The Common User Interface (CUI) project

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CfH team

- Owner: Mark Ferrar
  Dir. of Infrastructure

- Clinical: Dr. Mike Bainbridge
  Dr. Peter Johnson
  Dr. Kate Verrier-Jones
  David Allan-Smith
  Dr. Henry Dowlen

- PM: Roarke Batten

- Analysis: Miles Gray

- Design: Kit Lewis
  Mike Carey

- Safety: Barry Day (NPSA)
Microsoft partnership

- Enterprise Agreement (EA) signed – mid-2004
  - 3 terms of 36 month each, 2 (optional) renewals
  - EA covers Windows, Office & other software
  - “Full” Volume grows from 600,000 to 900,000, other software at lower volumes
- Memorandum of Understanding for CUI project – Oct 2004
  - Press releases & publicity
- Development Agreement for CUI project signed – Dec 2005
  - Formal initiation of project
- Joint commitment to CUI programme
  - Microsoft resource placed under direction of CfH team
  - Platform-agnostic approach (Design Guide)
4 Workstreams

• Part 1
  – NHS Desktop & Infrastructure
  – NHS Office

• Part 2
  – Design Guide
  – Software Developers Kit (SDK or “Toolkit”)

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CUI Part 1

NHS Desktop & Infrastructure
NHS Office

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IT Infrastructure - universal utility

- Infrastructure comprises those components of the information technology environment that would have utility in any organisation.

- “Line of Business” applications (e.g. clinical applications in the NHS) only have utility in a specific organisation or particular type of enterprise (a line of business).
Infrastructure Themes

- Managed Desktop Environment (NHS Windows)
- Electronic Software Distribution
- Mobility & Mobile Computing
- Group Collaboration
- Identity Management
- Network Connectivity & Services
NHS Office

- Covers “Office Professional”
  - Word, Excel, PowerPoint, Access, Outlook, InfoPath
  - Research Pane integration

- Ensures clinical & NHS utility
  - How should Office apps support clinical tasks?
  - Appropriate integration with clinical systems and data
  - Configuration to support common NHS processes
  - Office User Group set up for consultation

- Office 2007 Technical Adoption Programme
NHS Office

• Build new features [ongoing]
  – NHS Abbreviations Manager

• Configure common supporting features
  – Research pane to search NHS information sources
    • BNF
    • Map of Medicine
    • NLH
  – Integrated medical spell checker
  – Templates – consistent template usage and management
  – Smart Tags – linking to other applications & data
NHS Abbreviations Manager
CUI Part 2

Design Guide
Software Developer Kit (SDK)
National diversity

- NHS has procured a range of clinical systems across England (for very good reasons…)
  - 3 major “enterprise” systems
  - A range of GP systems
  - Other specialist systems (eg. PACS)
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- **North-East**: Accenture (iSOFT Lorenzo)
- **North-West**: CSC (iSOFT Lorenzo)
- **East**: Accenture (iSOFT Lorenzo)
- **South**: Fujitsu (Cerner Millennium)
- **London**: BT (IDX Carecast)

Available to GPs
Variety of systems via LSPs & under national GP Choice arrangements

National diversity
Why CUI?

• Patient Safety
  – Clinicians regularly cross borders; will often need to learn new systems
  – Risk introduced by different clinical applications performing same tasks in different ways

• Clinical & HCP utility
  – Consistent, optimised, appropriate views and tools

• Reduced (re-)training burden
  – Clinicians switching between postings shouldn’t need to significantly retrain to do same job

• Increase ROI (value)
  – Raise adoption of NPfIT applications
  – Get “best” value out of Microsoft EA investment, not just lower license costs
In practice…

• Real world issues need to be considered
  – Commonality is being addressed late in the day
  – Systems are already in development
  – Lots of work has already been done

• Ensure high-level of involvement from practicing clinicians & HCPs
  – Clusters, Service Implementation

• LSP & ISV involvement (enterprise, GP & other systems) is vital
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Scope

