Embedded TCP/IP

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• Small, low-cost devices, microcontrollers

• Internet (TCP/IP) connectivity

• Traditional approach: scale BSD TCP/IP stack down

• Requires megabytes, MHz, many bits (16 - 32)

• Does not meet “small, low-cost” criteria
Really small TCP/IP

- Approach 1: dissect BSD stack
- Approach 2: rewrite stack, BSD-style
- Approach 3: rewrite stack, different architecture
Possible trade-offs

- Functionality vs interoperability
- IP: routing, multihoming, fragmentation
- TCP: congestion control, multiple connections, urgent data
Full TCP/IP in 8 bits

- We have shown that it is possible to fit fully compliant stack in a very small space

- Reduced performance

- Different API (event driven)

Still useful:

- HTTP, FTP, VNC, RTCP/RTP

- POS applications, racing car engines, video editing equipment, BIOS firmware upgrading
Demo

• Lego brick with H8/32k/16Mhz and slow IR (4800 bps)

• TCP/IP stack, web server, web pages, Java applet

• Applet opens TCP connection to brick