MOBILITY VS PRODUCTIVITY

AN EXPLORATION OF COMPUTING HARDWARE, SOFTWARE, AND INTERFACE

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PROBLEM

The inverse relationship between mobility/portabiliy and functionality/productivity has been present throughout the developement of computer harware due primarily to physical dimensions. The mobility of a computer system is directly proportional to the size of the device: as mobiilty of a device increases the performance potential decreases. This is why there has been a fragmentation of mobile devices into many different sizes to suite various mobility and productivity needs.

In addition to the hardware limitations of increased portability, the software/user interface also becomes restricted with reduced screen size and less input options.

Let's generalize across the main 5 current computer hardware formats to compare the main differences and examine how this mobility vs productivity trade off breaks down. (Figures pulled from scanning Newegg.com in August 2010.)

	Desktop	**Laptop**	**Netbook**	**Tablet**	**Handheld**
Screen size	17"-30"	12"-17"	10"-13"	7"-12"	3"-5"
CPU	Quad core	Dual core	Dual core	Dual core	Single core
RAM	4-32 GB	2-16 GB	1-2 GB	2-6 GB	1 GB
Disk space	1+ TB	500+ GB	250+ GB	64+ GB	4+ GB
Media drives	DVD, card reader	DVD		SD card	SD card
Input	Keyboard, mouse, trackball, touch pad, tablet, touch screen, gamepad, joystick	Keyboard, mouse, trackball, touch pad, tablet, touch screen, gamepad, joystick	Keyboard, mouse, trackball, touch pad, tablet, touch screen, gamepad, joystick	Keyboard (virtual), touch pad, touch screen	Touch screen, Camera
Mobility rating	5th	4th	3rd	2nd	1st
Performance rating	1st	2nd	3rd	4th	5th

DESKTOP

A desktop is the largest and least mobile computer and as such it is the most powerful. The power supply on some desktops can weigh as much an entire laptop. Desktops also offer additional space to enhance the system with multiple hard drives, multiple disk drives, sound cards, network cards, graphics cards, etc. which other smaller computers are not able to support. Since a desktop system is rarely moved, it can also benefit from permanent peripherals such as large and multiple monitors, multiple input devices, and advanced speaker hardware. These systems are ideal for heavy computing including graphic work, video games, and data analysis. Here is the general configuration of a desktop system.

1. Desktop tower
2. Monitor
3. Keyboard
4. Mouse
5. Speakers

LAPTOP

A laptop attempts to take the key aspects of a desktop and package it to be relatively mobile. Since weight is now an issue, this means there will be a smaller screen, smaller power supply, weaker CPU, less RAM, and less storage space. And obviously it must contain a battery to be functional when a power outlet is not available. Tablets are adequate for moderate content creation but most often used for mobile entertainment, browsing the web, and communication. Here is the general configuration of a laptop system.

1. Built in screen
2. Built in keyboard
3. Built in touchpad
4. Built in speakers
5. Battery

NETBOOK

Netbooks are a more recent format as computer hardware became powerful enough for the average person to not need as large and powerful a device as a laptop. A netbook further compromises productivity/power in favor of mobility. With slower processors, less RAM, and less hard drive space, a netbook can be very small and light weight. This brings superior mobility over a laptop but sacrifices performance in the process. The general configuration of a netbook is identical to a laptop system.

1. Built in screen
2. Built in keyboard
3. Built in touchpad
4. Built in speakers
5. Battery

TABLET

Tablets are not entirely new, but up until the Apple iPad, they had not achieved any success. Tablets are yet another step towards maximizing mobility. A tablet is for all intents and purposes a netbook with the keyboard and touchpad replaced with a touch screen. In this case the productivity of a keyboard and touchpad is the only aspect that has been sacrificed. This is still a new enough hardware format that it is yet unclear whether the touch screen is adequate enough an input method to forego a physical keyboard. The general hardware configuration is getting even more sparse.

1. Built in touch screen
2. Built in speakers
3. Battery

HANDHELD (PHONE)

The handheld/phone is the smallest device and is thus the most mobile. These devices have been skyrocketing in popularity because recent hardware developments allow a great amount of productivity in a very mobile package. Extremely functional touch based UI (sparked by the iPhone) is largely the cause for this success. Hardware advancements also factor in since the successful UI wouldn't be possible without the hardware to run it on. These are most often referred to as "smart phones" but that focuses on just one of a great many functions they serve: applications, web, phone, calendar, email, instance message, GPS - it's a full blown operating system. For this

reason, I will refer to them as handhelds. The general hardware configuration for a handheld is almost the same as the tablet but smaller in size.

1. Built in touch screen
2. Built in speakers
3. Camera
4. Battery

OTHER/HYBRID

With other hybrid hardware configurations such as nettops (a netbook for the desk), desktop replacement laptops (very large, heavy, and powerful laptops), laptops and netbooks with touch screens, and handhelds with keyboards, there are numerous solutions to the mobility vs. productivity problem. These systems take the basic hardware configurations from one of the main categories I described above and include a trait from one of the others. In effect, these hybrid systems straddle the line between the main 5 computer types but they do not represent a majority.