- CUI produces standards & components over a 3 year period
  - Never a complete user interface
  - Big focus on safety, utility & usability, less on pixel-perfect graphic design
- Compliance and adoption will be pragmatic and progressive
  - Maintain internal consistency of clinical applications
  - CUI considered alongside other CfH requirements

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CUI remit

- CfH (Service Implementation, Technology Office & Clusters) set standards & detailed requirements for system operation
- CUI project will focus on establishing commonality at the presentation (UI) layer
  - Some aspects of UI inevitably go beyond this… work with LSPs, ISVs to manage impact
  - CUI project does NOT define data standards, system workflow or clinical best practice
  - CUI project does need to understand what these are (or are likely to be) in order to define most appropriate UI
  - Some standards may need iteration in conjunction with UI design process
Clinical subject areas

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Ratification & compliance

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Design Guide

• Traceable, fit-for-purpose guidance
  – Tailor style of guidance to supporting rationale
    • Few lines of text, explaining a guideline
    • UI principles, flows, wire frames etc.
    • Pixel perfect designs
    • … plus other specifications as necessary
  – Show supporting rationale and evidence of efficacy
  – Include recommendations / implications for existing system design
• Ready for international adoption
• Ready for ratification & compliance
  – Clinical Safety Committee
  – Information Standards Board
  – CfH Testing & Assurance process
Software Development Kit (SDK)

• For Microsoft Development Environments (WinForms & ASP.NET)
  – Embedded into MS Visual Studio
  – Are talking to other suppliers about alternative platforms

• What’s in the kit?
  – UI code for key areas previously covered by Design Guide
    • Ready to plug into apps
    • Reduces coding time for key areas
    • Thick & Thin-client components
    • Pre-configured for easy integration
  – “Fit for purpose demonstrators” – to illustrate the Design Guide and enable high-fidelity user testing
Progress to date - highlights

• Medications management
  – Medication item display across care settings
• Date & time
  – ISB “Requirement” stage standard for date display
  – Date & time entry
• Icons & symbols
  – High-level principles
• Terminology
  – SNOMED code selection & modification during free text noting
Date display

- How hard can it be to standardise dd-Mmm-CCYY?
  - ISO standard is ambiguous on display, W3C standard does not specify separator and is ambiguous (i.e. unsafe) in French
  - Accommodating French makes English format awkward (e.g. 04-August-2005)

### Examples of Correct Implementation

<table>
<thead>
<tr>
<th>Usage</th>
<th>Format</th>
<th>Examples</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓</td>
<td>DD-Mmm-YYYY</td>
<td>01-Jan-2005</td>
<td>Use this format to display all dates within a clinical application</td>
</tr>
<tr>
<td></td>
<td>DD-MM-YY</td>
<td>26-Feb-2005</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MM/DD/YYYY</td>
<td>05-Apr-2005</td>
<td></td>
</tr>
<tr>
<td></td>
<td>DD-MM YY</td>
<td>31-Dec-2005</td>
<td></td>
</tr>
</tbody>
</table>

### Examples of Incorrect Implementation

<table>
<thead>
<tr>
<th>Usage</th>
<th>Format</th>
<th>Examples</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>✗</td>
<td>D-MM-YY</td>
<td>08-04-05</td>
<td>Patient Safety Critical: These examples lack certainty. The day and month elements are ambiguous causing confusion and a high chance of misinterpretation errors.</td>
</tr>
<tr>
<td></td>
<td>DD-MM-YY</td>
<td>08-04-05</td>
<td></td>
</tr>
<tr>
<td></td>
<td>DD-MM YY</td>
<td>08-04-05</td>
<td></td>
</tr>
<tr>
<td></td>
<td>DD MM YY</td>
<td>08-04-05</td>
<td></td>
</tr>
<tr>
<td>✗</td>
<td>D-Mmm-YY</td>
<td>08-Apr-2005</td>
<td>Lack of Completeness: These examples lack clarity because the day and/or year elements do not display explicit information.</td>
</tr>
<tr>
<td></td>
<td>DD-Mmm-YY</td>
<td>08-Apr-2005</td>
<td></td>
</tr>
<tr>
<td></td>
<td>DD-Mmm YY</td>
<td>08-Apr-2005</td>
<td></td>
</tr>
<tr>
<td>✗</td>
<td>DD/MM/yyyy</td>
<td>08-Apr-2005</td>
<td>Lack of Readability: These examples lack readability because the separator is unclear or omitted.</td>
</tr>
<tr>
<td></td>
<td>DD Mmm.YYYY</td>
<td>08-Apr-2005</td>
<td></td>
</tr>
</tbody>
</table>
Date entry

