Government ICT Strategy

End User Device Programme

EUD Technical Framework Document – Phase 3

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(V1.1) – Part 3

PRODUCT CONTROL SHEET

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CHANGE HISTORY

Version No.	Date	Details of Changes included in Update
0.1	August 2012	Initial draft
02.	September 2012	Revised the draft as per feedback from Peer Review meeting
0.3	September 2012	Revised the draft as per feedback from EUD Programme team
1.0	September 2012	Baselined version for release 3.
1.1	October 2012	Final amendments for publication

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Table of Contents:

7	**User Profiles**	5
7.1	Usage Scenarios For Line of Business User	7
7.1.1	Line of Business User – A Day in the Life Example	9
7.1.2	Line of Business – Desktop with Thick OS	10
7.1.3	Line of Business – Thin Client with Thin OS	12
7.2	Usage Scenarios For Mobile Knowledge User	13
7.2.1	Mobile Knowledge User – A Day in the Life Example	16
7.2.2	Mobile Knowledge - Laptop with Thick OS	18
7.2.3	Mobile Knowledge - Tablet / Smartphone with Mobile OS	20
7.2.4	Case Study	21
7.3	Usage Scenarios For Knowledge User	22
7.3.1	Knowledge User - A Day in the Life Scenario	25
7.3.2	Knowledge – Desktop with Thick OS	26
7.3.3	Knowledge – Thin Client with Thin OS	28
7.3.4	Knowledge – Smartphone/Tablet with Mobile OS	29
7.3.5	Case Study	30
7.4	Usage Scenarios For Hybrid User	31
7.4.1	Hybrid User – A Day in the Life Example	33
7.4.2	Hybrid – Desktop with Thick/Thin OS	34
7.4.3	Hybrid – Smartphone/Tablet with Mobile OS	35
7.4.4	Case Study	36
7.5	Usage Scenarios For Field User	37
7.5.1	Field User – A Day in the Life Example	40
7.5.2	Laptop/Tablet with Thick OS	41
7.5.3	Smartphone / Tablet with Mobile OS	41
7.6	Usage Scenarios For Occasional User	44
7.6.1	Occasional User – A Day in the Life Example	46
7.6.2	Occasional – Shared Desktop with Thick/Thin OS	46
7.6.3	Case Study	47

This document is the continuation of 'EUD Technical Framework Document Release 3' and forms Part 3 of the document. It takes the technical solutions outlined in Part 2 and applies them to the EUD user profiles to identify best practice examples.

7 USER PROFILES

As part of an organisation's transformation, it is important to understand the principle ways in which people use IT. The EUD Framework has identified six profiles which cover the majority of users in central government:

- Line of Business user
- Mobile Knowledge user
- Knowledge user
- Hybrid user (Line of Business / Knowledge)
- Field user
- Occasional user

This document sets out full details of these user profiles based on the following descriptions:

Line of Business user	Typically performs a small number of dedicated processing tasks from a trusted location. For example, users who work in a contact centre or back office processing role such as PAYE. They use Line of Business applications, which serve a specialist customer transaction or business need.
Mobile Knowledge user	Typically uses generic productivity tools e.g. email, word-processing, internet access to perform core activities on the move (including working without network connectivity). They have little or no reliance on Line of Business applications.
Knowledge User	Primarily use rich productivity tools e.g. email and word-processing to perform core activities. Unlike mobile knowledge workers, they mainly work from a fixed office location. Examples of knowledge workers might include policy workers, managers and others.
Hybrid User (Line of Business / Knowledge)	Balance their IT usage between Line of Business systems and creating documents or manipulating data with productivity tools, from a fixed location or locations (commonly an office or offices). These might be caseworkers, line of business managers etc.
Field User	A Field user needs access to Line of Business and productivity applications, which are available on the move (including offline). A Field user might be a visiting officer, investigator or caseworker who needs to access or update customer records offline, as well as create documents and manipulate data.
Occasional User	Occasional Users have no reliance on IT to complete their core activities and only need access to systems to carryout supporting tasks such as viewing their payslip or booking annual leave. These tasks could be

	carried out on a device shared with other users in the category.

TABLE 1 – THE SIX USER PROFILES COVERED IN THIS DOCUMENT

Full details of the End User Device Framework Conceptual Framework (Level 1 and 2) can be found at: http://www.cabinetoffice.gov.uk/sites/default/files/resources/End-User-Device-Programme-Conceptual-Framework-Release-1-4_0.pdf

7.1 Usage Scenarios For Line of Business User

Line of Business users often act as the first point of contact for government services. Their day-to-day tasks involve capturing key information from customers, which is then used by other workers to decide on a course of action. Line of Business users often rely on IT for a narrow range of tightly-defined business processes using Line of Business applications, critical to running a given business area.

IT requirements for Line of Business users:

Within EUD we have based our definition of user roles on 4 key characteristics. The high-level profile for a Line of Business user is:

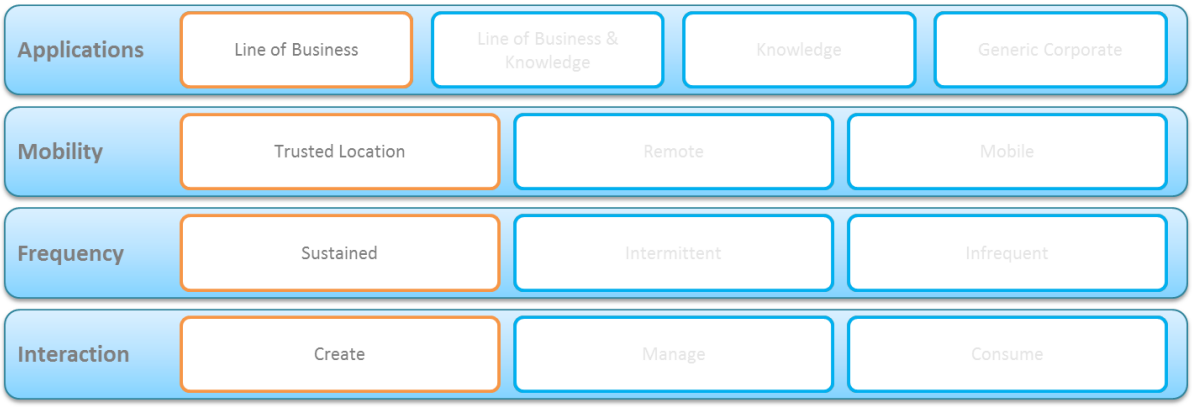


FIGURE 1 – USER IT SEGMENT FOR LINE OF BUSINESS USER

Applications: Line of Business users principally require access to Line of Business applications rather than a specific need for knowledge or collaboration tools

Mobility: Line of Business users typically need to work in trusted government locations, such as contact centres and tend to be fairly static although some flexibility to enable hot-desking is useful.

Frequency: Line of Business users require access to services throughout their working day, and need sustained access to their applications and devices with guaranteed response times.

Interaction: Line of Business users use their applications to view, amend or create information.

Important Note

The application interaction layer was discussed in the Level 2 Framework, available at: http://www.cabinetoffice.gov.uk/sites/default/files/resources/End-User-Device-Programme-Conceptual-Framework-Release-1-4_0.pdf.

In order to avoid any confusion the Interaction layer is detailed as follows:

Create – Create new content as well as view or alter existing content

Manage – Alter or delete existing Content as well as view.

Consume – View and Read only.

Given the Line of Business user profile, a desktop computer (either with a thick or thin OS) will, in most cases, be the primary device issued.

Typical configurations will be:

- **Desktop:** A desktop is likely to be the primary device issued to a Line of Business User given their application needs, their expected use cases for these applications as well as the constant location required by their usage pattern. This desktop is likely to take the following configuration.
    - **Desktop with Thick OS:**
      A desktop PC with an Operating System which runs on a thick client device and provides rich functionality, independent of a central server. Examples include Microsoft Windows, Unix, Linux, and OSX. This section will also cover a desktop PC as a hybrid with an Operating System that runs on a thick client device, but also relies on another server(s) to fulfil its computational roles.
    - **Thin Client with Thin OS:**
      An unintelligent device running thin Operating System that relies heavily on central server for its computation roles. Examples include Windows Embedded and Zero Clients.

The diagram below details the elements of the EUD framework **applicable to Line of Business workers**. Elements with an orange border are possible options:

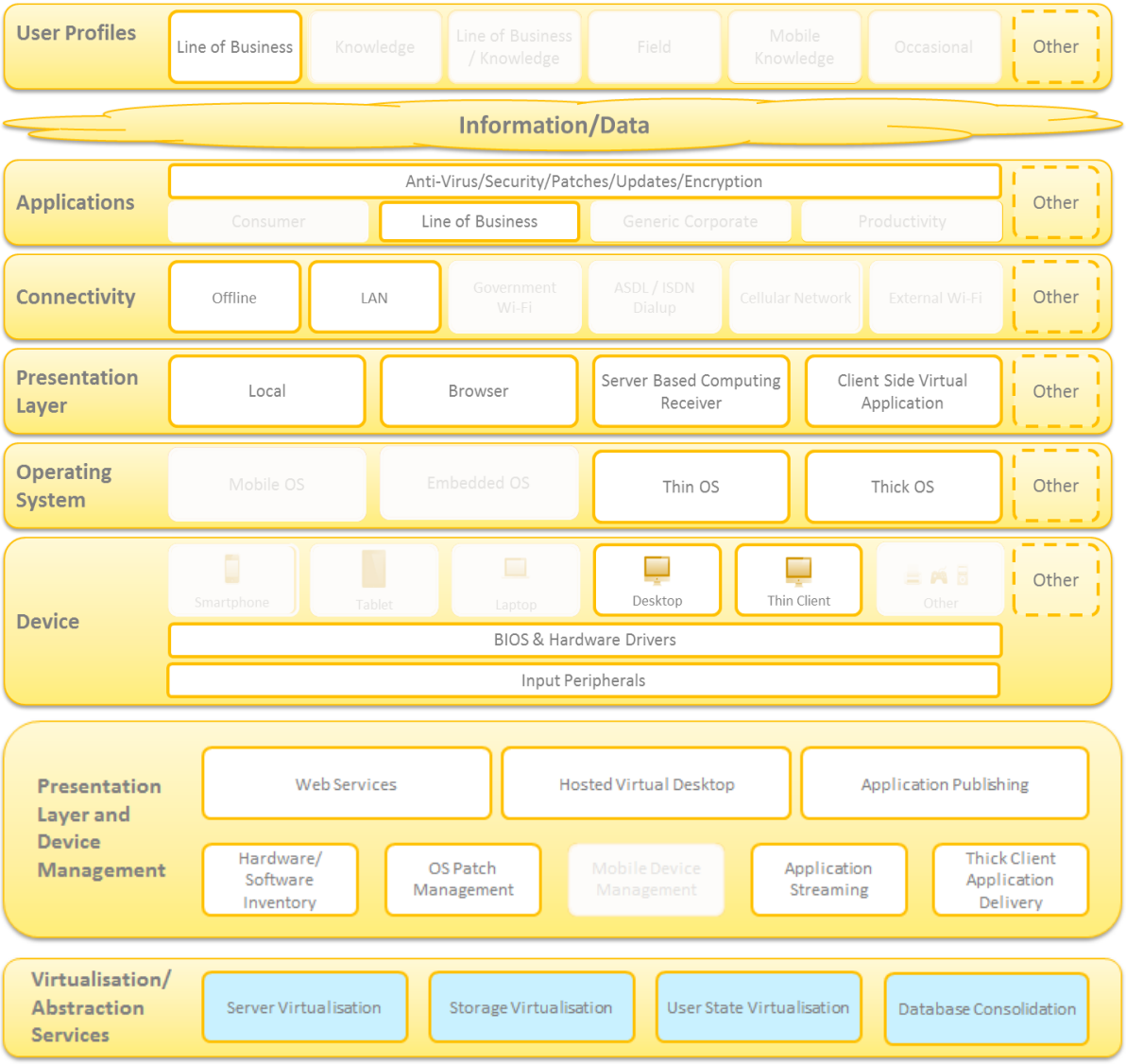


FIGURE 2 – LIGHTBOARD WITH ELEMENTS APPLICABLE TO LINE OF BUSINESS USERS

7.1.1 Line of Business User – A Day in the Life Example

The following section is an example scenario from, the user's point of view, of how the EUD Technical Framework can be exploited to enable greater flexibility and productivity.

7.1.1.1 Scenario

Maria is a Contact Centre Advisor within a government department. She only uses her IT from an office desk.

- Maria is a new recruit, though she has already completed her induction and training on a training log in.
- Maria logs into her workstation using her employee user account for the first time. All of her services have been previously allocated in line with her job role, and are quickly available for use upon start-up.

- With an experienced operative listening in and ready to help, Maria is soon talking to customers, finding the right guidance, accessing and updating their records accordingly. She is conscious that they are waiting on the line while she does this, and operates quickly and smoothly.
- Maria is not the only new recruit. After lunch, for practical reasons, her manager reshuffles the seating arrangements and asks her to use a different workstation. Maria logs on here instead. This desktop looks and behaves exactly the same the previous one, and Maria continues to work throughout the afternoon without any issues.

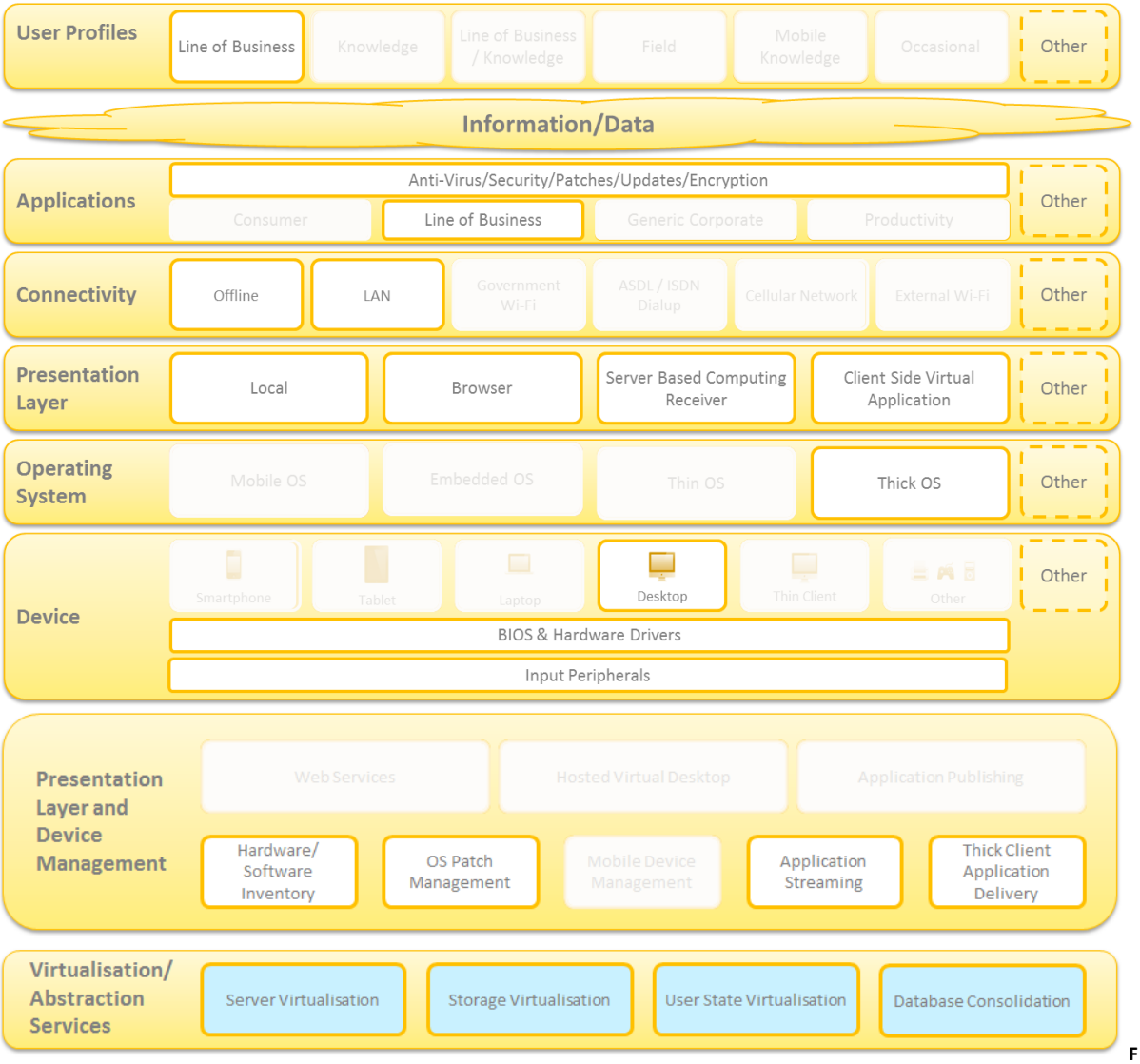
7.1.1.2 Critical Success Factors for This Scenario

- User can access all of their required services (including line of business) from any suitable corporate fixed workstation.
- Boot up/log in time of corporate workstation is minimised.
- Continuity of state across corporate fixed workstations (user experience is the same).
- Performance and response times meet user needs.
- Appropriate security measures are in place.