HARDWARE DUPLICATION

Where someone to have multiple devices, a desktop, laptop, and handheld for instance, there would be 3 screens, 3 power sources, 2 keyboards, 3 CPUs, 3 sets of RAM, at least 3 data storage locations, and so on. On top of that, all of these duplicate components generally only work with components within a single device; the RAM from a handheld or tablet can't be utilized by an attached system. Hard drives can be shared across devices when linked together, and more recently network devices can be shared with tethering. However, this leaves other core system components (CPU, RAM, GPU, etc.) isolated within a single device.

With less space to store the larger components, larger batteries for the higher energy needs, and the need to dissipate the higher heat that is generated, this step down of hardware is an unavoidable consequence of increasing a computers mobility. Unfortunately this brings about many negative consequences that the user has to deal with. Here are some of these negative aspects.

1. Hardware
    - Keeping multiple devices charged.
    - Keeping multiple devices secure.
    - Keeping data synchronized across multiple devices.
    - Keeping peripherals compatible across multiple devices.
2. Software
    - Changing applications between multiple devices.
    - Relearning basic system structure.
    - Relearning limited input options.

SOLUTION

I propose a unified hardware and software model to allow greater mobility and productivity as needed by the user. If a single platform allowed the user to gradually increase mobility by reducing the computing power while having a consistent user interface, many of the current difficulties could be overcome.

HARDWARE

Most people think of a "computer" as the monitor/screen, as it's the thing that you are always looking at, so I will start there. Desktop systems often have screens beyond the 20" mark, something that would be too large and heavy for a laptop. Laptops most often max out at 17". Netbooks are usually around the 12" size but what actually constitutes a netbook is still up for debate. Tablets are similar in size to netbooks but can also be smaller and begin to blur into handhelds. Handhelds are the smallest so anything less than 5-6" which can function reasonably as a phone when held to the ear. With the proliferation of touch screen smart phones, the largest distinguishing characteristic in individual hardware configuration is becoming screen size.

With memory density increasing, battery capacity and efficiency increasing, software power optimization, and continual processor advances, I suspect that within a few years a handheld computer will have the physical hardware capable to run most users needs. When this happens the largest difference between a handheld, tablet, and desktop will be screen size. Even if a super computer could fit into a dime, humans will still need a large enough screen to see and interact with the system.

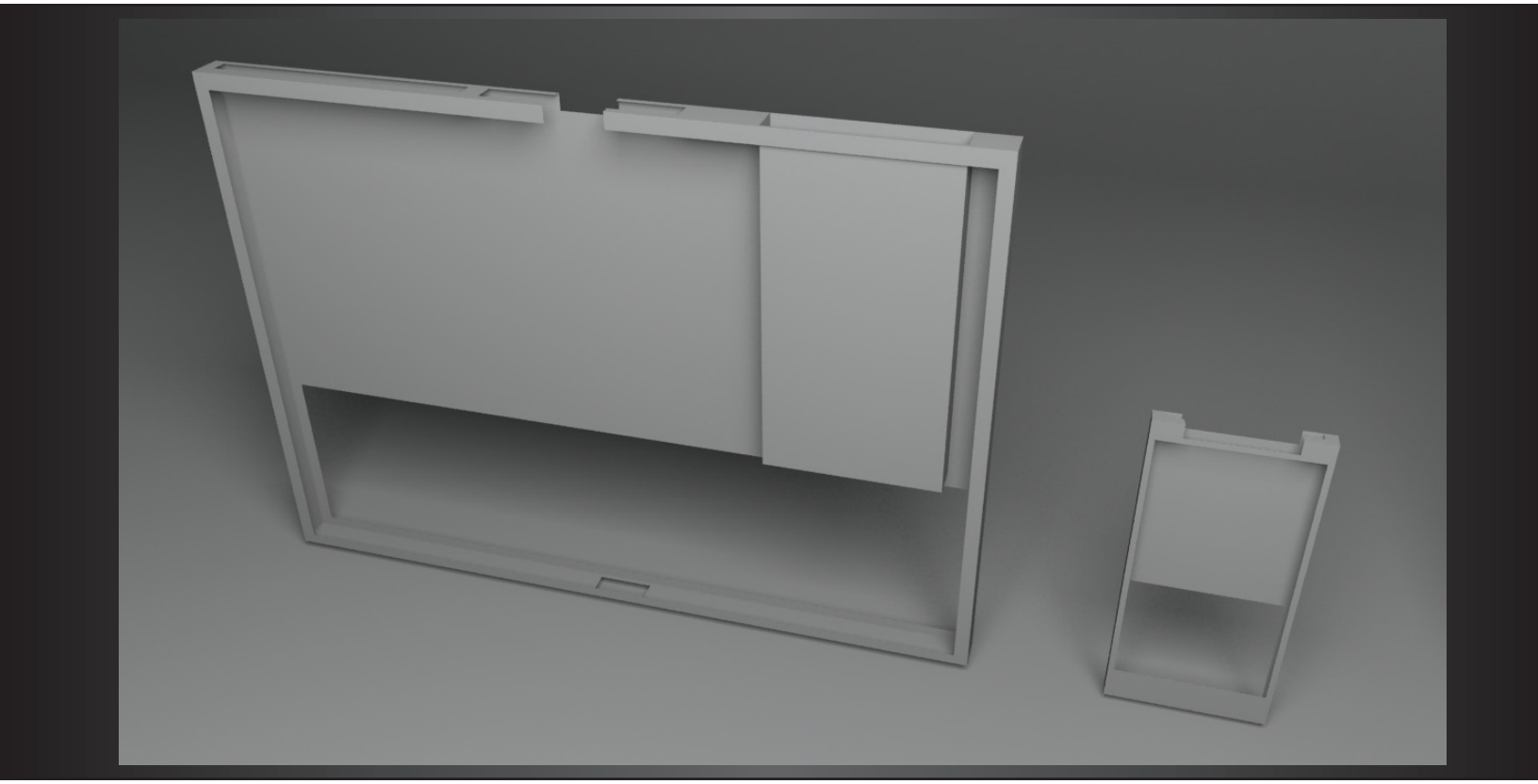
The laptop/netbook/tablet straddles the mobility vs productivity fence the best of the main 5 device categories. So is there a way to allow the user to add productivity or add mobility to the device as needed? A docked tablet could function as a desktop, but how can a tablet be made more mobile? The answer is if it a handheld were docked within it.

