

Woods Hole: Principles of mobile computing

2006 September 26th. Copies available from <http://www.handheldsfordoctors.com/guru/lectures/05.09.26.htm>.

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www.handheldsfordoctors.com/scholarship

NLM Mobile

www.nlm.nih.gov/mobile

NOTES:

Mobile computing?

- Handheld computer: a small mobile device that is part of your computing toolbox
- Forget Palm, Pocket PC
- Forget PDA and smartphone
- Forget the fancy
 - Fingerprints, photos and phones*

* Aziz et al. "Handheld computers and the 21st century surgical team: a pilot study." BMC Medical Informatics and Decision Making 2005, 5:28. <http://www.biomedcentral.com/1472-6947/5/28>

NOTES:

Great for personal use

- * For the first time, IT departments are behind the clinicians in adoption
- * Schedule, of course
- * Personal notes
- * Personal textbooks
 - o Personal Digital Educators*
 - o NLM mobile

* Cimino et al. "Personal digital educators." N Engl J Med. 2005 Mar 3;352(9):860-2. <http://content.nejm.org/cgi/content/full/352/9/860>

NOTES:

Internal medicine department in large teaching hospital in USA

In the beginning:

- Senior asks IT department what the best available device is

- Junior doctor tells medical students that handheld computers essential for their studies

Investment

- \$150,000

- 60 devices, WiFi

- UpToDate site license

Result

- 40 unopened boxes

- few residents and no medical students aware of UpToDate

NOTES:

The wrong way to fly

NOTES:

The Wright way to fly

A handheld computer is good for storing and displaying information that is the size of your hand, not your arm

* x-ray images vs x-ray reports

* complete medical records vs blood results and jobs lists

Result - search more textbooks in your hand than an entire bookshelf full of books

NOTES:

Advantages of handheld computers

Perhaps the best computer ever designed for clinicians

* Mobility

* Synchronization

* Beaming

NOTES:

Databases

There are many ways of storing your data

- Memo Pad / Notes

- Spreadsheets

- Simple databases

- Bespoke databases

NOTES:

Memo Pad / Notes

Fast and simple

But... limited

NOTES:

Spreadsheets

- Excel To Go or Pocket Excel

- Easy and great for calculations

- But problems with security, error checking, synchronization and relational data.

NOTES:

Database software

- Everything is a database – quite right too!

- Software like HanDBase makes it easy to get started. <http://www.ddhsoftware.com/handbase.html>

-eg surgical logbook <http://www.handheldsfordoctors.com/learn/organisation/surgicallogbook.htm>

Bespoke databases

- Allow advanced user interface

- Expensive and require computer expertise

NOTES:

Security

NOTES:

Five steps to analyse security systems

“Beyond Fear” by Bruce Schneier. Springer; 1 edition (July 28, 2003).

Recommended software is TealLock Corporate edition (www.tealpoint.com) for Palm Powered devices and SafeGuard PDA (www.utimaco.com) for Pocket PCs. Both allow numeric keypads for passwords and encryption of specific files (eg HanDBase files).

Five steps to analyse security systems

- 1 - What assets are you trying to protect?
- 2 - What are the risks to those assets?
- 3 - How well does the security solution mitigate those risks?
- 4 - What other risks does the security solution cause?
- 5 - What costs and trade-offs does the security solution impose?

NHS Information Authority Security Toolkit

The toolkit is available from Tom Lillywhite tom.lillywhite@nhsia.nhs.uk, version 3.0 has just been released. A good (ie short) introduction to the UK Government's Risk Analysis and Management Method (CRAMM) is available at <http://www.gammasl.co.uk/topics/hot5.html>.

Risk Analysis

Risk is normally defined as the chance or likelihood of damage or loss. In CRAMM this definition is extended to include the impact of damage or loss. That is, it is a function of two separate components, the likelihood that an unwanted incident will occur and the impact that could result from the incident.

Risk Analysis involves identifying and assessing risks to data and the information system and network which support it. Typical risks include:

- data being lost, destroyed or wiped
- data being corrupted
- data being disclosed without authority
- data being interfered in various ways during transmission.

The processes involved in risk analysis are identifying assets, valuing the assets, threats and vulnerabilities, and then calculating the risk.