The key factors identifying the choice between the two main options of a thick or thin device will be established by following the best practice guidelines in Part 1.

7.1.2 Line of Business – Desktop with Thick OS

The diagram below highlights the components of the Framework applicable to a Line of Business user with desktop PC using an installed operating system (Thick OS).



IGURE 3 – LIGHTBOARD FOR LINE OF BUSINESS USER WITH DESKTOP DEVICE AND THICK OS

The detailed solutions and best practice for each of the highlighted components have been covered in detail in Part 2 so are simply summarised and referenced here.

Presentation Layer and Device Management (such as patch management, application delivery, and hardware and software inventory) are covered in section 6.1.5.1 (Device Management Considerations).

The Desktop component in the **Device Layer** is covered in section 6.1.5.2 (End User Devices) and the Thick OS component in the **Operating System Layer** is covered in section 6.1.4 (Operating System Layer).

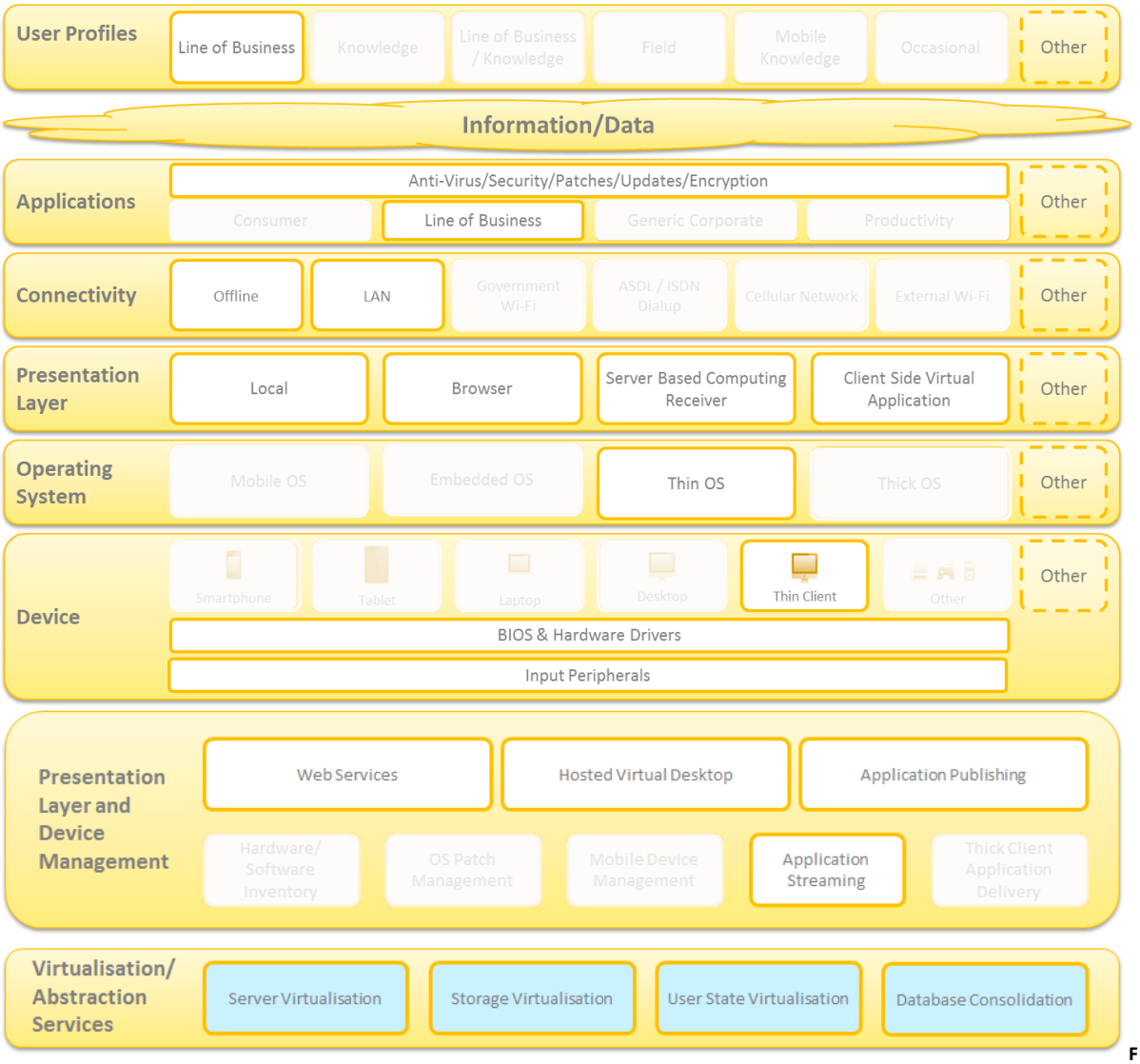
Presentation Layer components (such as Local, Browser, Server Based Computing and Client Side Virtual Application) are explained in section 6.1.3.

Connectivity Layer and Application Layer components are detailed in section 6.1.1 (Application Layer) and 6.1.2 (Connectivity Layer) respectively.

Implementation guidelines on desktop with thick OS are covered in section 6.5.1.

7.1.3 LINE OF BUSINESS – THIN CLIENT WITH THIN OS

The diagram below highlights the components of the Framework applicable to a Line of Business user working on a thin client device with a thin OS.



IGURE 4 - LIGHTBOARD FOR LINE OF BUSINESS THIN CLIENT WITH THIN OS

The detailed solutions and best practice for each of the highlighted components have been covered in detail in Part 2 so are simply summarised and referenced here.

The Thin Client component in the **Device Layer** is covered in section 6.1.5.2 (End User Devices) and the Thin OS component in **Operating System Layer** is covered in section 6.1.4 (Operating System Layer).

Presentation Layer components (such as Browser and Server Based Computing) are explained in section 6.1.3.

Connectivity Layer and Application Layer components are detailed in section 6.1.1 (Application Layer) and 6.1.2 (Connectivity Layer) respectively. Additionally, refer to section 6.5.2 for

Implementation guidelines on thin client with thin OS are detailed in section 6.5.2.

7.2 Usage Scenarios For Mobile Knowledge User

Mobile Knowledge workers use generic productivity tools such as word processing and email to perform core activities in a number of locations as well as offline. They have little or no reliance on Line of Business applications and need their IT devices and data to be available on the move. Examples of Mobile Knowledge workers might include senior managers, policy workers or consultants.

Given the Mobile Knowledge worker profile, it is likely that the following devices will be utilised:

- A laptop – if their role is more based around creating information
- A combination of one or more of smartphones or tablets if their role is based around accessing or consuming information

The high-level characteristics for Mobile Knowledge users working on laptop devices are:

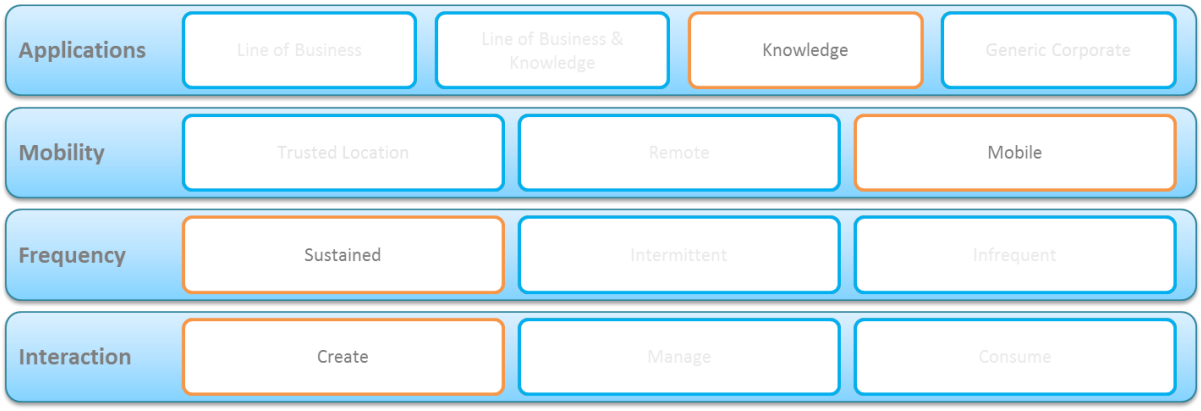


FIGURE 5 - USER SEGMENT FOR MOBILE KNOWLEDGE USER WITH LAPTOP

Applications: Mobile Knowledge users require knowledge applications, such as email, calendar, collaboration tools, communication and office productivity tools / applications.

Mobility: Mobile Knowledge users typically need to be able to work outside of the office and their IT devices to be easily portable. Size and weight are therefore critical requirements to ensure suitability.

Frequency: Mobile Knowledge users require access to services throughout their working day, and need sustained access to their applications and laptop devices.

Interaction: Mobile Knowledge users in this category need to be able to create or alter existing content.

IT requirements for Mobile Knowledge users on Smartphone devices:

The high-level characteristics for Mobile knowledge users working on Smartphone devices are:

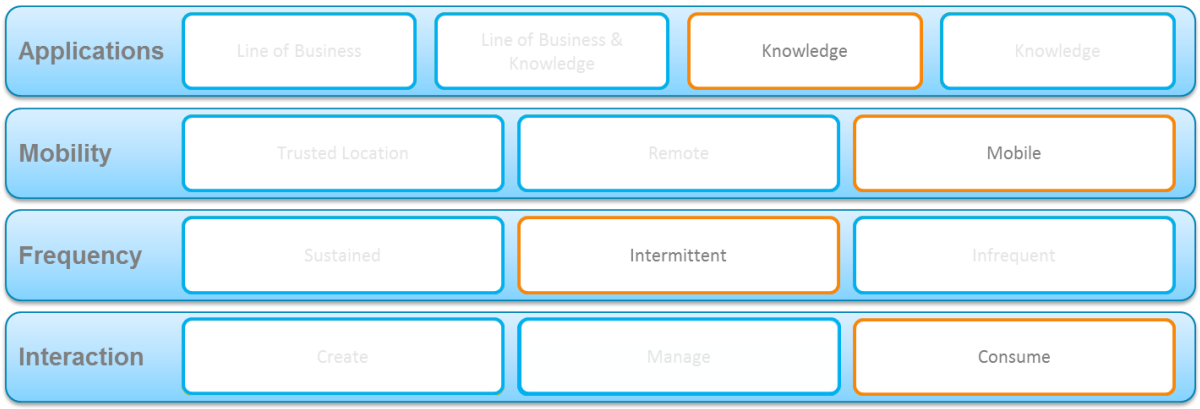


FIGURE 6 - USER SEGMENT FOR MOBILE KNOWLEDGE USER WITH SMARTPHONE

Applications: Mobile knowledge users require knowledge applications, such as email, calendar, collaboration tools, communication and office productivity tools / applications.

Mobility: High degree of mobility and flexibility to use devices "on the go".

Frequency: Mobile Knowledge users will tend to use their smartphone devices in short sharp bursts of activity.

Interaction: Mobile Knowledge users mostly use their smartphones for consuming information and data.

IT requirements for Mobile Knowledge users on Tablet devices:

The high-level characteristics for Mobile knowledge users working on tablet devices are:

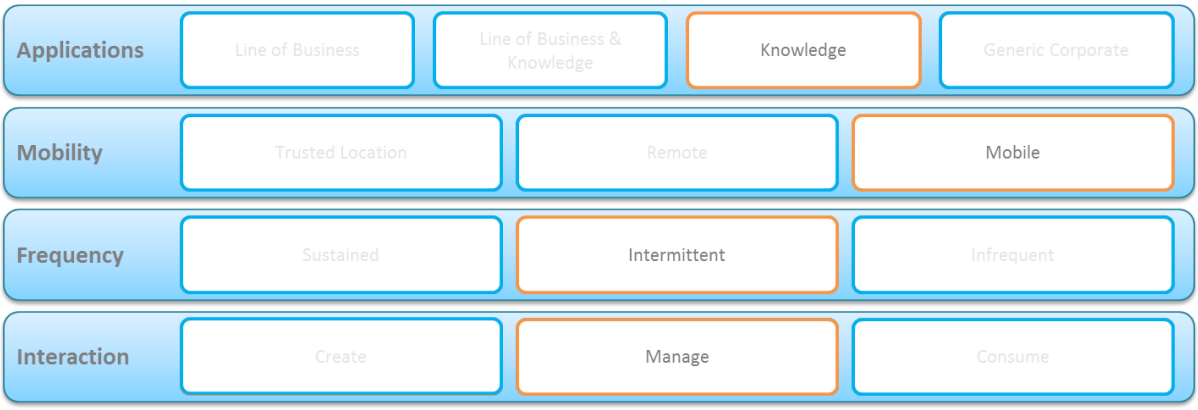


FIGURE 7 - USER SEGMENT FOR MOBILE KNOWLEDGE USER WITH TABLET

Applications: Mobile knowledge users require knowledge applications, such as collaboration, communication and office productivity tools / applications.

Mobility: Sits between the high flexibility and mobility of a smartphone and a laptop .

Frequency: Mobile Knowledge users will use their tablet devices intermittently, due to the enhanced functionality tablets provide over smartphones.

Interaction: Mobile Knowledge users mostly use their tablets for altering content and consuming information.

The following sections will outline the usage scenarios for devices for Mobile Knowledge users':

- **Laptop with Thick OS**
  A laptop with an Operating System that runs on a device, providing rich functionality independent of a central server. Examples include Microsoft Windows, Unix, Linux and OSX.
- **Smartphone / Tablet with Mobile OS**
  A smartphone with a mobile OS which combines the features of a personal computer operating system with cellular technology. Examples of Mobile OS include Apple iOS, Android, Blackberry, Windows 7 and Symbian.

