

Servers on Mobile Devices

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Server Applications

Answerphone

Users can have a voicemail server on their phone. In the past this has not been practical due to lack of coverage. Nowadays calls are rejected, because of inconvenience to user, not because of lack of connectivity.

By having a voicemail server on the phone the user can set up more customisation options than are typically available from the network operator.

- White-lists to allow certain numbers
- Reject and reply with SMS

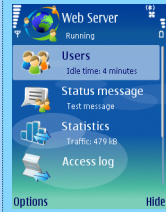
Video Streaming

Video calls are restricted to a 1-to-1 connection. Video could be streamed to anyone who requests it over the Internet

- Stream video direct to the internet (or via a service such as YouTube)
- Wireless webcam for your computer (over Bluetooth)

Mobile Web Servers

Primarily when people think of serving data they think of websites. Traditional models for servers are high density racks of machines in data centres that serve data from a centralised point.



Nokia have released Mobile Web Server that runs on Symbian mobile devices[1]. It is similar in configuration and setup to Apache, one of the most widely used web servers on the Internet.

Nokia have also recently (8th May) released their web server with PHP and MySQL servers. This means that in theory mobile devices can do almost as much a dedicated webhosting commercially available for end users.

LIVE DEMO! In a web browser:

<http://pauldart.mymobilesite.net>



Device Sensors

Mobile devices have a plethora of sensors that could be used to serve information

- Microphone/Speaker
 - Conference/Speaker phone
 - Hidden microphone
- GPS
 - Location tracking
- Thermometer
 - Temperature and environmental conditions
- Wi-Fi/Bluetooth
 - Wireless Access Point (backhaul internet over 3G)

Implications on user and phone

Data Transfer

Mobile data costs in the UK are prohibitive to running servers. The following table shows the standard data transfer rates for the main mobile operators in the UK.

Provider	Tariff/Product	Cost
O2[2]	Monthly contract	Max. £1 / day
O2[3]	Prepaid	£3 / MB.
T-Mobile[4]	1 day pass	£1
T-Mobile[4]	5 day pass	£2.50
T-Mobile[4]	1 month	£7.50
Orange[5]	Pay monthly	Max. £1.5 / day
Orange[6]	Pay as you go	Max. £2 / day
Vodafone[7]	First 15MB / day	£1
Vodafone[7]	Over 15MB limit	£2 / MB
Vodafone[7]	Monthly subscription	£7.50
3[8]	10 MB.	£2.50
3[8]	1GB	£5
3[8]	Internet Casual	£2 / MB.
3[8]	Pay as you go daily	50p / day
3[8]	Pay as you go weekly	£2.50 / week
3[8]	Pay as you go monthly	£5 / month

Network Connection

Currently the Internet is primarily using IPv4 network addresses. Due to the limited space these addresses are running out.

The new standard is IPv6 and this comes with many more advantages beyond just additional address space.

Some advantages that may be important for mobile devices serving data in the future:

- Global routable addresses
- No NAT traversal required
- Multicast
 - Save the limited wireless bandwidth by only sending data once to many clients
- Mobility
 - Keep the same network address even whilst moving and connecting to different infrastructure access points

Battery Life

As mobile devices become more complex and include more features and larger colour screens the battery life is reduced. In general battery technology has not managed to keep up with the advancements of the other technology in mobile devices, reducing standby time in some devices to only a couple of days.

Software developers can write applications that use processing power and so battery life efficiently. For example, polling a web server every 10 seconds is not the most efficient way to check for updates.

New battery technology is emerging that could increase battery life.

- Bio fuel cells
- Environmental energy harvesting
 - Vibrations
 - Solar power

Privacy and Data Protection

Camera phones are already banned from locations where individuals privacy or companies intellectual property or rights could be stolen or infringed upon.

If photos or video are steamed directly to the internet there is nothing that can be done, even if the culprit is caught to stop that data potentially becoming public. This may lead to more bans.

Security

When connecting to any untrusted network such as the Internet, security is always important. If the device is hosting services then it is even more open to attacks from malicious users or software.

Commercial companies already known in the computer field have released products for the mobile device market to protect users and their devices.

- Trend Micro [9]
- F-Secure [10]



What does the future hold?

What does the future hold?

- Future wireless networks:
 - 3.5G/4G
 - WiMAX
- Improved battery technology
- IPv6 rollout
- Move towards mobile internet
- Exciting new applications
 - 'Killer App' for mobile devices?

[1] Nokia, "Mobile Web Server | Nokia Research Centre," Available: <http://research.nokia.com/research/projects/mobile-web-server/> (Accessed 01/04/2008), 2007.

[2] O2, "Available: <http://www.o2.co.uk/mobilestariffs/tariffs/paymonthly/> (Accessed 21/04/2008), 2008.

[3] O2, "Talklot - pay & go - tariffs - mobiles & tariffs - o2," Available: <http://www.o2.co.uk/mobilestariffs/tariffs/paygo/talklot> (Accessed 21/04/2008), 2008.

[4] T-Mobile, "Mobile internet, mobile broadband and mobile tv - t-mobile," Available: <http://www.t-mobile.co.uk/services/mobile-internet/on-your-phone/> (Accessed 23/04/2008), 2008.

[5] Orange, "Pay monthly mobile phone plans for new customers - contracts & tariffs - the orange shop," Available: <http://shop.orange.co.uk/shop/paymonthly?WT.svl=203> (Accessed 25/04/2008), 2008.

[6] Orange, "New annual packages for pay as you go customers," Available: <http://shop.orange.co.uk/shop/payasyougo?WT.svl=205> (Accessed 25/04/2008), 2008.

[7] Vodafone, "Mobile internet costs - mobile internet prices - vodafone," Available: http://online.vodafone.co.uk/dispatch/Portal/appmanager/vodafone/wrp?afpb=true&pageLabel=template10&pageID=MI_0004 (Accessed 25/04/2008), 2008.

[8] 3 Customer Services, "The real deal," Available: <http://three.co.uk/customer/linkdocument.om?cid=1089021441077> (Accessed 25/04/2008), 2008.

[9] Trend Micro, "Trend micro mobile security - trend micro uk," Available: <http://uk.trendmicro.com/uk/products/personal/mobile-security/> (Accessed 30/04/2008), 2008.

[10] F-Secure, "F-secure.com > F-secure mobile anti-virus(tm)," Available: <http://www.f-secure.com/home/user/products-a-z/fsmav.html> (Accessed 30/04/2008), 2007.