Date: Enter your preferred date

Date: 1999 - 02

Did you mean: **1999 to 2002**? or **February 1999**?

Date: 1999 - 202

Date: **February 1999**

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Icons & symbology - framework

Classification
Alert symbols are classified by:

- Intensity (whether they must be obeyed or merely offer advice / alerts)
- Polarity (whether they recommend or deprecate a course of action)

This classification allows us to identify four classes of alert symbol:

- Prohibitions
- Mandatory actions
- Warnings
- Suggested actions

Visual Syntax
A study of the structure of signs shows that the graphical element associated with an alert is a 'container' surrounding a symbol or icon.

Warning Signs in use
A review of alert symbols shows a very wide range in use. Some alert symbols are used in contradictory cases. Symbols adhering to ISO standards are, however, among the most commonly used.

Analysis of these symbols shows that combinations of their shape and tone determine their meaning. Colour is used to enhance their meaning.
Terminology

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Terminology

Presented chesty cough 3/52

1. chesty cough
2. loose cough
3. cough drop
4. cough swab
5. cough
6. dry cough
7. cough reflex
8. whooping cough
9. unable to cough

1. chesty cough
is a: functional finding of respiratory tract
also called: chesty cough (finding)
also called: finding of chesty cough

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Assistive Technology
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The Latest White Paper

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The Continuum of Care

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Traditional HIT Focus

Healthy, Independent Living
Community Clinic
Chronic Disease Management
Doctor’s Office
Assisted Living
Skilled Nursing Facility
Specialty Clinic
Community Hospital
ICU

HOME CARE
RESIDENTIAL CARE

QUALITY of LIFE
COST of CARE/DAY

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Hardware and Infection Control
• Keyboard
• Portable devices
• Bedside devices
  – Patient used
  – Clinical use
• Device location
• Uniforms
• Cloths
• Coatings
• No single ‘magic bullet’ solution
• Multi-factorial
  – Technology
  – Human behavioural
• Coordination needed across the enterprise
• Reinforcement also required
• Prime Minister’s Delivery Unit
• The Chief Nurse
  – Cleaner Hospitals Board
• Department of Health
  – DH Infection control
  – DH Patient Safety
  – DH Equality strategy group
• National Patient Safety Agency
• Health Protection Agency
• MHRA

• Care Record Development Board
• NHS Connecting for Health
  – Technical Office
  – Communications
  – EWAT team
• Suppliers
• Academia
• The Design Council
• PASA
• The Service
  – Microbiology
  – Medical Physics

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Innovation in Device Design

Portable device prototypes
Keyboards
Cards and Card Readers
• Technology
  – ‘Push the envelope’
• Policy
  – What are the implications before publication?
• Safety
  – MHRA / NPSA / HPA risk assessment built in
• Profession(s)
  – What are the rules?
  – Do once and share….
• Citizens
  – Access / choice / involvement
New Challenges

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In 2015….

• No paper records
• Consent to share
• Genomic and other “omic” data
• Decision support
• Knowledge support
• Active Patient Partners

• All images
• Automated prompts and warnings
• Background data mining
• Feedback of research and evaluation into the service

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Even at its scientific best, medicine is a social act.

Davidov. JAMA 1998
Questions ?