The figure below details the elements of the EUD Framework **applicable to Mobile Knowledge workers**:

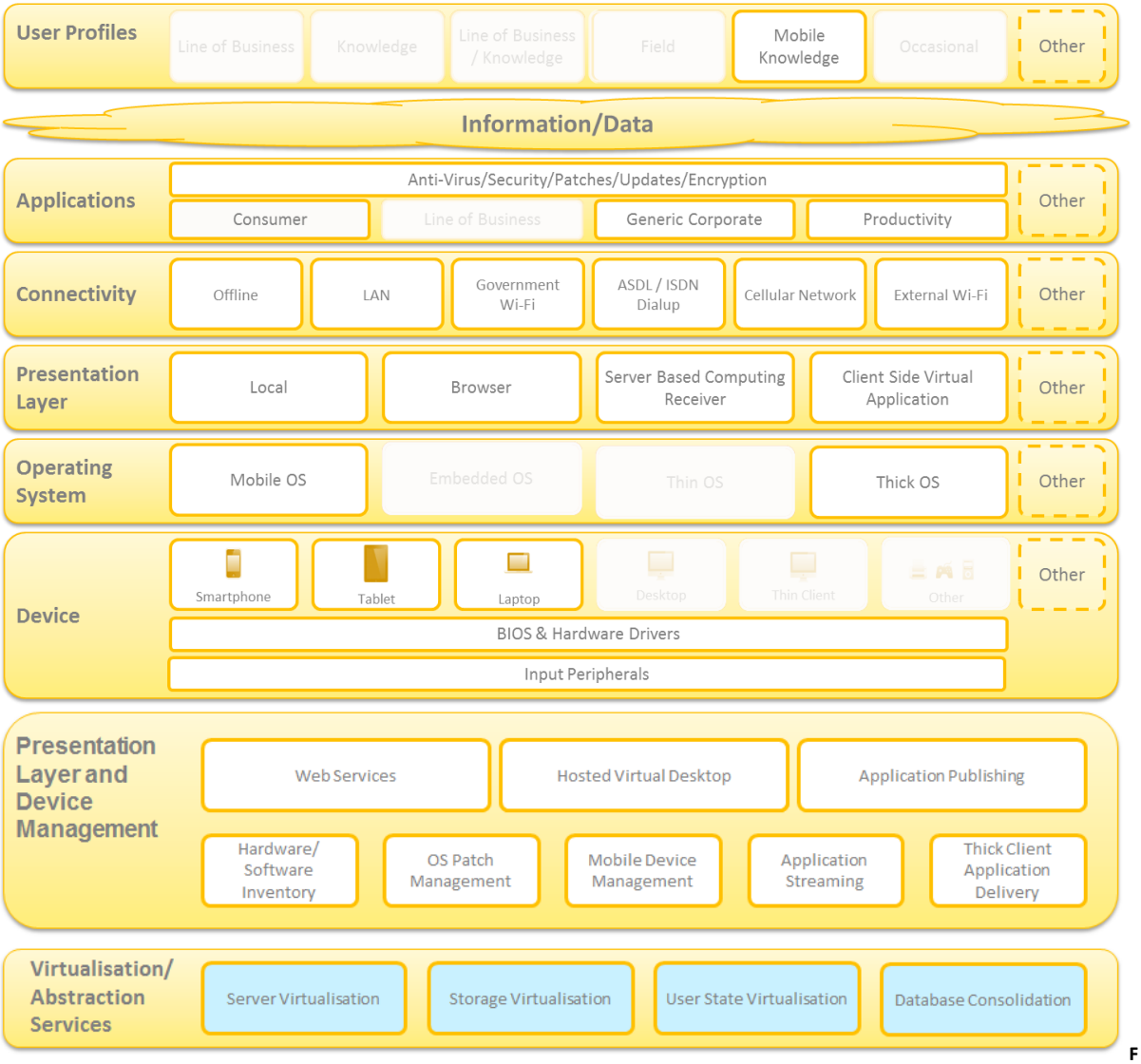


FIGURE 8 - LIGHTBOARD WITH ELEMENTS APPLICABLE TO MOBILE KNOWLEDGE USERS

7.2.1 MOBILE KNOWLEDGE USER – A DAY IN THE LIFE EXAMPLE

The following section is an example scenario from, the user's point of view, of how the EUD Technical Framework can be exploited to enable greater flexibility and productivity. The scenario is based upon the assumption that all data would be classified at the entry level of the new Government Protective Marking Scheme, and that appropriate solutions are developed and assured.

7.2.1.1 SCENARIO

Umer is a policy worker within a government department. He has a number of staff based at different sites and spends a lot of his time on the move. Umer accesses his IT services from a range of locations and whilst on the move. He has a corporately supplied laptop and smartphone.

- Umer begins his day at his department's headquarters. He finds an available desk, logs in and works on a document he has been sent for comment and review. He suggests some comments and changes before sending back to the author.

- Umer sets off for an external meeting, taking his laptop with him. While on public transport, he uses his smartphone to catch up on his emails. He hasn't visited this office before so after he gets off public transport he uses the GPS on his smartphone to navigate there.

- Arriving at the meeting, he opens his laptop and is quickly able to refer to the agenda and meeting papers, as well as take notes and actions.

- During the discussions, a question arises concerning factual data not circulated as a meeting paper. This is within Umer's area of expertise, and he is able to find the information they need within his filestore, and progress the matter.

- After the meeting he sets off to another of his own department's sites to give a presentation, and have a face to face with some of his team.

- While on the train, Umer makes the judgement this it's appropriate from security perspective to work on some of his documents. They are not sensitive and the risk from other passengers reading form his screen is minimal. **NOTE:** Should Umer's laptop have been lost or stolen during his journey, he would have reported it to his IT support who would have immediately begun a remote wipe.

- He finishes editing this morning's document, and picks up where he left off working through his emails. He then browses the web to read some business articles, and watches a vodcast.

- Arriving at his station, Umer leaves the train and heads to his destination. He prints some paper hand-outs to share with his team in the meeting room. Umer meets with his team and delivers his presentation, when it's over he travels home.

7.2.1.2 Critical Success Factors for this Scenario

- Boot up/wake up time and shutdown/lock down time of devices is minimal.
- Battery life of devices is maximised and practical (e.g. smartphone lasts at least all day)
- Laptop device is compact and lightweight enough to carry throughout the working day and rugged enough to resist damage from regular transport.
- User can access all of their services from their laptop, remotely, over wifi (and the mobile network if required).
- User can access email and calendar services from their smartphone, as well as use commodity functionality such as mapping (internet browsing and document consumption are also likely to be required).
- Email and calendaring services synchronise across device types (e.g. emails marked as read/unread or filed in subfolders) wirelessly, and are available off-line (as far as possible).
- User is able to print from office locations.

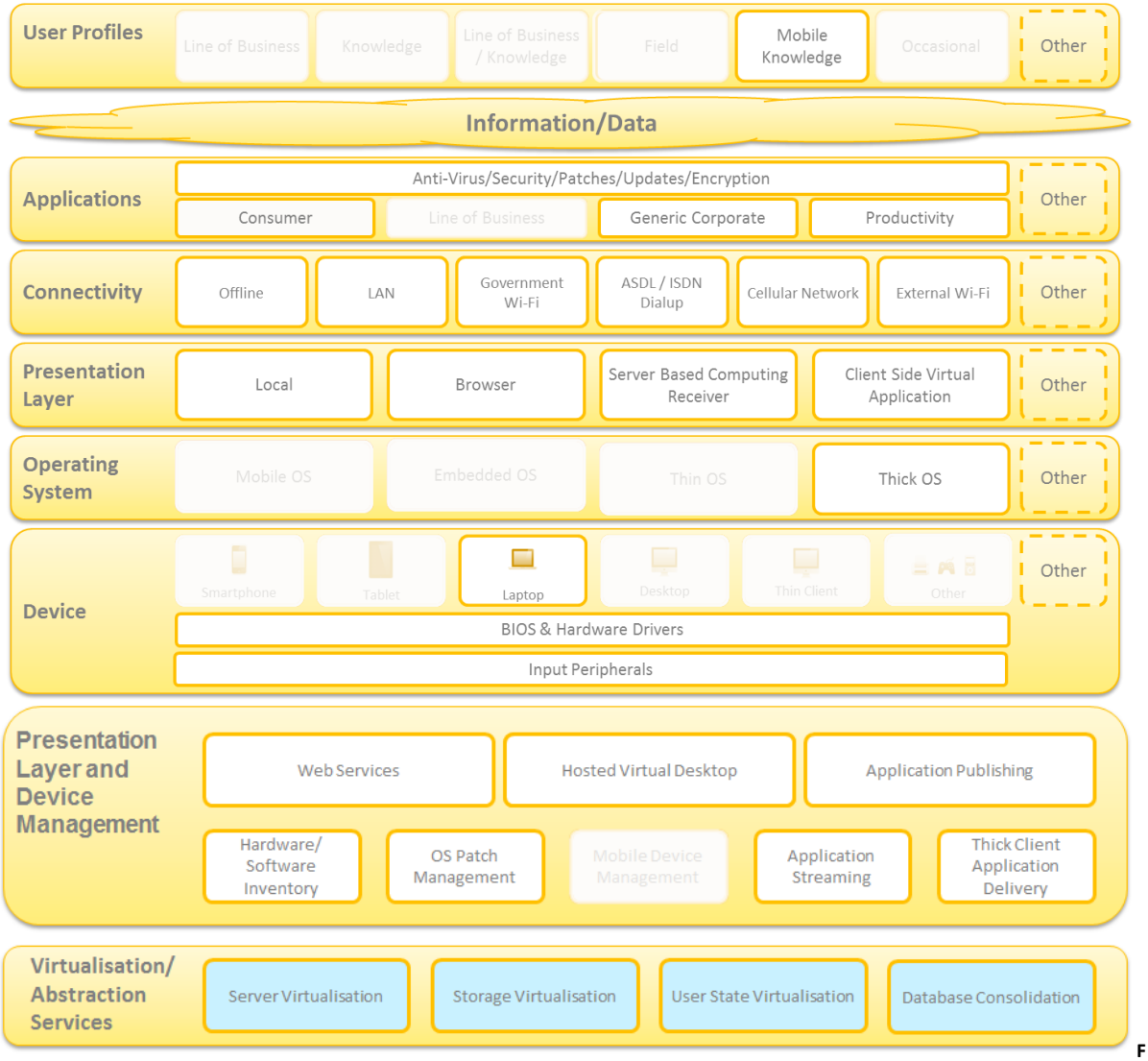
- Laptop is able to access all services on which apps are delivered, is able to consume multimedia in common formats and is capable of video conferencing.
- End to end user experience is comparable to reasonable modern expectations, and conducive to productivity.
- Appropriate solution in place at the headquarters to allow hot-desking.
- Appropriate security requirements are adhered to.
- The device specification and the device management system in place allows for the remote wiping of the device.

7.2.1.3 NOTES ON DEVICE CHOICE

- Similar mobile knowledge worker scenarios could be satisfied by the use of a tablet as the primary device (perhaps in conjunction with shared desktops as a secondary device for certain occasional tasks). A hybrid device where the tablet element docks with a base unit might also be suitable. A deciding factor will be the extent to which rich content creation versus content consumption is required by the user.
- Some mobile knowledge workers, such as senior executives, spend much of their time decision making and in meetings; they chiefly consume information, and may benefit from a lightweight tablet as a primary device to replace paper.

7.2.2 MOBILE KNOWLEDGE - LAPTOP WITH THICK OS

The diagram below highlights components in each Framework Level applicable to Mobile Knowledge users with laptop devices.



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IGURE 9 - LIGHTBOARD FOR LAPTOP WITH THICK OS

The detailed solutions and best practice or each of the highlighted components have been covered in detail in Part 2 so are simply summarised and referenced here.

The Laptop component in the **Device Layer** is covered in section 6.1.5.2 (End User Devices).

The Thick OS component in **Operating System Layer** is covered in section 6.1.4 (Operating System Layer).

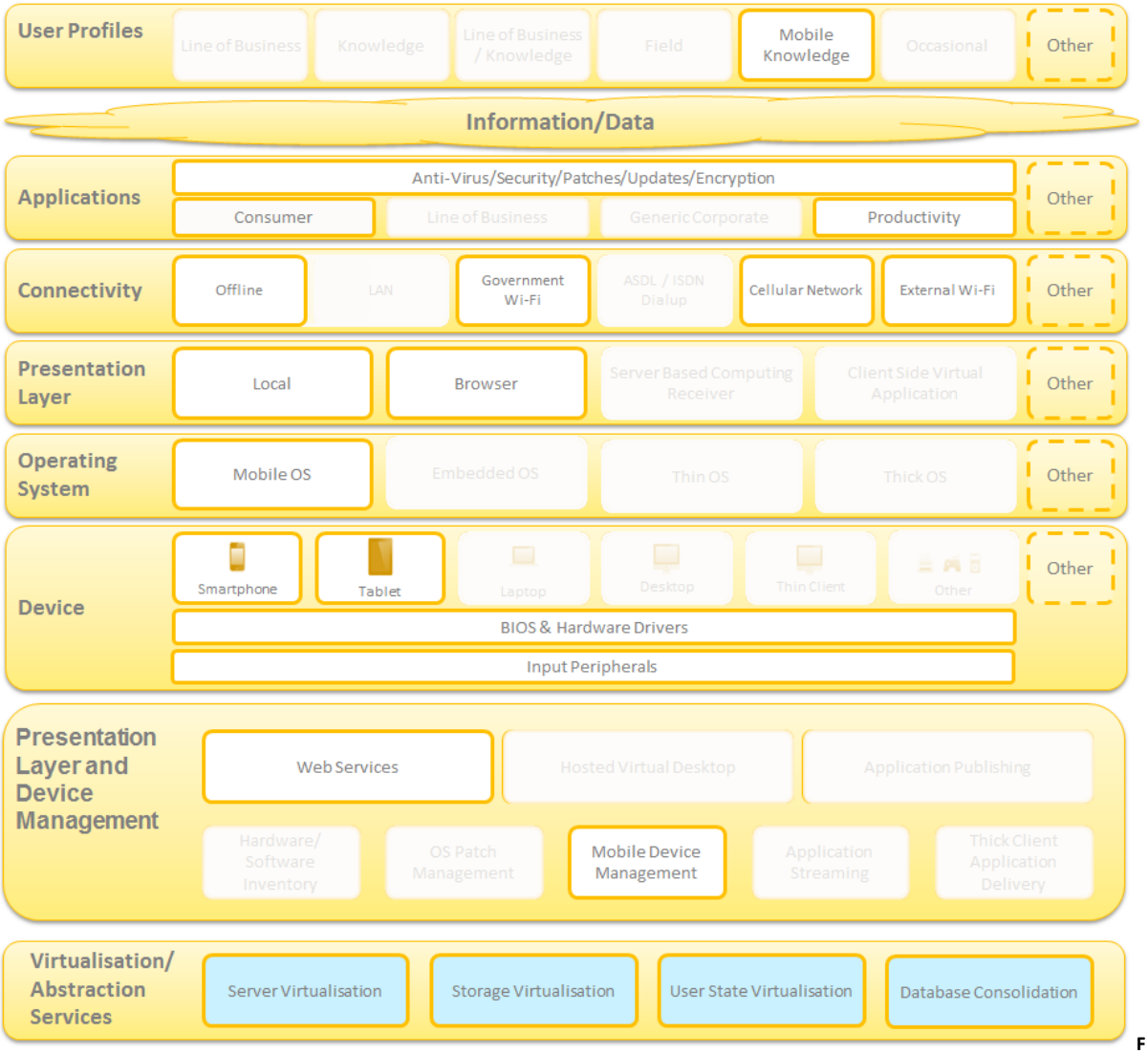
Presentation Layer components (such as Local, Browser, Server Based Computing and Client Side Virtual Application) are explained in section 6.1.3.

