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Mobility

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Learning Outcomes

- After attending this lecture and reading the additional literature, you should be able to:
 - Understand what type of problems can arise when you include mobile workers in a team
 - Understand the unpredictability associated with mobile ICT
 - Give examples of mobile devices and groupware supporting mobile collaboration

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Mobile workers

- The mobile worker can be defined by having a 'place of work' that is not fixed
 - They have to be able to work effectively in a range of different work settings and contexts
 - For some workers mobility is central to their role – e.g., field service engineers
 - They are also known as Nomads

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Devices

- Personal Mobile
 - Two-way pagers
 - Mobile phones
 - Talk/SMS/MMS/Video
 - Wireless PDAs
 - Mobile Web Browsing
 - Offline
 - Online
 - Laptop
 - In-car
- Public Static
 - Internet Café
 - Email & Broadband Internet 'Phoneboxes'
 - Can be used to access private space
 - Large public displays
 - Cannot be used to access private space

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Examples

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Mobile computing

- Exploits the advanced technologies of
 - Wireless communication and networking
 - GSM, GPRS, UMTS, 802.11, Bluetooth
 - Internet
 - GPS
- Provide anytime, anywhere access


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Loss of Predictability

- Device capabilities
 - Small low-resolution screens
 - Limited processing power
 - Limited battery life
 - Clumsy input mechanisms
- Network conditions
 - Low-bandwidth variable connectivity
 - Unpredictable connections that may break up frequently
- Context
 - Location
 - Environmental conditions
 - Attention



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Dealing with unpredictability

- Device capabilities
 - Service discovery (Bluetooth)
 - Device aware services
 - Content selection/transformation (HTML to WML)
 - Modality selection (Text to Voice)
- Network conditions
 - Anticipating information needs
 - Server emulation
 - Backup
 - Synchronisation
- Context
 - GPS, sensor technology
 - Zone markers


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Mobile awareness

- Extend the benefits of awareness information to mobile users
 - E.g., Mobile IM (IBM Sametime Everyplace)
- Provide information about unpredictable factors
 - Presence: Which device should a person be contacted on?
 - E.g., desktop or mobile phone
 - Context: Which mode of communication will be most effective and suitable for the circumstances?
 - E.g., voice or text
 - Location: Is the person in a location in which this message makes sense? (GPS + meta data?)



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Space-Time Matrix

	SAME TIME	DIFFERENT TIME
SAME PLACE	 Whiteboards, projectors Recording devices	 Messages, documents Shared data stores
DIFFERENT PLACE	 Telephone Videoconferencing Shared workspaces	 Mail Shared data stores

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Extended Matrix

		TIME	
		Same time	Different time
SPACE	Same place/fixed		
	Same place/mobile	RoamWare	Footsteps/Digital Graffiti
	Different place/fixed		
	Different place/mobile	Mobile chat; SMS, MMS etc. (IBM mobile IM)	WAP mail

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Group exercise

- In small groups, think about how you can design a system to exploit the mobility of students on campus
 - Information access
 - Sociability support
 - Communication

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RoamWare

The diagram illustrates the RoamWare system architecture. It shows a 'Mobile meeting' where participants are near each other. A 'Mobile device' captures data from other devices and handles note-taking. This data is synchronized with a 'Stationary computer' which stores an internal record, associates and stores notes, participants, date, and time, and builds history. The stationary computer is connected to the 'Internet', which includes a 'User data base' and an 'Email server'. The system is numbered 1 through 5, indicating the sequence of operations.

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Digital Footprints

- Aka Digital Graffiti
- Uses GPS (although location information can be provided by other means)
- Attaches location information to media objects available on the Web
- Objects can be retrieved when in the right location using a GPS enabled multimedia phone

The image shows a trail of brown footprints leading downwards, symbolizing the path of digital footprints.

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Hubbub

The image shows a Palm V PDA displaying the Hubbub application. The screen shows a list of users and their locations, such as 'Edithen' at '0:09' near 'Dpractic', 'Brian' at '1:57' near 'Dp', 'Candy' at '0:00' near 'Dpvo dr', 'Diane' at '0:05' near 'DMP', 'Dapt' at '0:04' near 'Ddolu', 'Ed' at '0:45' near 'DPrinet', 'Jon' at '1:41' near 'DConc.L', 'Dion' at '0:45' near 'Dronand', 'MaryJane' at '1:13' near 'DForham', 'Dwan' at '0:03' near 'DHome', and 'Ron' at '3:05' near 'DHome a'. To the right, a computer window shows a detailed view of the Hubbub application with a list of users and their locations, including 'Edithen' at '0:09' near 'Dpracticng D6560', 'Brian' at '1:57' near 'Dp', 'Candy' at '0:00' near 'Dpvo airport', 'Diane' at '0:05' near 'DMP', 'Dapt' at '0:04' near 'Ddolu, wassy & hot', 'Ed' at '0:45' near 'DPrinetion - rns', 'Jon' at '1:41' near 'DConc Implementation', 'Dion' at '0:45' near 'Dronand', 'MaryJane' at '1:13' near 'DForham Park', 'Dwan' at '0:03' near 'DHome', 'Dwan' at '0:03' near 'DHome', 'Dwan' at '0:03' near 'DHome', 'Dwan' at '0:03' near 'DHome', and 'Ron' at '3:05' near 'DHome a'. The computer window also shows a 'Mute' button and a 'Connect' button.

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Accessibility

- How do provide access in unpredictable circumstances?
 - Input/Output redundancy
 - System standards
 - Compatible devices


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Further Reading

- Wiberg and Gronlund – Exploring mobile CSCW

<http://www.cos.ufrj.br/~jano/CSCW2004/5mobilecscw.pdf>



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