This might seem redundant at first glance to have a handheld within a tablet, but realize that handhelds are becoming almost like wallets, an item that's core to a person's identity (and could eventually replace the wallet). The handheld is in essence the digital identity of the owner. Handhelds are the smallest/lowest level of the mobility/productivity chain and like the Earth's ecosystem more complex systems are built from the smallest component.

FORM FACTORS

Desktop motherboard form factors (ATX, Ultra ATX, Micro ATX, etc.) allow the (educated) consumer to build a system to their needs with components they choose. If this principle was applied to smart phones and tablets, a consumer could get a device more suited to their needs and within their budget. It would also simplify replacement of components for upgrades and repair. There is currently no widely used laptop motherboard form factor and thus every device is very specific and loses all the benefits of having a form factor.

Some might criticize a form factor as making all systems look the same or limiting development. However, if you look at current handheld designs they already do look very similar, with a screen dominating the overall appearance. While desktop computers have form factors and there are plenty of variety in desktop designs. My hope is that establishing a form factor would encourage development.



SHARED HARDWARE

The trend towards hardware ambiguous operating systems is quickly approaching if not already here. The current generation of Microsoft Windows, Mac OSX, Linux and the more recent Jollicloud and Meego are very capable of matching themselves to the hardware which they are installed on. Setting up a new desktop computer today is a breeze compared to a decade ago. This is largely because of device detection and retrieving device drivers as needed from the web. If this trend continues, the OS layer will become almost completely independent from the hardware layer and could be switched if needed. Even now notebooks and handhelds can often run operating systems other than they were designed for with little manipulation.

Some operating systems already allow some sort of hot swappable device. Windows allows RAM extensions with USB drives of adequate transfer speeds, and recent developments are allowing video cards to be powered on and off and used just when needed. This opens the door for systems to have even more hot swappable components.

The USB connection type allows “daisy chains” of multiple devices that pass through each other. One other benefit of the USB connection standard is that it is backwards compatible; a USB 3.0 connection supports USB 2.0 as well. I see the principles of the USB connector taking us in the direction of almost completely adaptive operating systems, where multiple devices could form dynamic links together to share all physical resources (CPU, RAM, Hard drives, etc.). A fiber optic connection between devices would allow the fastest possible speeds for the sharing of system resources (such as Intel’s Thunderbolt technology). However, seeing as this specific technology doesn’t exist yet I will refer to this connection type as SystemLink from this point on.

SYSTEMLINK

The SystemLink connection type would allow a chain of devices to all share system resources; handheld to tablet to a dock and finally to a desktop. Even though wireless communications between devices is becoming very common (Bluetooth, Wi-Fi, Infrared (IR), etc.) I believe a physical connection is required when systems are sharing physical resources. Any two devices equipped with the SystemLink connector could connect to another device and share system resources. When devices are connected together and sharing system resources they act like a cluster; allowing systems to disconnect and new systems to connect while in use with little change in the user experience. This would also mean that new devices can be linked together over time. That is to say that someone can purchase a tablet or handheld first and then buy the other later. It isn't necessary to buy all the devices at once if they are not needed.

PORTS

As the mobility of a device decreases the need for a greater number of peripheral connectors increases. A handheld would likely need no more than a couple devices connected at a time, while a desktop system could have a great many, especially in professional work environments. For this reason, the available connectors would increase with size. Of course there are also wireless technologies to allow devices to link together. This list describes how the number of ports could decrease as mobility increases.

- Desktop (depends on system form factor, motherboard, video card, and sound card)
    - 4 Standard USB
    - 2 Micro USB
    - 2 Analog/DVI/HDMI out
    - 5.1 Audio
    - Card reader
    - 2 SystemLink
- Tablet
    - 3 Micro USB
    - HDMI out
    - Micro SD card slot
    - Audio headset jack
    - 1 SystemLink
- Handheld
    - 1 Micro USB
    - HDMI out
    - Micro SD card slot
    - Audio headset jack
    - 1 SystemLink

WIRELESS CONNECTIONS

Highly mobile devices don't have room for numerous ports, and that's where wireless connections come into the picture. There seems to be a new form of wireless communication every few months; most recently near-field communication (NFC) and wireless HD video. The device manufacturer would ultimately decide which components to support, but I suggest the more the better: Wi-Fi, CDMA, GSM, GPS, NFC, wireless HD, IR, Bluetooth, etc. The more connection options available the more devices can be connected to. These wireless connections make

most sense on a very mobile device such as the handheld, but could also be included in a tablet and desktop.