Connectivity Layer and Application Layer components are detailed in section 6.1.1 (Application Layer) and 6.1.2 (Connectivity Layer) respectively.

Implementation guidelines for a laptop with thick OS are detailed in section 6.5.3.

7.2.3 MOBILE KNOWLEDGE - TABLET / SMARTPHONE WITH MOBILE OS

The diagram below highlights components of the Framework applicable to a Mobile Knowledge user with tablets or smartphones.



IGURE 10 - LIGHTBOARD FOR SMARTPHONE / TABLET WITH MOBILE OS

The highlighted components of **Presentation Layer and Device Management** (such as Web Services and Mobile Device Management) in the figure above have already been covered in the section 6.1.5.1 (Device Management Considerations) and section 6.4.1.4 (Security Technology).

The Smartphone and Tablet components in the **Device Layer** are covered in section 6.1.5.2 (End User Devices).

The Mobile OS component in **Operating System Layer** is covered in section 6.1.4 (Operating System Layer).

Presentation Layer components (such as Local and Browser) are explained in section 6.1.3. Refer to this section for further details.

Connectivity Layer and Application Layer components are detailed in section 6.1.1 (Application Layer) and 6.1.2 (Connectivity Layer) respectively. Refer to these sections for further details. Additionally, refer to section 6.5.4 for **implementation guidelines** on smartphones / tablets.

7.2.4 Case Study

7.2.4.1 Cabinet Office

Cabinet Office has successfully piloted the use of modern consumer laptops and smartphones coupled with commodity cloud services to improve productivity. At around £220 per year, the laptop solution is significantly cheaper to run than the previous one, and provides their mobile knowledge users with the flexibility and choice of tools they need to work more effectively. Light, fast-booting machines with long battery life, together with portable 3G connectivity, have improved users' mobility, allowing them to work anywhere and easily go paperless for meetings. Feedback on the user experience has been extremely positive.

7.2.4.2 Environment Agency

The Environment Agency has successfully piloted 450 mobile tablets within their organisation. Commodity devices coupled with mobile device management and content management tools has enabled many of their busiest executives to go paperless for their meetings. Field staff use the devices to access essential information during normal activities and more importantly when an environmental incident is in progress without having to return to base . These users spend most of their time consuming information and decision-making (rather than creating content). Reductions in printed papers contribute to government’s green agenda, and reduced boot-up/wake up times have offered measurable productivity gains.

7.3 USAGE SCENARIOS FOR KNOWLEDGE USER

Knowledge workers primarily use rich productivity tools such as email and word processing to perform core business activities. Unlike mobile knowledge workers, they mainly use their IT from fixed office locations. Examples of knowledge workers might include policy workers, managers and others.

Given the Knowledge worker profile, it is likely that the following devices will be utilised:

- A desktop as their primary device.
- They may also use a smartphone or tablet as a secondary device.

This introduction will outline the IT requirements for Knowledge users on Desktop and Smartphones and will provide some guidance as to which devices end users require to do their jobs.

The following sections define the type of applications, mobility profile, frequency of connectivity and the type of interaction users have with devices. For example, if end users need to 'create' documents and information, then a desktop would be a possible device.

IT requirements for Knowledge users on Desktop devices:

The high-level profile for a knowledge worker using desktop is:

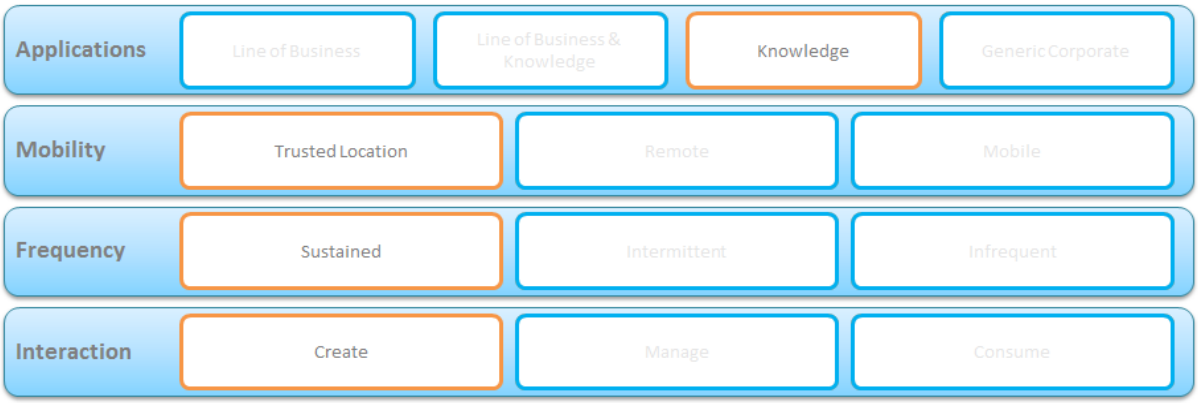


FIGURE 11 – USER IT SEGMENT FOR KNOWLEDGE USER

Applications: Knowledge users require knowledge applications such as email, calendar, collaboration, communication and office productivity tools / applications.

Mobility: Knowledge users typically need to work from a trusted government locations, such as headquarters offices and tend to be fairly static although some flexibility to enable hot-desking is useful.

Frequency: Knowledge users require sustained access to services throughout their working day.

Interaction: Knowledge users in this category need to be able to create or alter existing content.

IT requirements for Knowledge users on Smartphone devices:

The high-level characteristics for Knowledge users working on Smartphone devices are:

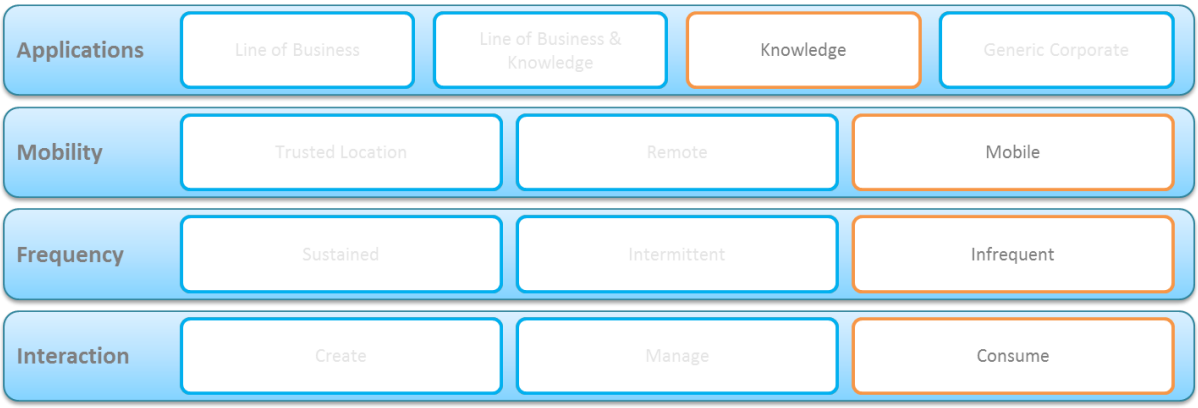


FIGURE 12 - USER SEGMENT FOR KNOWLEDGE USER

Applications: Knowledge users require knowledge applications, such as email, calendar, collaboration, communication and office productivity tools / applications.

Mobility: Knowledge users may occasionally need to work from different government locations and hence need their IT devices to be portable.

Frequency: Knowledge users will tend to use their smartphone devices on an infrequent basis.

Interaction: Knowledge users mostly use their smartphones for consuming information and data.

Usage scenarios for devices
The following sections will outline the usage scenarios for devices for Mobile Knowledge users':

- **Desktop:** A desktop is likely to be the primary device issued to a Knowledge User given their application needs, their expected use cases for these applications as well as the constant location required by their usage pattern. This desktop is likely to take the following configuration.
    - **Desktop with Thick OS:**
      A desktop PC with an Operating System which runs on a thick client device and provides rich functionality, independent of a central server. Examples include Microsoft Windows, Unix, Linux, and OSX. This section will also cover a desktop PC as a hybrid with an Operating System that runs on a thick client device, but also relies on another server(s) to fulfil its computational roles.
    - **Thin Client with Thin OS:**

An unintelligent device running thin Operating System that relies heavily on central server for its computation roles. Examples include Windows Embedded and Zero Clients.

- **Devices using Web Services:**
  A device (desktop, laptop or thin client) with an Operating System, connected to the network using web based applications.

- **Smartphone/Tablet with Mobile OS:** A Knowledge Worker might additionally receive a smartphone or tablet as secondary devices given their application needs, their expected use cases and the flexibility required by their role. Smartphone will be primarily used to access and consume information and a tablet to manage it.

The diagram below details the elements of the EUD Framework **applicable to Knowledge workers**:

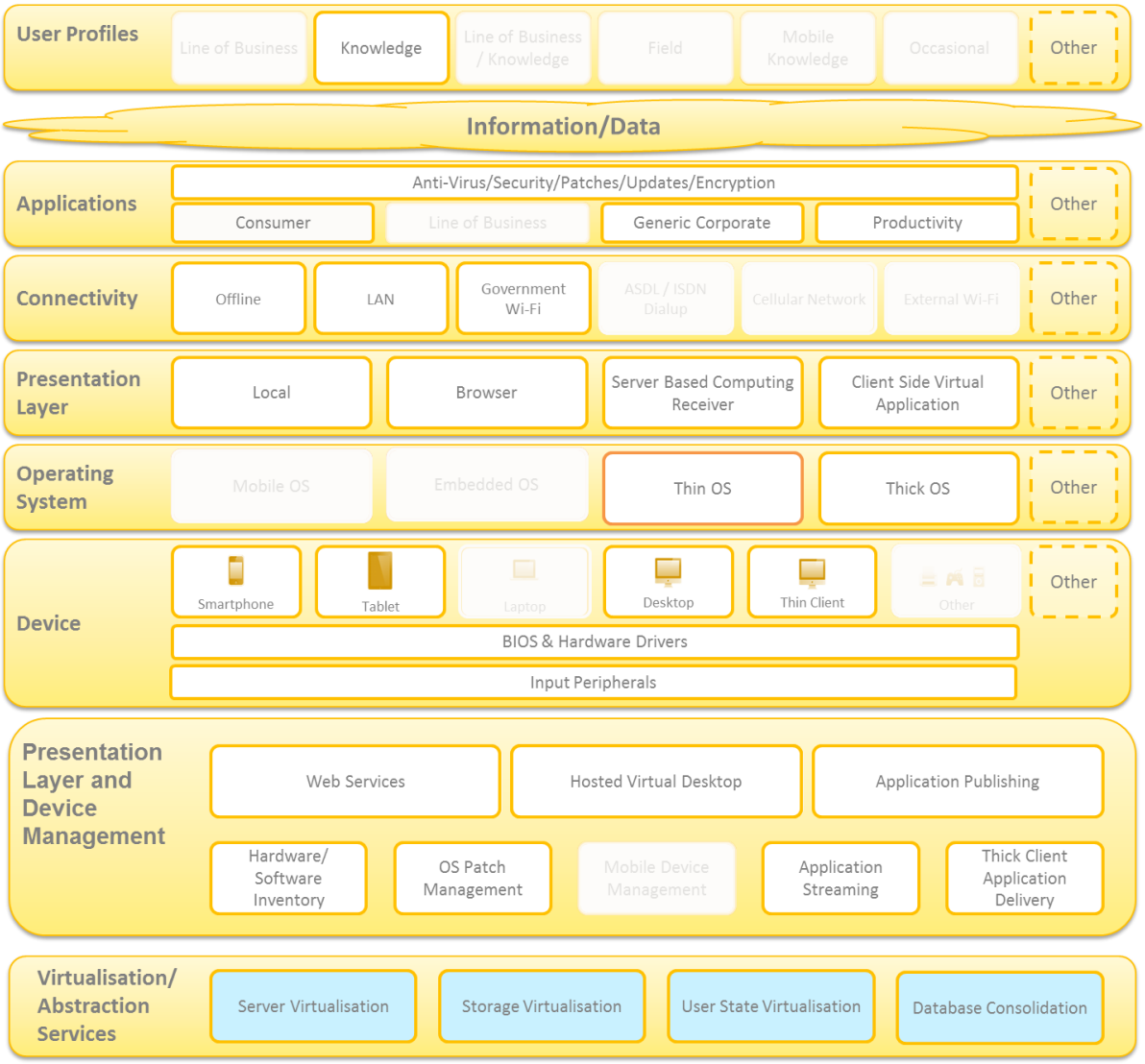


FIGURE 13: LIGHTBOARD WITH ELEMENTS APPLICABLE TO KNOWLEDGE USERS

7.3.1 KNOWLEDGE USER - A DAY IN THE LIFE SCENARIO

The following section is an example scenario from, the user's point of view, of how the EUD Technical Framework can be exploited to enable greater flexibility and productivity.

7.3.1.1 SCENARIO

Sarah is a policy worker within a government department. Her main use of IT is from a desktop workstation at the office.

Day One

- Today is a typical day for Sarah. Having arrived at her usual office she logs into a machine and works her way through her emails before setting up some meetings for later in the week.
- Later in the day, Sarah has a meeting with Emma, a colleague in the same building. She logs off before attending.
- At the meeting, Sarah and Emma decide that it would be productive to work closely throughout the rest of the day. Sarah logs on at an available hot-desk near Emma, so that they can confer as they work. The desktop she logs into looks and behaves exactly like her usual one, with all of the same services and personal settings.
- For the rest of the day, Sarah spends most of her time drafting a document, while referring to papers and spreadsheets, and conferring with her colleague.

Day Two

Although Sarah's main use of IT is from a fixed desktop in an office, she does sometimes need the flexibility to do certain things from home or on the move. She has a corporate solution so that she can occasionally work from her personally owned home computer (using email, generic office tools and filestore), and is able to use her own smartphone and tablet for certain business tasks.

- Sarah is working from home this morning before meeting a stakeholder not far from where she lives. She logs into her corporate environment and checks her email for anything requiring her attention.
- Her first task of the day is to finalise a document with input from her team. She makes some requests for information by email, and contacts Bill for a more in depth conversation.
- Having completed the document, Sarah saves it to a shared filestore, and asks her team to review and comment.
- Sarah now makes her way to her stakeholder meeting. She has never been to this destination before. She is able to see her corporate calendar appointments from her own smartphone, and uses this to find her destination address. The maps function makes it easy to find her way there.
- Sarah has her own tablet device. She prefers to use this for viewing meeting papers, rather than printing and carrying hard copies. At the meeting, she also uses her tablet to take notes.

- The meeting involves a whiteboard session. Sarah photographs the outputs with her tablet before she leaves and travels into the office.
- Sarah doesn't always work in this particular site; she is here for a face to face meeting later in the day with her manager. She finds an available hot-desk before the meeting, and uses the time to put through her travel expenses. The desktop she logs into looks and behaves exactly like her usual one, with all of the same services and personal settings.
- Sarah checks her team's comments on this morning's document, accepting most of the changes before emailing it on to the final recipient and logging off to go and meet her manager.
- Once the meeting is over Sarah can catch the train home. This takes a little longer than her usual journey, so she uses the time to do some more emails using her personal tablet before finishing her working day from home.

