they want to transmit.
• Bluetooth works for periodic short-range wireless links but not for applications with heavier duty cycles, such as audio transfer to headphones or speakers while Wibree can.
WHAT BENEFITS CAN WIBREE BRING TO ALREADY-CROWDED WIRELESS PAN MARKETS?

- Wibree is complementary to existing technologies; it does not replace them.
- Nokia believes that Bluetooth, as we today understand it, serves some use cases very well, but is not well equipped to serve others.
  The same will apply to Wibree, meaning that there will be room for both technologies.
- The communication becomes more data-intensive, the power consumption benefits of Wibree will diminish compared to Bluetooth.
- It’s more power efficient, you'll get longer battery life and it can be put into smaller devices, like a pen or watch.” Wibree makes it possible to operate these devices for more than a year without recharging.
Wibree Protocol Stack

Diagram showing the Wibree stack in comparison to the Bluetooth stack.
<table>
<thead>
<tr>
<th></th>
<th>Bluetooth</th>
<th>Wibree</th>
<th>Zigbee</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Band</strong></td>
<td>2.4 GHz</td>
<td>2.4 GHz</td>
<td>2.4 GHz ,</td>
</tr>
<tr>
<td><strong>Antenna/hw</strong></td>
<td>Shared</td>
<td>Shared</td>
<td>Independent</td>
</tr>
<tr>
<td><strong>Power</strong></td>
<td>100mW</td>
<td>~10mW</td>
<td>30mW</td>
</tr>
<tr>
<td><strong>Target Battery Life</strong></td>
<td>Days-months</td>
<td>1-2 years</td>
<td>6 months-2 years</td>
</tr>
<tr>
<td><strong>Range</strong></td>
<td>10-30m</td>
<td>10m</td>
<td>10-75m</td>
</tr>
<tr>
<td><strong>Component Cost</strong></td>
<td>$3</td>
<td>Bluetooth+20</td>
<td>$2</td>
</tr>
<tr>
<td><strong>Network topologies</strong></td>
<td>Adhoc, point to point, star</td>
<td>Adhoc, point to point, star</td>
<td>Mesh, adhoc, star</td>
</tr>
<tr>
<td><strong>Security</strong></td>
<td>128-bit encryption</td>
<td>128-bit encryption</td>
<td>128-bit encryption</td>
</tr>
</tbody>
</table>
Advantages

- Integrate with Bluetooth Chips
- operates on 2.4Gh Band
- low power consumption
- Less cost
- Less weight
- Long Battery life
- packets are transmitted with differential length
- (M)Any device can contact with any device
Applications

➢ Health Care

- You can monitor your heart rate and blood pressure at home to improve your personal diet.
- You can being connected over-the-air to your physician while rehabilitating out of hospital.
- It looks promising for healthcare, “as it is able to send body sensor information wirelessly to a monitoring device.”
- Wibree makes being healthy easier and more fun.
Sports

- Wibree enabled products can provide the measurement and consequent optimization of a professional athlete’s performance during a work out session. It enables the automatic selection of suitable music from your mp3 player to match your heart rate while bicycling to work.
- The heart rate meter around your chest and the accelerometer and compare your performance. Pressing the answer button on your wrist watch you can manage your pulse rate.
Entertainment

- Steer your little racing car clear of obstacles with your mobile phone.
- Watch your little robot interact with that of your friend when they come close and tune up the volume to your favorite beat with your tiny mp3 player remote control.
- If Wibree is fitted into the airbag in your car, then whenever it is deployed in an accident, the airbag could send an emergency call out through your phone. The cost of implementing that is around a dollar for the chip, plus the cost of the monitoring contract, which a network could offer for a minimal annual premium.
Office

- Wibree ensures that your wireless keyboard, mouse and digital pen will work when you work with laptops where ever you go.
- For small and mid-size businesses, the advent of Wibree poses great potential, from changing how employees communicate with each other inside the office to enabling more applications for low-cost voice over Internet protocol (VoIP) to potentially allowing a business to communicate to the wrist watches, gaming devices, or pedometers of potential customers.
A new world of wireless connectivity for small devices

- Sports & wellness
- Healthcare
- Entertainment & toys
- Office & mobile accessories

Stand-alone host device (W)
Dual-mode host device (BT-W)

Wibree

Internet
- Weight loss and fitness coaching
- Elderly monitoring service
- Personal health record
- Healthcare provider

Connect your Bluetooth device to ANY tiny, button cell battery device
Enable new functionalities and wireless connection to Internet applications
Conclusion

- Wibree will also dramatically extend the battery lifetime of existing wireless devices such as keyboards, mice and remote controls.
- It’s up to 10 times more energy efficient than Bluetooth. Nokia said it expected the first commercial version of the standard to be available in the market.
- Wibree’s attributes will ensure widespread adoption in many new applications where Bluetooth can’t be used due to its power consumption and expense, according to Nokia.
THANK YOU