1. Assets – Physical assets; End user services; Software assets; Data assets

2. Threat and vulnerabilities

- Masquerading of User Identity (by insiders; by contracted service providers; by outsiders)
- Unauthorised use of an application
- Introduction of damaging or disruptive software
- Misuse of system resources
- Communications infiltration; interception; manipulation; failure
- Repudiation
- Embedding of malicious code
- Accidental mis-routing
- Technical failure of host; storage facility; print facility
- Technical failure of network distribution component; gateway; management or operation host; interface; service
- Power failure
- Air conditioning failure
- Application software failure
- Operations error
- Maintenance error (software; hardware)
- User error

- Fire; water damage; natural disaster
- Staff shortage
- Theft by insiders; outsiders
- Willful damage by insiders; outsiders
- Terrorism

3. Countermeasures

Training users

- Palm OS Simulator - <http://www.palmos.com/dev/tools/simulator/>
- MS Windows Mobile Emulator - <http://www.microsoft.com/downloads/details.aspx?FamilyId=4953D34D-692F-4C87-AC69-CB235DBDAD1D&displaylang=en>
- Palm Graffiti Alphabet printout – http://www.palmone.com/us/products/input/graffiti2_alphabet.pdf

NHS Lanarkshire nurses

Hospital Emergency Care Teams

- Hospital at night has 2 specially trained Nurses + 5 medics
- Team manages all sick patients in the hospital. No JHOs.
- Nurses triage all calls, structured clinical assessments, IV cann, bloods inc ABG, ECGs, male cath, prescribe O2

Hector

- Very detailed activity data
- Ability to generate hand-over registers + reports
- Reference info at the bedside
- 24/7 availability, fast interaction, security
- Printed clinical assessments at the bedside

NOTES:

NLM Mobile

<http://www.nlm.nih.gov/mobile>

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Further reading

- Open source handheld computer software – see http://freedomsoftware.info/content/view/31/45/#software_yates. Part of “Free Software for Busy People” by Mohammad Al-Ubaydli. Idiopathic Publishing, 2005. Entire book is available free online at <http://freedomsoftware.info/content/section/1/45/>.
- Pharmaceutical references at ePocrates (www.epocrates.com) and MedHand (www.medhand.com).
- HandDBase tutorials at <http://www.ddhsoftware.com/support.html>
- QEH hematology department – chapter 12 of “Handheld computers for doctors” and as a paper: Mohammad Al-Ubaydli, Laura Deans: Introduction Of Handheld Computers Into The Haematology Department Of A District General Hospital. *The Internet Journal of Pediatrics and Neonatology*. 2003. Volume 3 Number 1. <http://www.mo.md/id155.htm>
- QEH family practice – chapter 13 of “Handheld computers for doctors”. We discussed with the GPs instances when the practice's reliance on paperwork was most irritating to the doctors. Three areas became apparent: 1 - The personal development plan; 2 - Tracking of expenses; 3 - The cataloguing of useful clinical literature. <http://www.handheldsfordoctors.com/book/text/chapter13.htm>
- QEH internal medicine department – chapter 14 of “Handheld computers for doctors”. Like many hospitals in the UK, this one has been trying to cope with the reduction in junior doctors' hours. Reducing hours means increasing reliance on the shift system; more shifts mean more handovers; and handovers carry with them the risk of reducing continuity of care. The consultants asked whether handhelds could assist in providing this continuity. <http://www.handheldsfordoctors.com/book/text/chapter14.htm>
- Beyond Fear, by Bruce Schneier. Springer, 2003. A security book that manages to be entertaining bedtime reading. The five-step process of analysing a security situation is well worth remembering. <http://www.schneier.com/>
- Security Engineering: A Guide to Building Dependable Distributed Systems, by Ross Anderson. John Wiley & Sons Ltd, 2001. Excellent textbook on all aspects of security peppered with hilarious anecdotes. Chapter 3 on passwords and chapter 8 on the BMA security model are particularly useful for clinicians. <http://www.cl.cam.ac.uk/~rja14/book.html>
- DatePak allows you to share calendars with the rest of your team. <http://www.handheldsfordoctors.com/learn/organisation/datepak.htm>
- RepliGo is good for storing read-only documents on a handheld computer. This is ideal for local guidelines and protocols. <http://www.handheldsfordoctors.com/learn/ebooks/repligo.htm>
- Offline web browsers allow you to download a website for later reading on your handheld computer. The commercial iSilo is available for Palm Powered and Pocket PC devices (www.isilo.com) while Plucker is freely available for Palm Powered devices (www.plkr.org).
- Software – <http://www.handango.com>