The handheld and tablet would also both support inductive charging. It is much more natural for a mobile device to be charged whenever not being held.

KEYBOARD

The debate for and against having a physical keyboard continues to rage on among the tech savvy, but I see a touch screen combined with good UI design trumping a physical keyboard for most tasks. Keyboards allow greater productivity, but they can limit mobility. Desktop users obviously require a keyboard for heavy content creation. However, as mobility increases the need for text heavy content creation decreases. This decrease indicates the limitations of not having a hardware keyboard are outweighed by the benefits of a software keyboard. Of course the peripheral market could supply the consumer with an abundance of hardware keyboards and other input options; Bluetooth keyboard/mouse, USB wireless adapter keyboard and mouse, case with built in keyboard, etc..

SOFTWARE

In the world of web design HTML and Cascading Style Sheets (CSS) allow different display types for the same content. This allows the designer to create multiple formats for the same content. If this principle extended to software, then a single program could be designed to run in different modes: desktop/docked, tablet, handheld. The handheld mode would be a subset of the tablet mode, and the tablet mode would be a subset of the desktop mode.

Software would be written with different modes for different devices:

1. Desktop = large screen, keyboard, mouse
2. Laptop/Netbook/Tablet = medium screen, touch or keyboard and mouse
3. Handheld = small screen, touch

OPERATING SYSTEM CONSISTENCY

There is currently little consistency between desktop/laptop (Windows 7, Mac OS X, Linux) and handheld operating systems (Windows Phone 7, iOS, Android). Apple is the most consistent with both a strong desktop/laptop OS and a strong handheld OS. They also seem to be moving towards unifying the user experience between the two with upcoming iOS releases. With different input methods and screen sizes, there does need to be unique UI for each device, but a shared UI paradigm could help users easily move between the two; at the very least the same labels/icons for applications and settings between the devices.

Even though the iPad received much criticism for being “just a large iPhone,” this means the user does not have to relearn how to use the device. This principle of keeping a consistent user experience despite a change in device size is what I’m proposing.

PROGRAMS

Programs such as CAD, Photoshop, Matlab, and other professional software would not be able to run on the limited hardware of a handheld in their native desktop form, but there could be an aspect of that software that could run on a handheld. The device appropriate software versions could either be free or paid additions. Software

could be loaded onto any device in the device chain (Desktop - Tablet - Handheld). Once a new device was added to the chain, the newly installed software could prompt the user to install the device appropriate software to the additional device.

For example:

1. Install Photoshop on desktop
2. Connect tablet
3. Prompts the user to install Photoshop Tablet with limited features
4. Connect handheld
5. Prompts the user to install Photoshop Handheld with even further limited features

When software is installed with multiple devices connected the software will prompt the user to install the other device appropriate versions to the attached devices if the shared devices have permission to install software.

Assuming all the application features were available and just the UI had to be adjusted, consider the main screen in the different modes of a graphing calculator.

1. Desktop = equation, equation history, full toolbar, and large graph
2. Tablet = equation, condensed toolbar, and medium graph
3. Handheld = equation and minimal toolbar or graph

This is despite the obvious benefit of being able to display the content larger.

EXECUTION

This hardware and software model would be easiest to implement within a single company. Ideally the hardware and software would be open and based around the established form factors, just as there are many desktop manufacturers that follow the various form factors. The form factors allow the greatest consumer option, but as long as the SystemLink connector is present the devices would be able to share the core features which make this an ideal solution.

HARDWARE

There are three levels to this computing solution: handheld, tablet, desktop (via dock). The tablet serves as the bridge between the desktop/docked and handheld (primarily because of the screen size). Any variety of screen/device sizes could be used for the handheld and tablet, but I chose sizes that I think suite their purposes. With current devices not working together or sharing a consistent UI, large handhelds and small tablets (between 6”-10”) allow people get a device that attempts to do both what handheld and tablet can do. Were the devices to work together, including share a consistent UI, and, for the sake of the tablet, contain the handheld these middle sizes would not be necessary.

For illustration purposes, I will brand this hardware model “MYPC” for MY Personal Computer. This suites the hardware model well as the flexibility of SystemLink truly allows the user their own personal computing experience based off the various devices they own and interact with regardless of the device size and features.

HANDHELD

The handheld would be much like the tablet but scaled down to be more appropriate for holding as a phone. When the handheld was docked within the tablet, only necessary hardware would stay in use. This means that duplicate or unusable components would be disabled to optimize power usage: the screen, speaker, camera, duplicate Wi-Fi or GPS components etc.

The primary holding position of the handheld is portrait. With limited space, there would be 3 primary buttons on the face of the handheld: back, home, search. There would also be a screen lock button and volume rockers.