7.3.1.2 Critical Success Factors for this scenario

- User can access all of their services from any suitable corporate fixed workstation.
- Boot up/log in time and shutdown/lock down time of corporate workstation is minimal.
- Continuity of state across corporate fixed workstations (personal settings persist, user experience is the similar)
- User can remotely access email, calendar, generic office tools (word processing, spreadsheets, presentations etc.), collaboration and filestore from their own home computer.
- User can access email and calendar services from own smartphone or tablet device.
- User is able to easily access and view business documents from own tablet device, with offline capability.
- User uses a secure link to access organisational resources.
- Email and calendaring services synchronise across all device types (e.g. emails marked as read/unread or filed in subfolders); mobile devices synchronise wirelessly and have offline capability.
- End to end user experience is comparable to reasonable modern expectations, and conducive to productivity.
- Appropriate solution in place to allow hot-desking across multiple sites.
- Appropriate security requirements are adhered to.

7.3.2 Knowledge – Desktop with Thick OS

The diagram below highlights components in each Framework Level applicable to Knowledge users with Desktop with Thick OS.

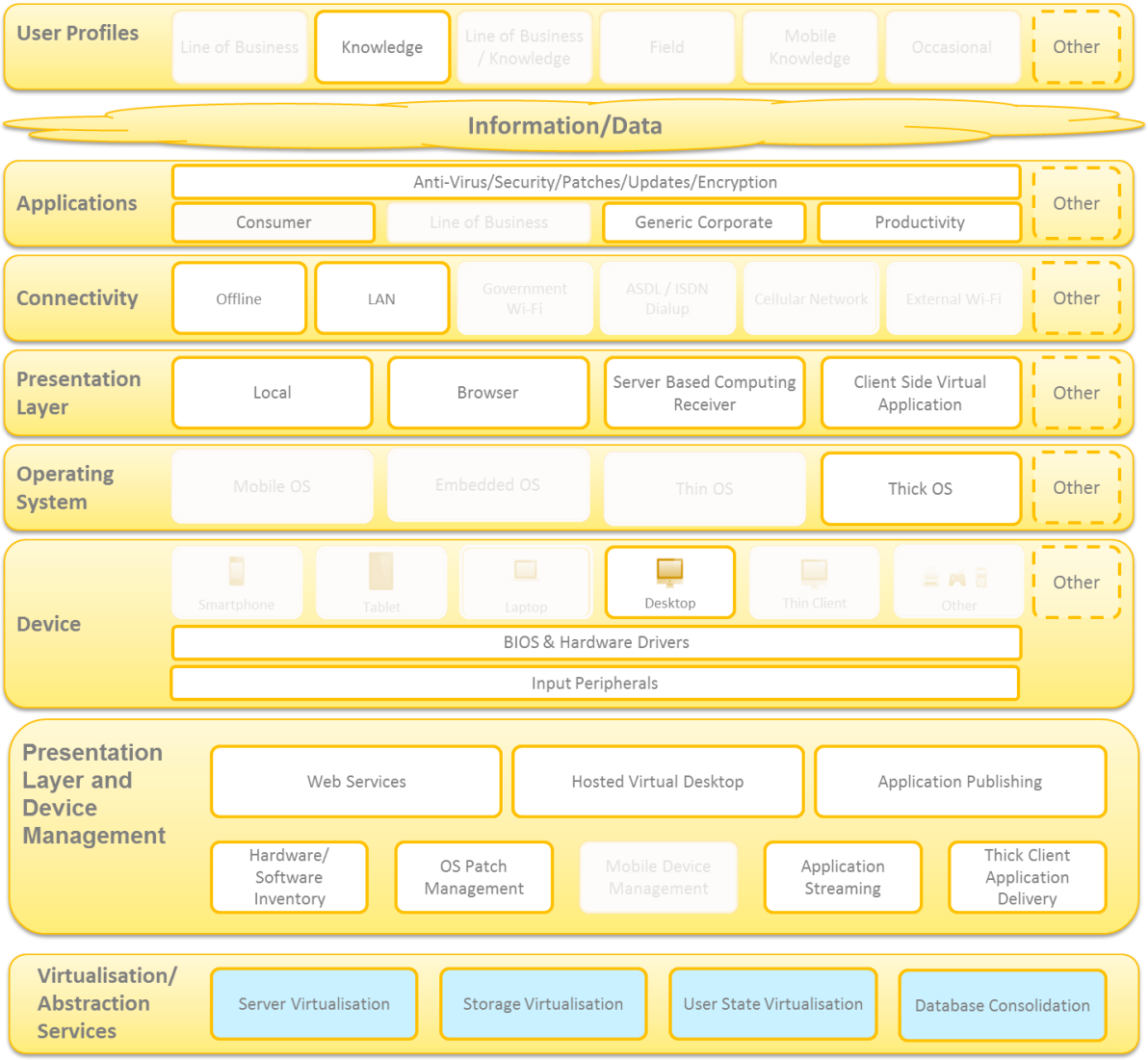


FIGURE 14: LIGHTBOARD FOR KNOWLEDGE USERS WITH DESKTOP WITH THICK OS

The detailed solutions and best practice for each of the highlighted components have been covered in detail in Part 2 so are simply summarised and referenced here.

Presentation Layer and Device Management (such as patch management, application delivery, and hardware and software inventory) section 6.1.5.1 (Device Management Considerations).

The Desktop component in the **Device Layer** is covered in section 6.1.5.2 (End User Devices) and the Thick OS component in the **Operating System Layer** is covered in section 6.1.4 (Operating System Layer).

Presentation Layer components (such as Local, Browser, Server Based Computing and Client Side Virtual Application) are explained in section 6.1.3.

Connectivity Layer and Application Layer components are detailed in section 6.1.1 (Application Layer) and 6.1.2 (Connectivity Layer) respectively.

Implementation guidelines on desktop with thick OS section 6.5.1.

7.3.3 KNOWLEDGE – THIN CLIENT WITH THIN OS

The diagram below highlights components in each Framework Level applicable to Knowledge users with Desktop with Thin OS.

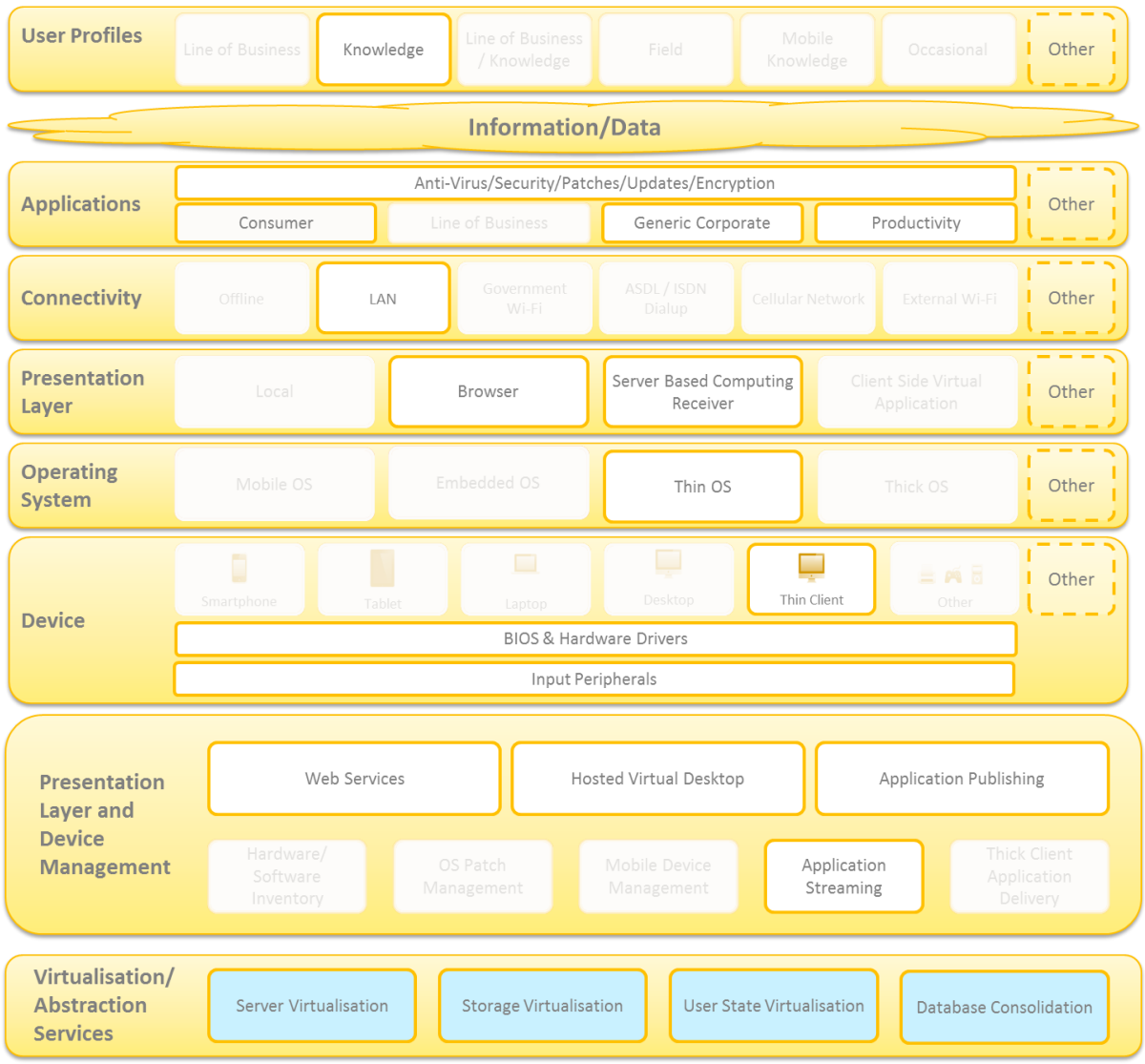


FIGURE 15: LIGHTBOARD FOR KNOWLEDGE USERS WITH THIN CLIENT WITH THIN OS

The Thin Client component in **Device Layer** is covered in section 6.1.5.2 (End User Devices) and the Thin OS component in **Operating System Layer** is covered in section 6.1.4 (Operating System Layer).

Presentation Layer components (such as Browser and Server Based Computing) are explained in section 6.1.3.

Connectivity Layer and Application Layer components are detailed in section 6.1.1 (Application Layer) and 6.1.2 (Connectivity Layer) respectively. Additionally, refer to section 6.5.2 for **implementation guidelines** on thin client with thin OS.

7.3.4 KNOWLEDGE – SMARTPHONE/TABLET WITH MOBILE OS

The diagram below highlights components in each Framework Level applicable to Knowledge users with Smartphone with Mobile OS.

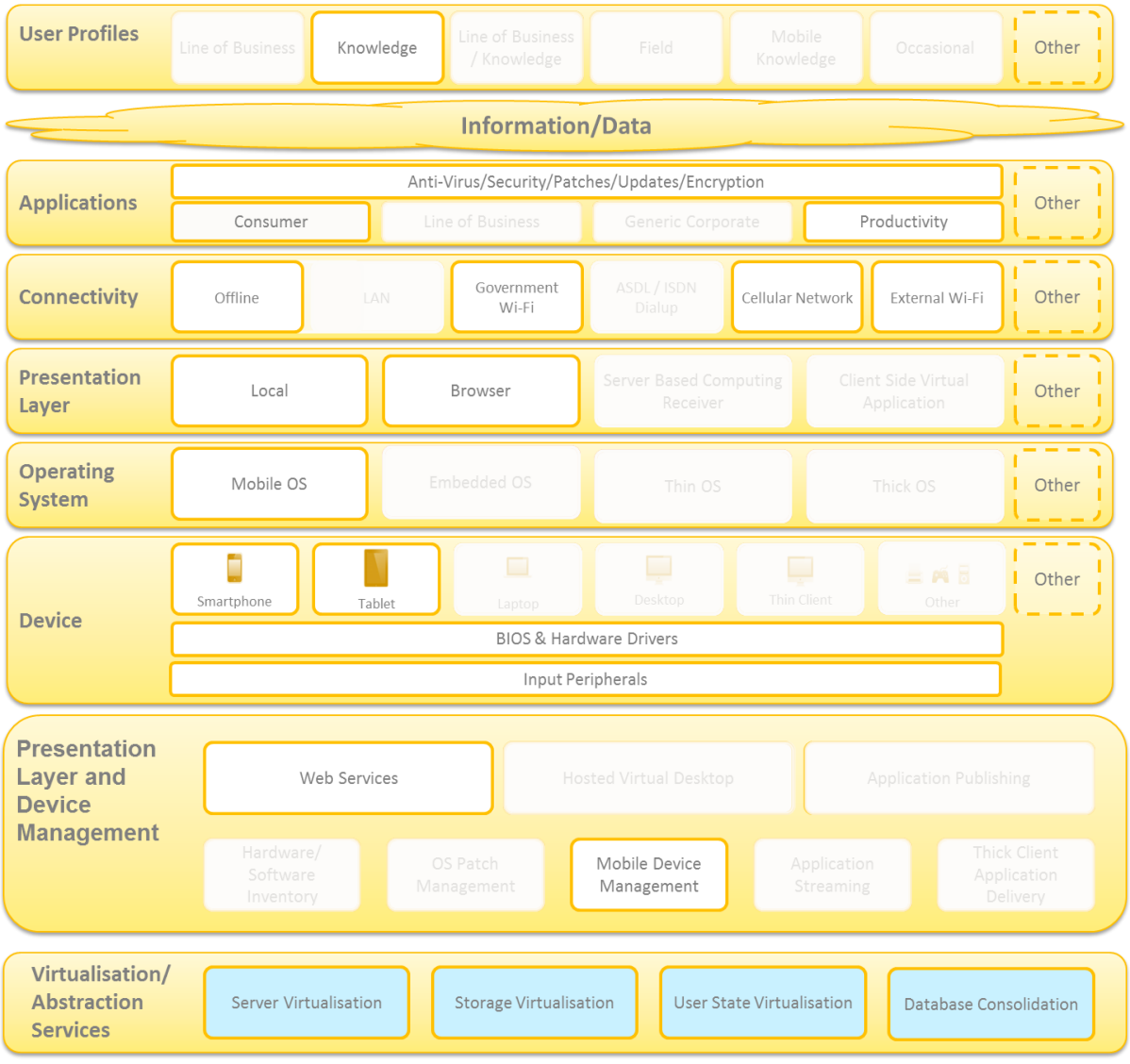


FIGURE 16: LIGHTBOARD FOR KNOWLEDGE USER WITH SMARTPHONE/TABLET WITH MOBILE OS

The highlighted components of **Presentation Layer and Device Management** (such as Web Services and Mobile Device Management) in the figure above have already been covered in the section 6.1.5.1 (Device Management Considerations) and section 6.4.1.4 (Security Technology). Refer to this section for further information.

The Smartphone and Tablet component in **Device Layer** is covered in section 6.1.5.2 (End User Devices). This section details the current market landscape for smartphones and tablets. It also discusses the device provisioning models and mobile web applications. The Mobile OS component in **Operating System Layer** is covered in section 6.1.4 (Operating System Layer). Refer to respective sections for further information.

Presentation Layer components (such as Local and Browser) are explained in section 6.1.3. Refer to this section for further details.

Connectivity Layer and Application Layer components are detailed in section 6.1.1 (Application Layer) and 6.1.2 (Connectivity Layer) respectively. Refer to these sections for further details. Additionally, refer to section 6.5.4 for **implementation guidelines** on smartphones / tablets.