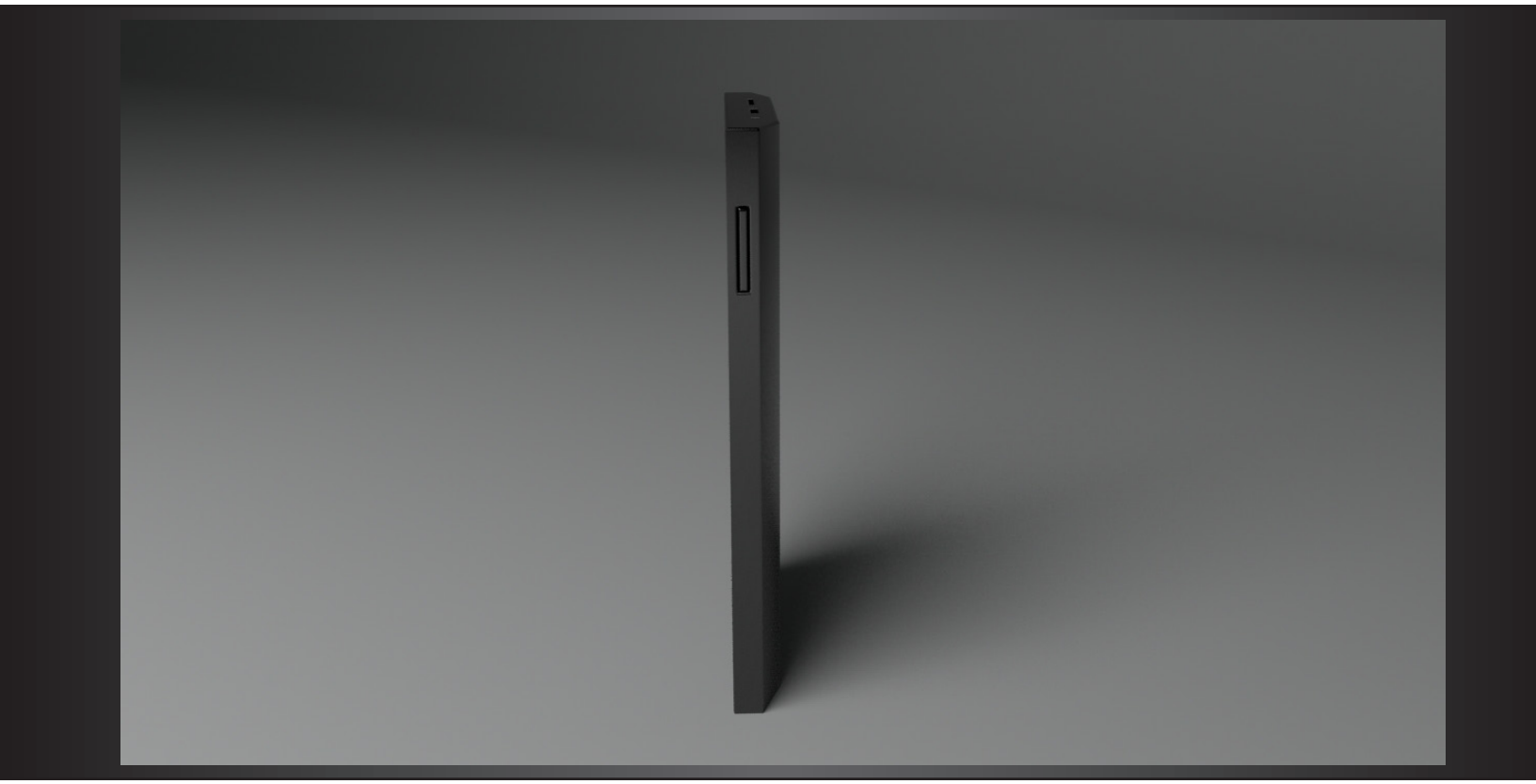
The handheld could serve as a peripheral to the tablet when it is not docked: by acting as a remote control for media play back, a wireless keyboard, or a wireless touch pad.