7.3.5 Case Study

7.3.5.1 Department for Business, Innovation and Skills (BIS)

BIS have deployed a flexible and scalable application delivery service. Their Remote IT Environment (RITE) makes office productivity tools, email and document management services available using a secure web portal, virtualised applications and two-factor authentication. The solution, designed for occasional use, allows for a more flexible and ubiquitous deployment than providing laptops and blackberry devices to users, previously the only option for home-working. Core BIS applications are accessible from users personal laptops, PCs or Macs in the UK, or PCs in other departments. This increase in flexibility for staff has allowed BIS to improve flexible working options, reduce estate costs and rationalise business continuity sites, as well as providing a ready-made solution for transport issues such as those arising from major incidents and the London 2012 Olympics

7.4 Usage Scenarios For Hybrid User

Hybrid (Line of Business / Knowledge) workers use a combination of rich productivity tools such as email and word processing as well as Line of Business systems. Like both Line of Business and Knowledge workers they work from a fixed office location. Examples of Hybrid workers might include caseworkers, line of business managers etc.

Given the Hybrid worker profile, it is likely that the following devices will be utilised:

- A desktop – if their role is more based around creating information.
- A smartphones if their role is based around accessing or consuming information.

This introduction will outline the IT requirements for Hybrid users on Desktops and Smartphones and will provide some guidance as to which devices end users require to fulfil their roles.

The following sections define the type of applications, mobility profile, frequency of connectivity and the type of interaction users have with devices. For example, if end users need to 'create' documents and information, then a desktop would be a possible device.

IT requirements for Hybrid users on Desktop devices:

The high-level profile for a Hybrid worker using desktop is:

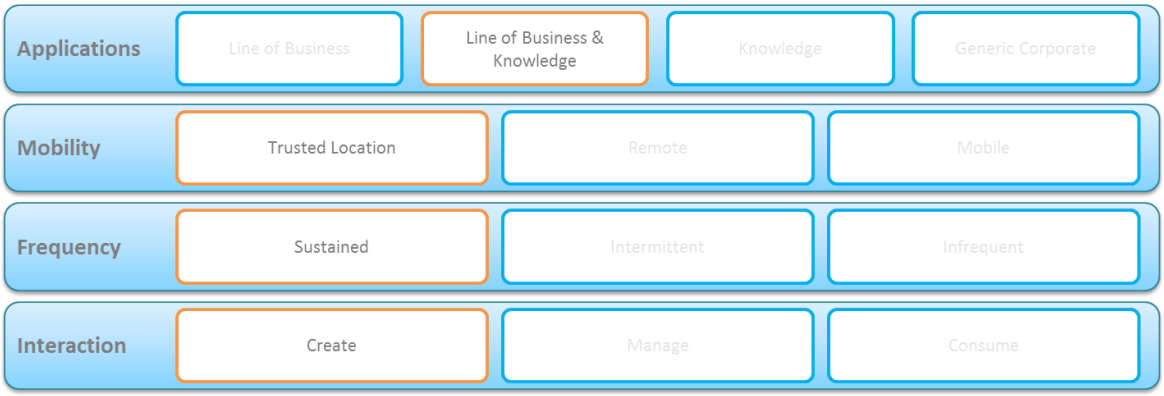


FIGURE 17 – USER IT SEGMENT FOR HYBRID USER

Applications: Hybrid users require knowledge applications such as email, calendar, collaboration, communication and office productivity tools / applications.

Mobility: Hybrid users typically need to work from a trusted government locations, such as contact centres and tend to be fairly static although some flexibility to enable hot-desking is useful.

Frequency: Hybrid users require access to services throughout their working day, and need sustained access to their applications and laptop devices.

Interaction: Hybrid users need to be able to create or alter existing content.

IT requirements for Hybrid users on Smartphone devices:

The high-level characteristics for Hybrid users working on Smartphone devices are:

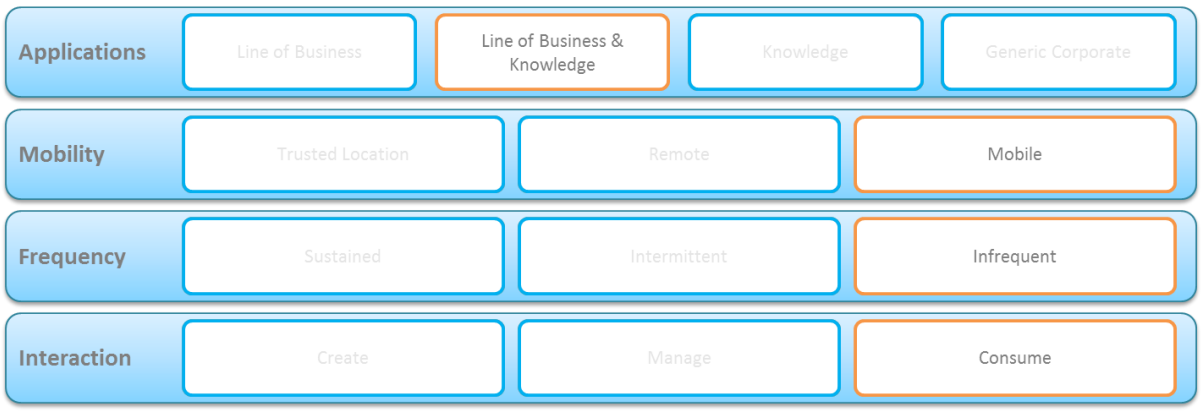


FIGURE 18 - USER SEGMENT FOR HYBRID USER

Applications: Hybrid users require knowledge applications, such as email, calendar, collaboration, communication and office productivity tools / applications.

Mobility: While mostly working from trusted locations, Hybrid use smartphone devices which they need to be portable.

Frequency: Hybrid users will tend to use their smartphone devices on an intermittent basis.

Interaction: Hybrid users mostly use their smartphones for consuming information and data.

Usage scenarios for devices
The following sections will outline the usage scenarios for devices for Hybrid users:

- **Desktop:** A desktop is likely to be the primary device issued to a Hybrid user given their application needs, their expected use cases for these applications as well as the constant location required by their usage pattern. This desktop is likely to take the following configuration.
    - **Desktop with Thick OS:**
      A desktop PC with an Operating System which runs on a thick client device and provides rich functionality, independent of a central server. Examples include Microsoft Windows, Unix, Linux, and OSX. This section will also cover a desktop PC as a hybrid with an Operating System that runs on a thick client device, but also relies on another server(s) to fulfil its computational roles.
    - **Thin Client with Thin OS:**

An unintelligent device running a thin Operating System which relies heavily on central server for its computation roles. Examples include Windows Embedded and Zero Clients.

- **Devices using Web Services:**
  A device (desktop, laptop or thin client) with an Operating System, connected to the network using web based applications.

- **Smartphone:** A Hybrid worker might additionally receive a smartphone as a secondary device given their application needs, their expected use cases and the flexibility required by their role. Smartphone will be primarily used to access and consume information.

The figure below details the elements of the EUD Framework applicable to Hybrid workers:

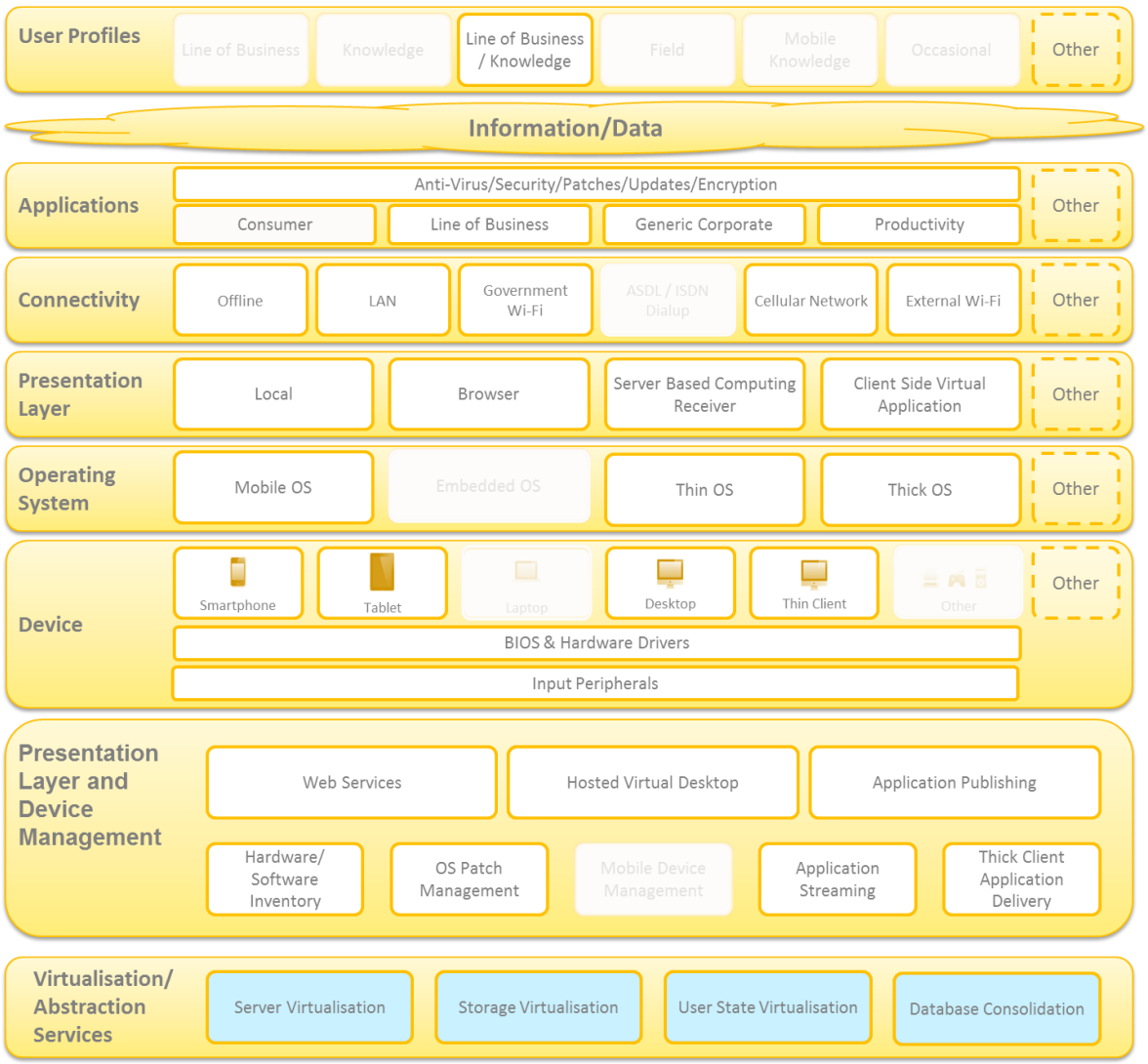


FIGURE 19 – LIGHTBOARD WITH ELEMENTS APPLICABLE TO HYBRID USERS

7.4.1 HYBRID USER – A DAY IN THE LIFE EXAMPLE

The following section is an example scenario from, the user's point of view, of how technologies and devices might be exploited to enable greater flexibility and productivity. It is based upon the assumption that all data would be classified at the entry level of the new Government Protective Marking Scheme, and that appropriate solutions are developed and assured.

7.4.1.1 SCENARIO

Janet develops operational policy within a government department. She spends much of her time using office productivity tools (email, word processing etc), but also needs access to Line of Business systems. Her main use of IT is from a fixed office location. However, sometimes she finds it helpful to work from home. She has a corporate solution to work from her personally owned home computer (using email, generic office tools and filestore).

- Janet has a medical appointment today at her local GP, so is working from home this morning. She logs into her corporate environment from her own computer and checks her emails, responding as necessary.
- Janet's main concern this morning is to start work drafting a policy document. She also needs to run some reports on operational data from a Line of Business system, but this will have to wait until she gets into the office. Janet starts work drafting her document using a word processor, until it is time for her appointment, saving her work before she leaves.
- Once Janet has finished at the doctor's, she travels into the office and logs into an available workstation. Now she can attend to her operational reports. She opens the relevant line of business application and starts the process of retrieving and analysing the data.
- Picking up where she left off with her policy documents, Janet spends the rest of the day finalising and submitting these.

7.4.1.2 CRITICAL SUCCESS FACTORS FOR THIS SCENARIO

- User can access all of their services from any suitable corporate fixed workstation.
- Boot up/log in time and shutdown/lock down time of corporate environment is minimised.
- Continuity of state across corporate fixed workstations (personal settings persist, user experience is the similar)
- User can remotely access email, calendar, generic office tools (word processing, spreadsheets, presentations etc), collaboration and filestore from their own home computer.
- User uses a secure network link to access organisational resources.
- End to end user experience is comparable to reasonable modern expectations, and conducive to productivity.
- Appropriate security requirements are adhered to.

7.4.2 HYBRID – DESKTOP WITH THICK/THIN OS

The solutions are the same as described in 6.1.1.2 and 6.1.1.3 for Line of Business User and 6.1.3.2 and 6.1.3.3 for a Knowledge Worker.

The factors which tip the choice in favour of a thick or thin OS are:

- Whether the key elements of the role tend more towards Line of Business applications of Knowledge
- Whether the Line of Business Applications can be supported in a thin client environment (see Part 1)
- Whether the user experience in a thin OS environment has the capability to support all aspects of the Knowledge worker role

7.4.3 HYBRID – SMARTPHONE/TABLET WITH MOBILE OS

The diagram below highlights components in each Framework Level applicable to Hybrid users with Smartphone with Mobile OS.

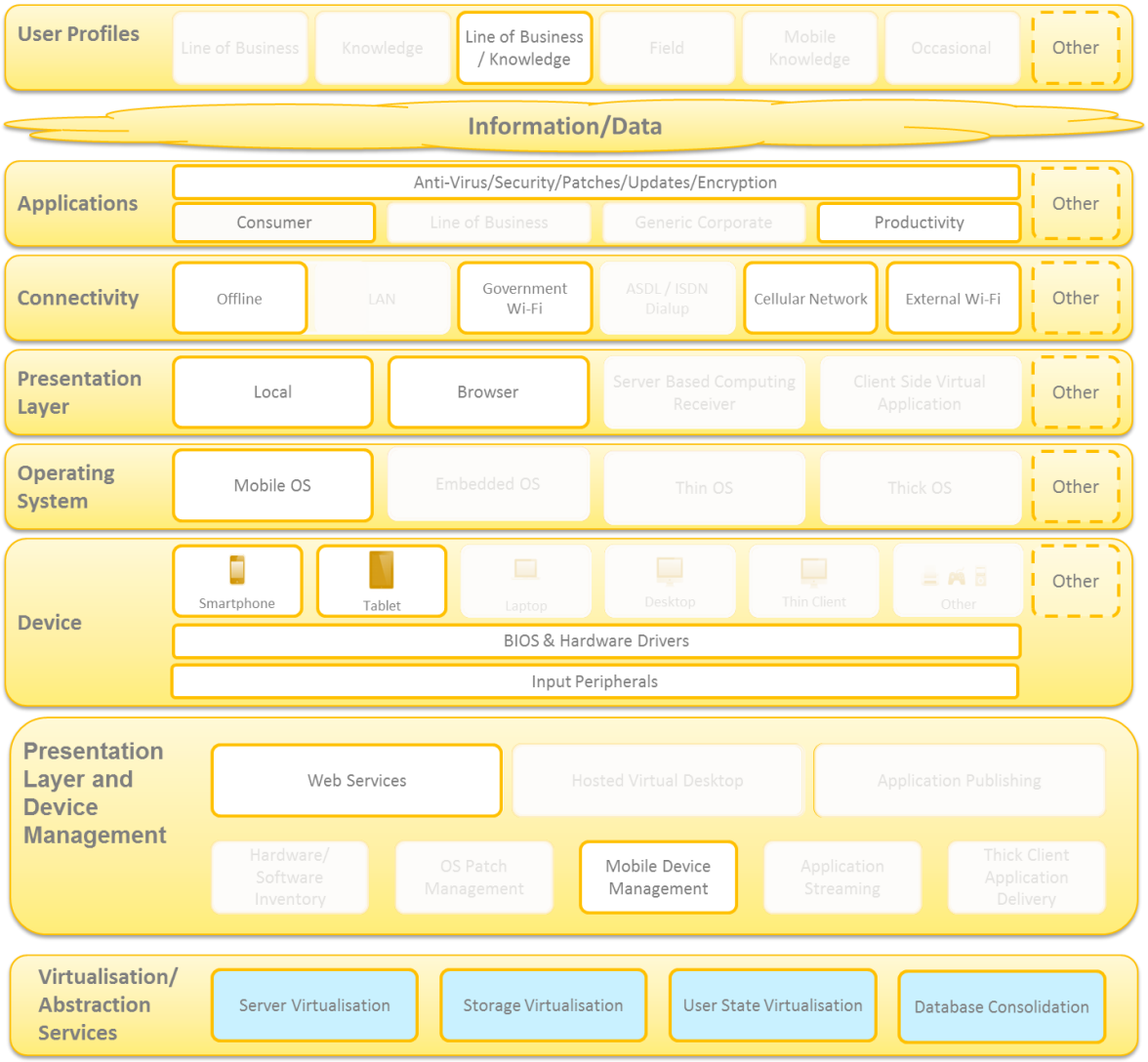


FIGURE 20: LIGHTBOARD FOR HYBRID USERS WITH SMARTPHONE/TABLET WITH MOBILE OS

The highlighted components of **Presentation Layer and Device Management** (such as Web Services and Mobile Device Management) in the figure above have already been covered in the section 6.1.5.1 (Device Management Considerations) and section 6.4.1.4 (Security Technology). Refer to this section for further information.