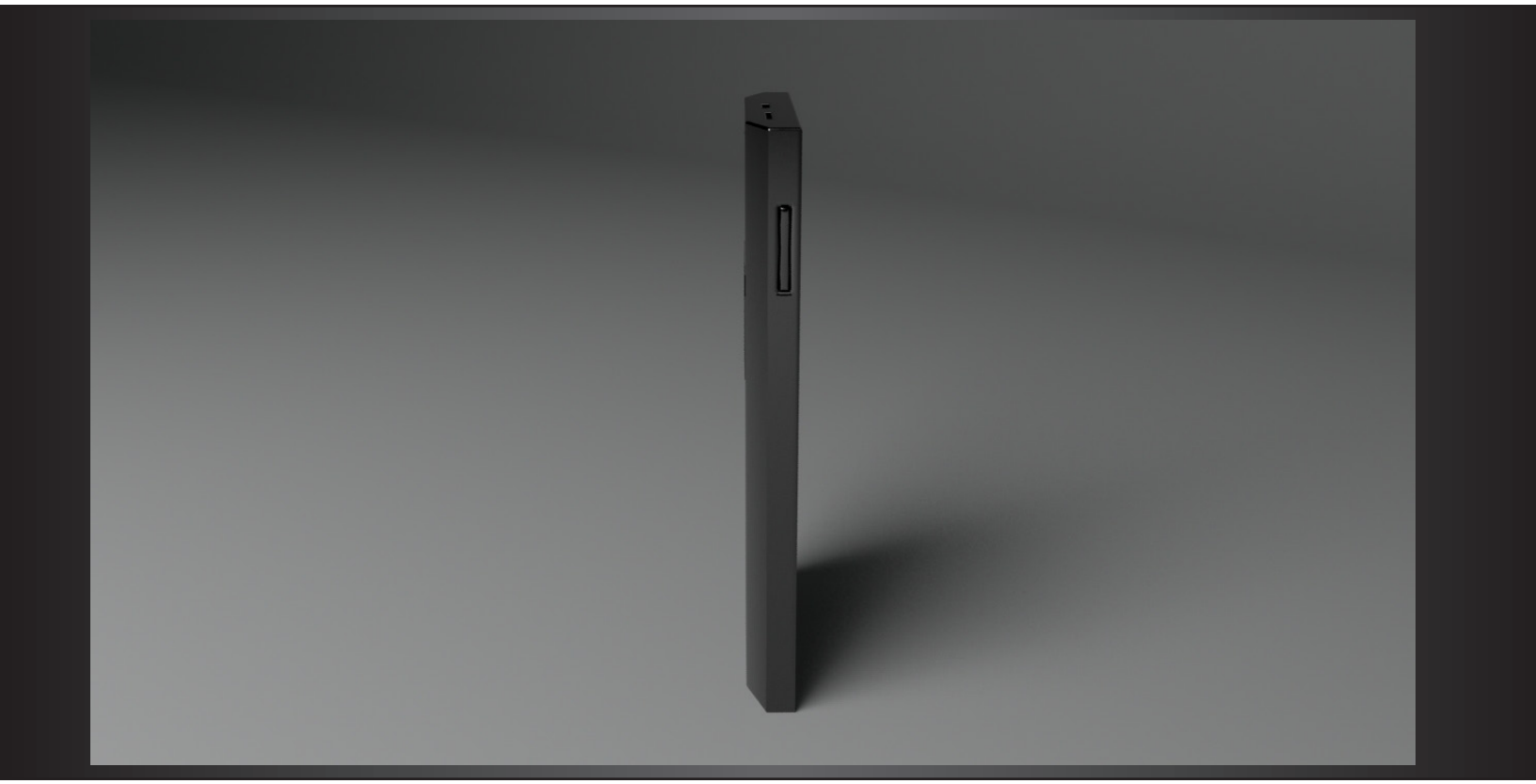
Each device would have independent applications and system settings unless multiple devices are linked so they share the same settings. The handheld could use the tablet battery to be recharged when inserted on the move, and the tablet would be charged when docked. Of course there would also be standard USB power adapters for outlets and cars.

Ideally the handheld would be an unlocked dual-SIM chip device which would allow the device to function for both work and personal needs.

Screen size: 4.5” 16 : 9


3G
10:45 AM
New Email
Jane Doe
10:33 AM
New Text Message
David Smith
10:25 AM
Car Home
Clock
Contacts
Dictionary.co
Digg
Document S.
doubleTwist
Earth
Email
Epocrates
ES Task Man.
Facebook
Gesture Sea.
Gmail
Goggles
Google Buzz
Phone
Web
Applications