The Smartphone and Tablet components in **Device Layer** are covered in section 6.1.5.2 (End User Devices). This section details the current market landscape for smartphones. It also discusses the device provisioning models and mobile web applications. The Mobile OS component in **Operating System Layer** is covered in section 6.1.4 (Operating System Layer). Refer to respective sections for further information.

Presentation Layer components (such as Local and Browser) are explained in section 6.1.3. Refer to this section for further details.

Connectivity Layer and Application Layer components are detailed in section 6.1.1 (Application Layer) and 6.1.2 (Connectivity Layer) respectively. Refer to these sections for further details. Additionally, refer to section 6.5.4 for **implementation guidelines** on smartphones / tablets.

7.4.4 Case Study

7.4.4.1 Oil and Gas Corporation

A multinational oil and gas corporation recently implemented a BYOD policy for mobile devices allowing employees to use their personal mobile devices to access corporate data (provided they met minimum security standards). This increased user satisfaction and maximised their effectiveness, using the devices they already owned with many users enrolling both a phone and a tablet. Granting access to corporate email gave greater flexibility of working for all employees, improving productivity. Additionally a 'self-service portal' was created which allowed users to manage their own devices, reducing the load on technology support staff.

Following the success with mobile devices, the program is due to be extended to laptops and other devices with an eventual aim of moving away from prescribed corporate devices altogether.

7.5 USAGE SCENARIOS FOR FIELD USER

A Field user needs access to Line of Business and productivity applications, which are available on the move (including offline). A Field user might be a visiting officer, investigator or caseworker who needs to access or update customer records both online and offline as well as create documents and manipulate data.

Given the Field worker profile, it is likely that the following devices will be utilised:

- A laptop – if their role is more based around creating information.
- A tablet – lightweight device if their role is more based around managing information.
- A smartphone - if their role is based around accessing or consuming information.

In the case of Field users, it is likely that ergonomics will also be a deciding factor when selecting devices. For example, a tablet may be more appropriate for those who need to use IT while standing.

IT requirements for Field users on Laptop devices:

The high-level profile for a Field worker using Laptop is:

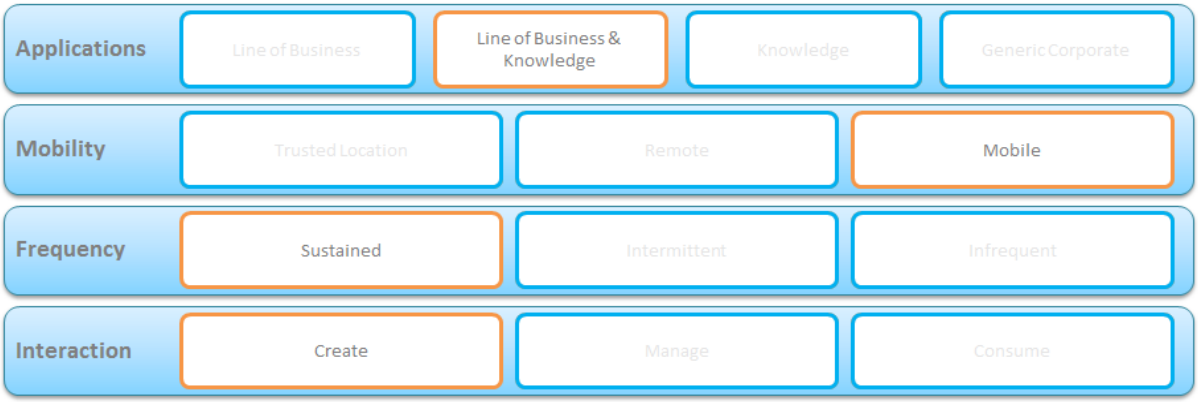


FIGURE 21 – USER IT SEGMENT FOR KNOWLEDGE USER

Applications: Field user requires knowledge applications, such as email, calendar, collaboration, communication and office productivity tools / applications. They will also require Line of Business applications on move.

Mobility: Field users typically need to be mobile and need their IT devices to be highly portable but will need a keyboard to support sustained data input.

Frequency: Field users require access to services throughout their working day, and need sustained access to their applications and laptop devices.

Interaction: Field users in this category need to be able to create new or alter existing content.

IT requirements for Field users on Smartphone devices:

The high-level characteristics for Field users working on Smartphone devices are:

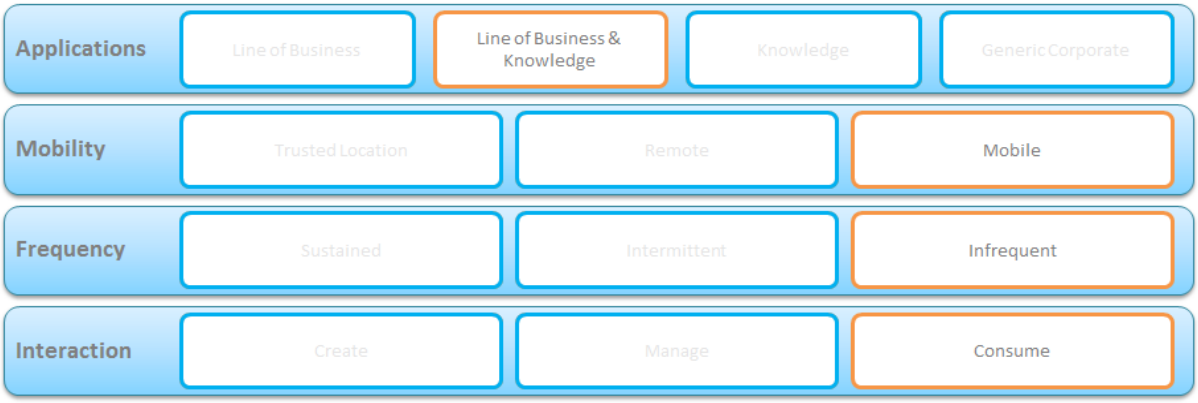


FIGURE 22 - USER SEGMENT FOR KNOWLEDGE USER

Applications: Field users require knowledge applications, such as email, calendar, collaboration and communication applications.

Mobility: Field users are mobile and need their IT devices to be portable.

Frequency: Field users will tend to use their smartphone devices on an infrequent basis.

Interaction: Field users mostly use their smartphones for consuming information and data.

IT requirements for Field users on Tablet devices:

The high-level characteristics for Field users working on Tablet devices are:

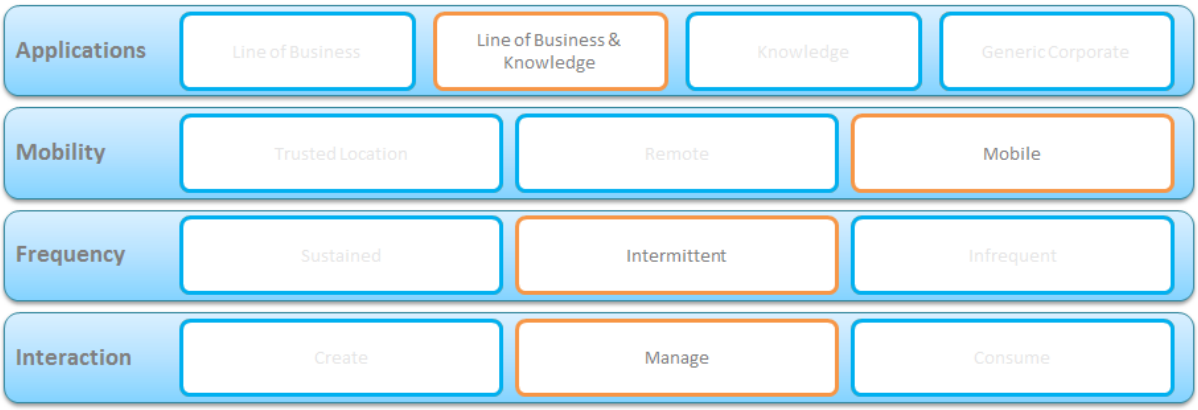


FIGURE 23 - USER SEGMENT FOR KNOWLEDGE USER

Applications: Field users require knowledge applications, such as email, calendar, collaboration, communication and office productivity tools / applications.

Mobility: Field users typically need to be mobile and need their IT devices to be portable therefore size and weight is critical requirements to ensure suitability.

Frequency: Field users will tend to use their tablet devices on an intermittent basis.

Interaction: Field users mostly use their tablets for managing information and data. The device may also be used in special cases to create information.

Usage scenarios for devices
The following sections will outline the usage scenarios for devices for Mobile Knowledge users':

The following sections will outline the usage scenarios for devices for Field users':

- **Laptop/Tablet with Thick OS**
  A laptop or tablet with an Operating System that runs on a device, providing rich functionality independent of a central server. Examples include Microsoft Windows, Unix, Linux and OSX.
- **Devices using Web Services:**
  A device (desktop, laptop, thin client, Tablet and Smartphone) with an Operating System, connected to the network using web based applications.
- **Smartphone / Tablet with Mobile OS**
  A Field Worker might additionally receive a smartphone or tablet as a secondary device given their application needs, their expected use cases and the flexibility required by their role. Smartphone will be primarily used to access and consume information, while tablet will generally be used to manage information.

Note that no consideration is given at this time to laptops with thin OS due to lack of market penetration.

The figure below details the elements of the EUD Framework **applicable to Field workers**:

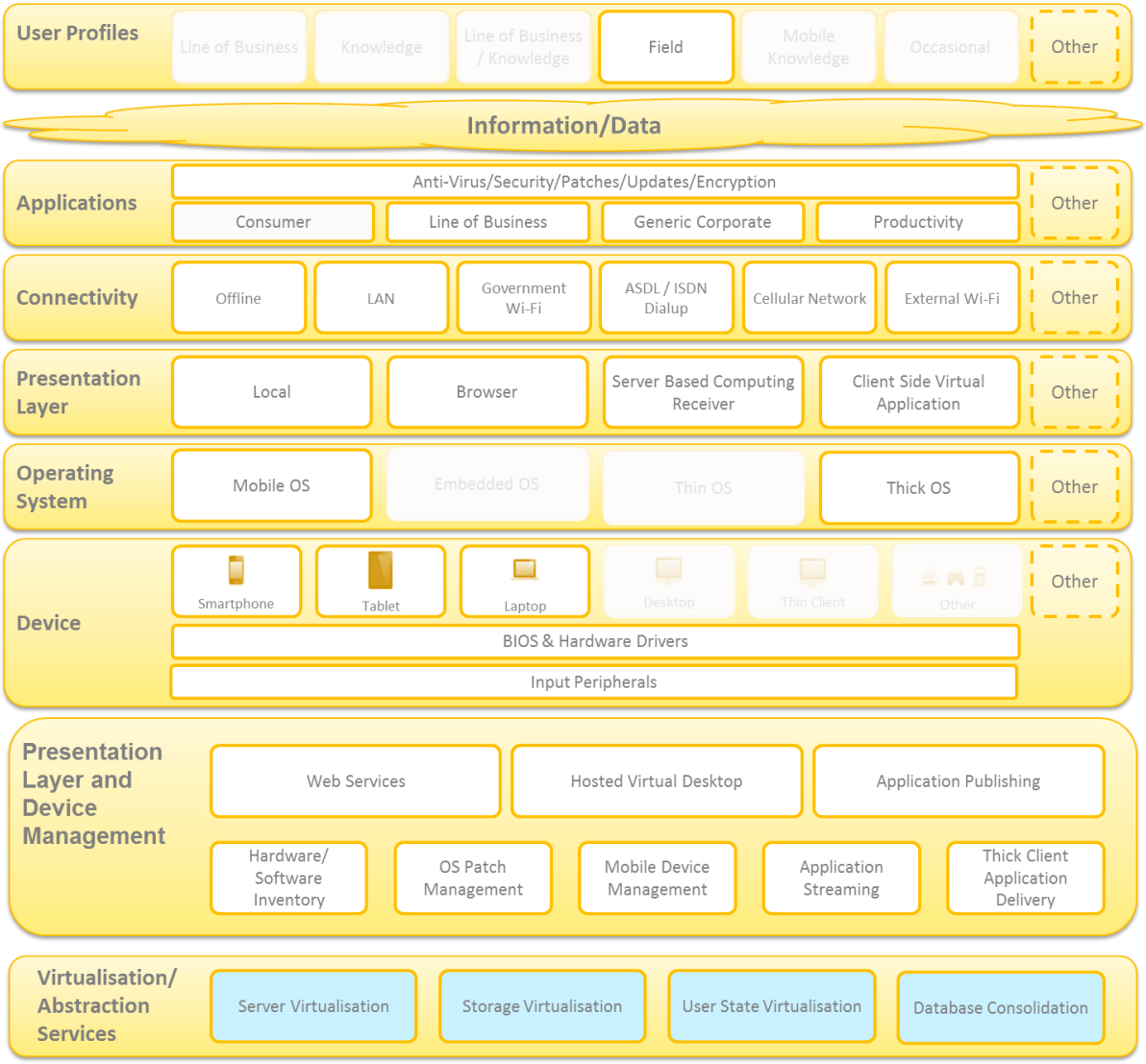


FIGURE 24: LIGHTBOARD WITH ELEMENTS APPLICABLE TO FIELD USERS

7.5.1 Field User – A Day in the Life Example

The following section is an example scenario from, the user's point of view, of how the EUD Technical Framework can be exploited to enable greater flexibility and productivity. The scenario is based upon the assumption that appropriate solutions are developed and assured in line with the appropriate security controls.

7.5.1.1 Scenario

Greg is a visiting debt collector for a government department. He mainly uses his IT while on the move, often without being able to sit down at a desk. He has a corporate tablet device and smartphone. He also has a printer in his car.

- When he sets out for work, Greg already has his appointments for the day planned out in his calendar. He travels by car, and uses his smartphone's calendar and SatNav capability to find the first destination.
- When he arrives Greg logs into his tablet device and explains the reason for his visit to the business owner. He refers to the relevant customer records on his tablet for details of the debt, and negotiates the next steps in the process. They agree upon settling the payment, and Greg updates his records accordingly.
- At his next stop, Greg has to issue a distraint warrant, impounding goods as surety against payment within a fixed time. Greg uses his tablet to confirm that no payment has yet been received, and compute the amount including interest before he continues.
- He proceeds with filling in the relevant forms on his device, and returns to his car to print out the owner's paperwork. He also uses his tablet to photograph the secured goods for his records.
- When Greg has completed his remaining visits, he returns home and docks his device with a keyboard and mouse to finish writing up the day's cases. He also plans tomorrow's visits and books his annual leave before finishing for the day.

7.5.1.2 Critical Success Factors for this Scenario

- Boot up/wake up time and shutdown/lock down time of devices is minimal.
- Battery life of devices is maximised and practical (e.g. smartphone lasts at least all day)
- Tablet device is compact and lightweight enough to carry throughout the working day.
- Tablet device is able to take photographs.
- Smartphone / tablet device is GPS enabled.
- User can access all of their services (including line of business systems) from their tablet, remotely, over wifi and the mobile network if required
- User can access email and calendar services from their smartphone, as well as use commodity functionality such as mapping and satellite navigation.
- Calendaring services synchronise across device types wirelessly, and are available off-line (as far as possible).
- User is able to print from the tablet to a mobile printer.
- End to end user experience is comparable to reasonable modern expectations, and conducive to productivity.
- Appropriate security requirements are adhered to.

7.5.2 Laptop/Tablet with Thick OS

The solutions are the same as described in 6.1.2.2 for a Mobile Knowledge Worker.

7.5.3 Smartphone / Tablet with Mobile OS

The diagram below highlights components in each Framework Level applicable to Field users with Smartphone and Tablets with Mobile OS.

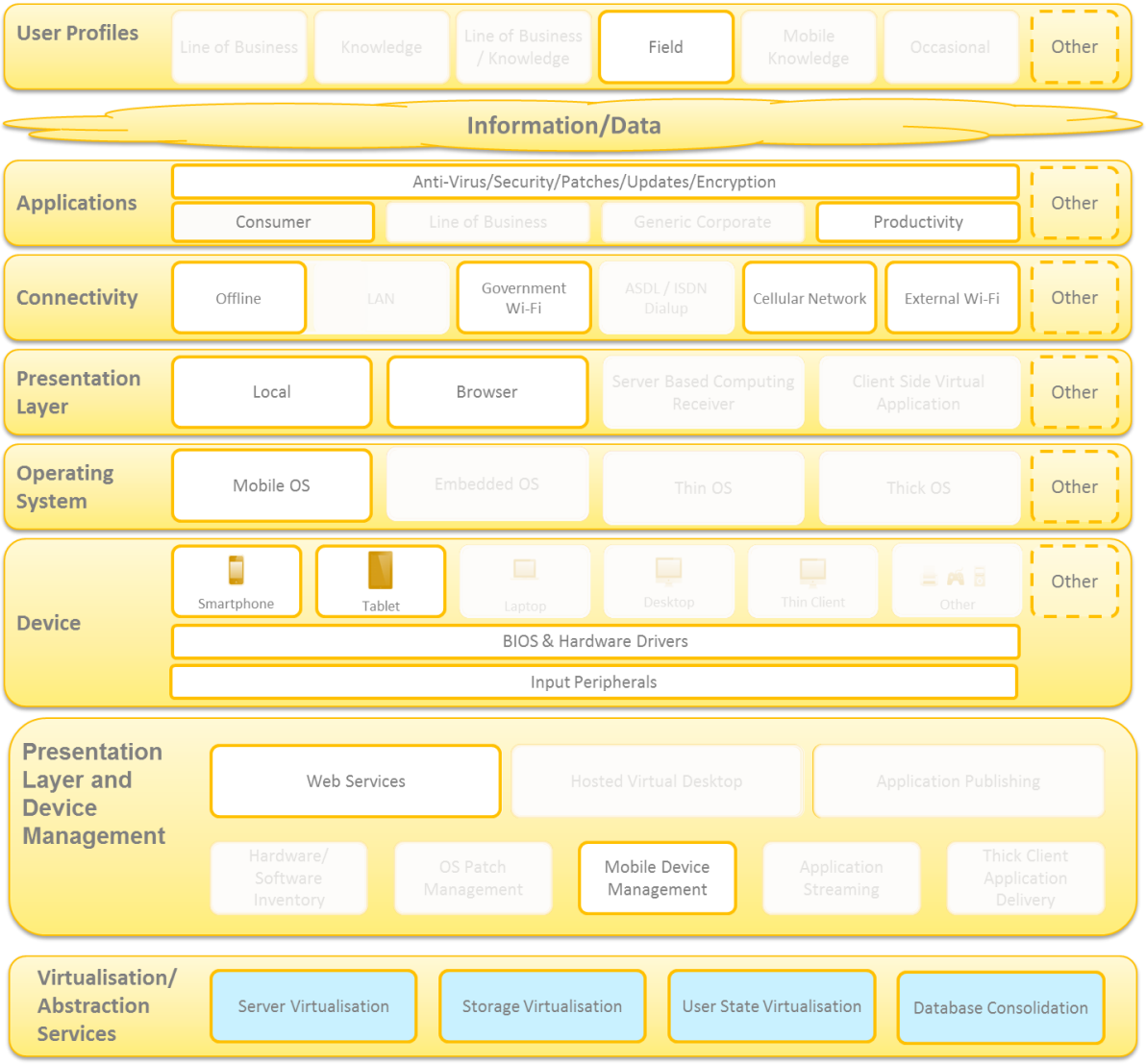


FIGURE 25: LIGHTBOARD FOR FIELD USERS WITH SMARTPHONE / TABLET WITH MOBILE OS

The highlighted components of **Presentation Layer and Device Management** (such as Web Services and Mobile Device Management) in the figure above have already been covered in the section 6.1.5.1 (Device Management Considerations) and section 6.4.1.4 (Security Technology). Refer to this section for further information.

The Smartphone and Tablet components in **Device Layer** are covered in section 6.1.5.2 (End User Devices). This section details the current market landscape for smartphones and tablets. It also discusses the device provisioning models and mobile / tablet web applications. The Mobile OS component in **Operating System Layer** is covered in section 6.1.4 (Operating System Layer). Refer to respective sections for further information.

Presentation Layer components (such as Local and Browser) are explained in section 6.1.3. Refer to this section for further details.

Connectivity Layer and Application Layer components are detailed in section 6.1.1 (Application Layer) and 6.1.2 (Connectivity Layer) respectively. Refer to these sections for further details. Additionally, refer to section 6.5.4 for **implementation guidelines** on smartphones / tablets.

7.6 USAGE SCENARIOS FOR OCCASIONAL USER

Occasional Users have no reliance on IT to complete their core activities and only need access to systems to carryout supporting tasks such as viewing their payslip or booking annual leave. These tasks would always be carried out from a fixed trusted location and they could be carried out on a device shared with other users in the category.

Given the Occasional User, it is likely that the following devices will be utilised:

- A shared desktop

Organisations should also look at using devices such as Smartphones / Tablets / BYOD for accessing applications that are not sensitive in nature.

IT requirements for Occasional Users on Desktop devices:

The high-level profile for an Occasional User using desktop is:

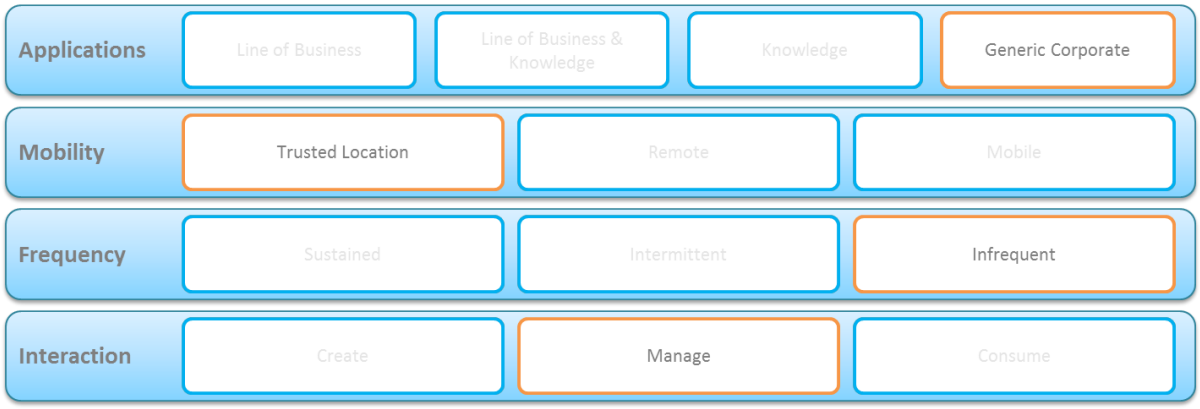


FIGURE 26 – USER IT SEGMENT FOR LINE OF OCCASIONAL USER

Applications: Occasional Users require only Generic Corporate applications.

Mobility: Occasional Users typically work from a range of locations but due to their usage pattern they only access systems from a trusted location.

Frequency: Occasional Users require only infrequent access.

Interaction: Occasional Users use desktops only to alter or consume information.

The figure below details the elements of the EUD Framework applicable to Occasional Users:

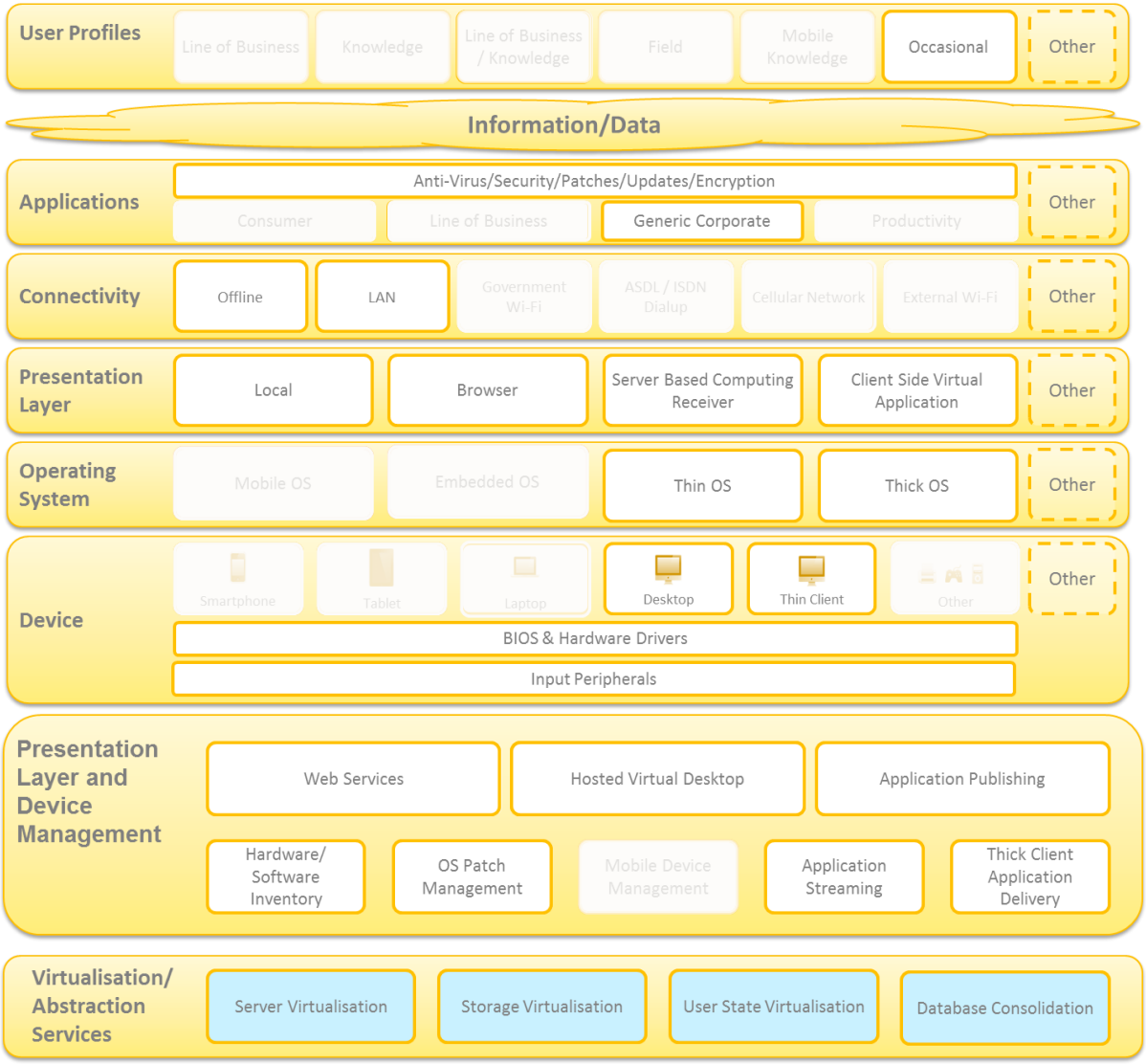


FIGURE 27: LIGHTBOARD WITH ALL ELEMENTS APPLICABLE TO OCCASIONAL USERS

7.6.1 Occasional User – A Day in the Life Example

The following section is an example scenario from, the user's point of view, of how the EUD Technical Framework can be exploited to enable greater flexibility and productivity. The scenario is based upon the assumption that appropriate solutions are developed and assured in line with the appropriate security controls.

7.6.1.1 Scenario

Paul works as a security guard for a government department. He doesn't use a device in his normal daily tasks but has access to a desktop to access Generic Corporate applications.

- Paul finishes a shift but before leaving the office, decides to book some holiday. He finds a free desk office and logs in to the shared desktop located there.
- Opening the 'vacation' tracker he can see the calendar of his shifts and any holiday he already has booked. He adds his new holiday booking submits his booking.
- Paul receives a confirmation of the holiday booking and logs off from the desktop. His manager is also immediately informed of the booking by email so she can account for it when planning Paul's shifts.

7.6.1.2 Critical Success Factors for this scenario

- Boot up/wake up time and shutdown/lock down time of devices is minimal.
- User experience of required applications on accessed device is suitably smooth and intuitive for a user who may not be familiar with the application due to their occasional use.
- End to end user experience is comparable to reasonable modern expectations, and conducive to productivity.
- Appropriate security requirements are adhered to.

7.6.2 Occasional – Shared Desktop with Thick/Thin OS

The key factors involved in identifying the choice between the two main options of a thick or thin device will be established by following the best practice guidelines in Part 1.

The solutions are similar to those described in 6.1.1.2 and 6.1.1.3 for Line of Business User and 6.1.3.2 and 6.1.3.3 for a Knowledge Worker.

Some of the factors which tip the choice in favour of a thick or thin OS are:

- Whether the Generic Corporate Applications used can be supported in a thin client environment (see Part 1)

- Whether the user experience in a thin OS environment is suitable for an Occasional user, particularly given that their level of IT exposure is likely to be lower than for the other user types.

7.6.3 CASE STUDY

7.6.3.1 MINISTRY OF DEFENCE

Ministry of Defence use a secure web-portal to provide employees with access to selected information from their HR systems. The solution allows military personnel who need to / or without other access to remotely view their payslips from any device with a suitable web browser, at home or overseas. This enables government to fulfil its commitments for providing pay details to employees, without the need for printing and mailing paper payslips.