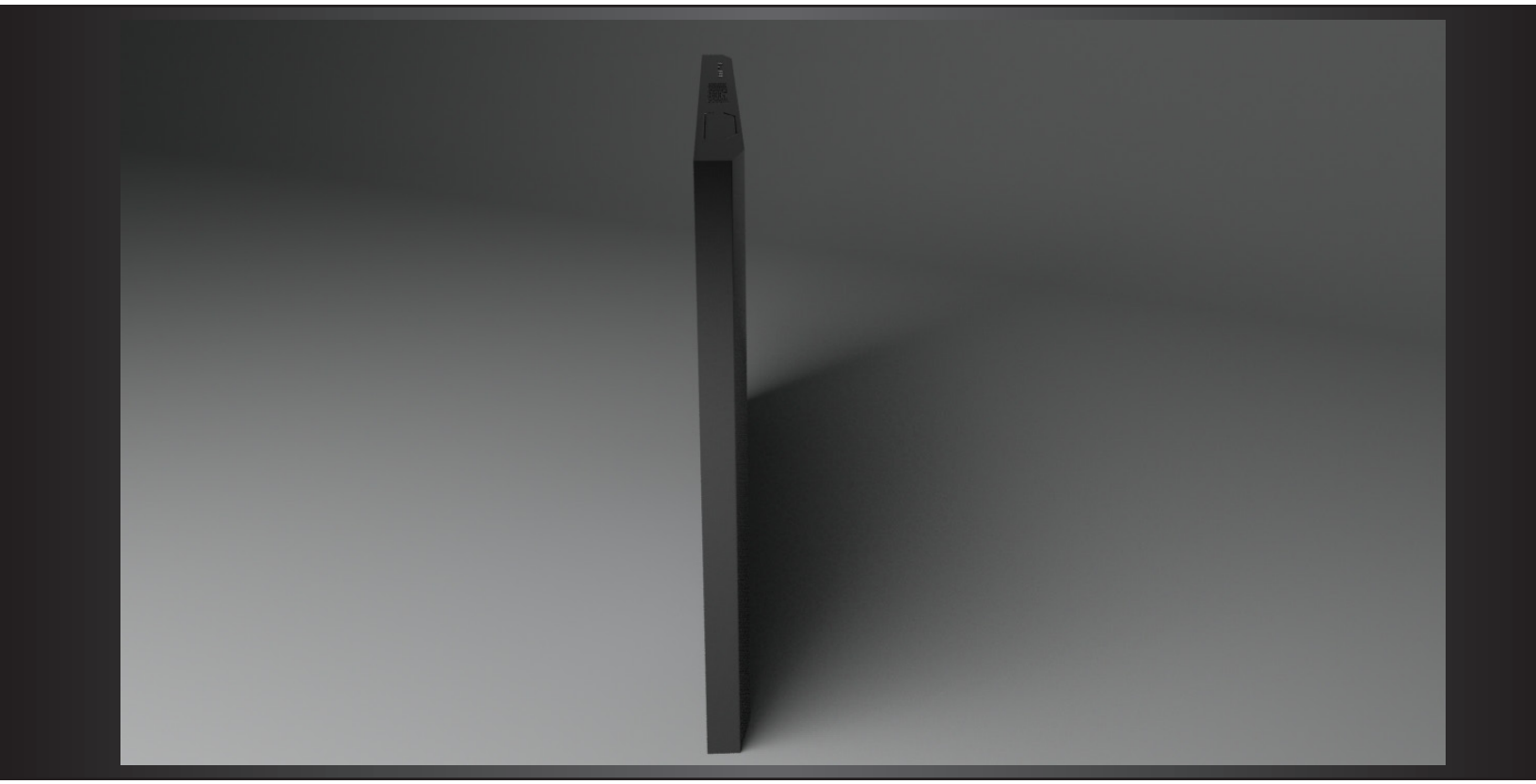
TABLET

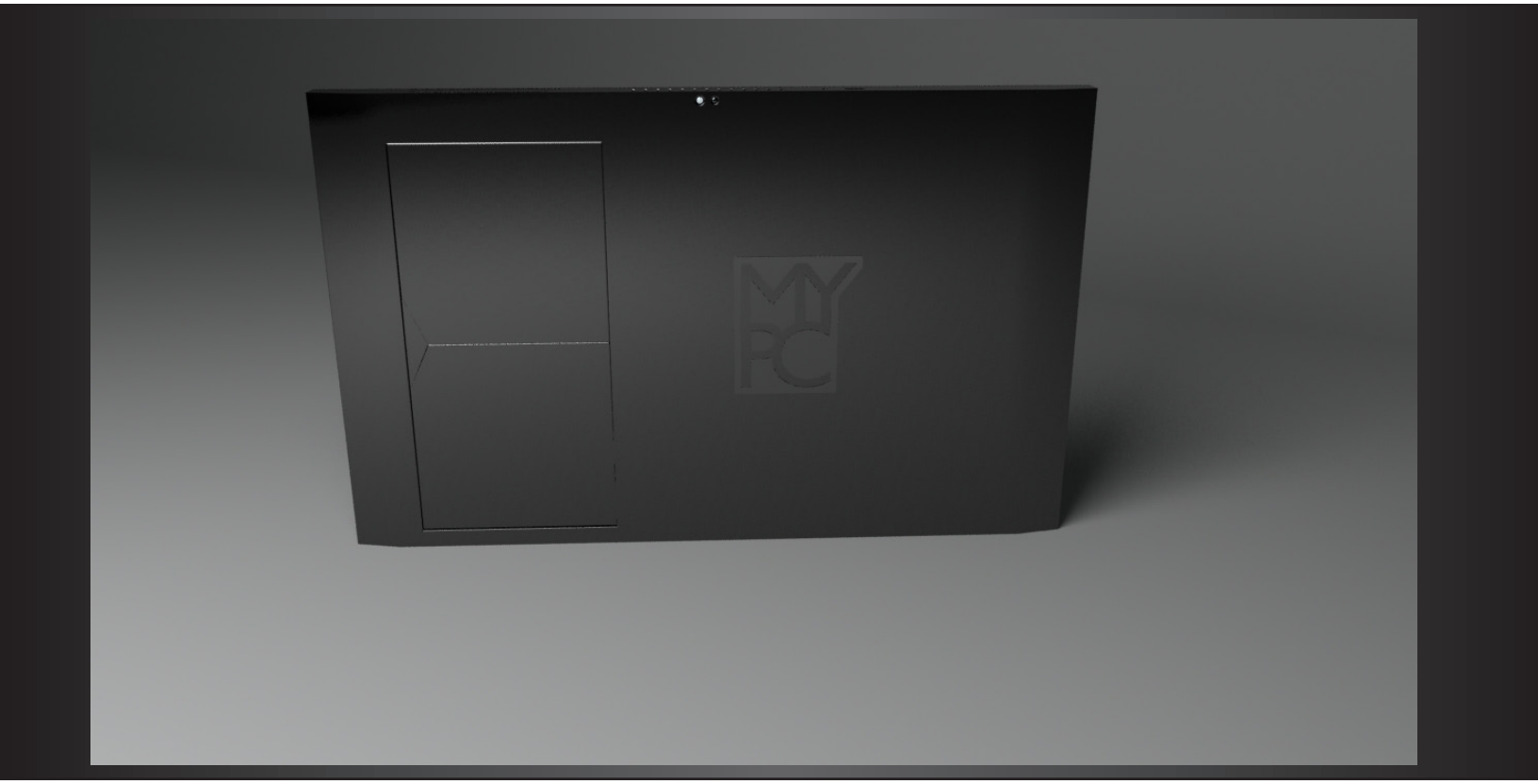
The tablet is its own system when in isolation and would function and appear as tablets do today; a single medium size touch screen. However, the tablet can dock with a desktop system for enhanced productivity and can contain a handheld device docked within itself. Tablet cases could come with a keyboard holder (and/or extended battery) to effectively turn the tablet into a laptop/netbook.

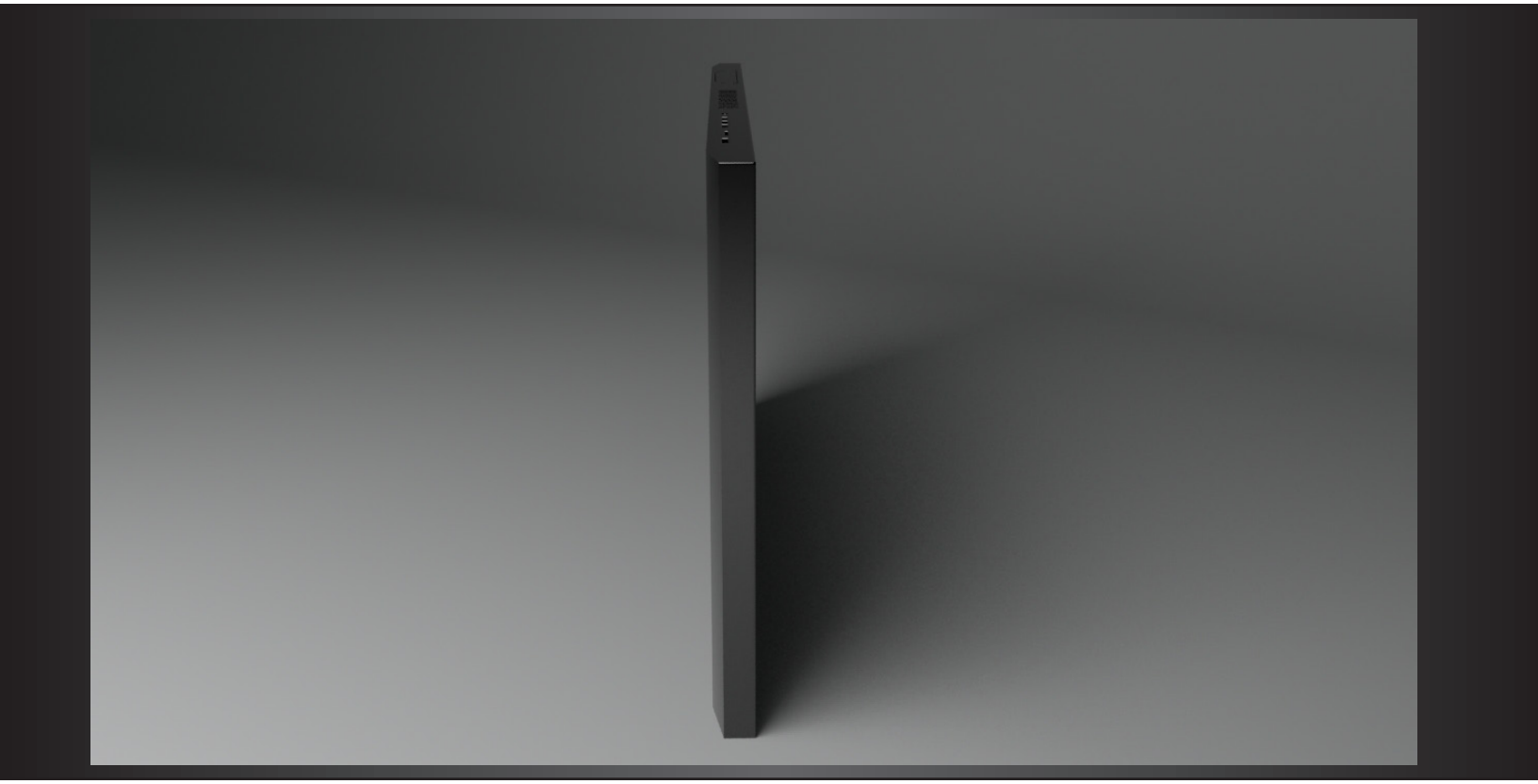
The primary holding position of the tablet is landscape. The tablet would have the same three main buttons that the phone has, a screen lock button, and it would also have five function buttons (previous, play/pause, next, volume up, volume down). The three main buttons would be on the right with the five media buttons on the left. The five function buttons would be e-ink panels that would allow the icons to changed as needed by the OS or a program. For instance a more advanced program such as Photoshop could allow the user to set those keys for preferred actions.

Screen size: 12” 16 : 9

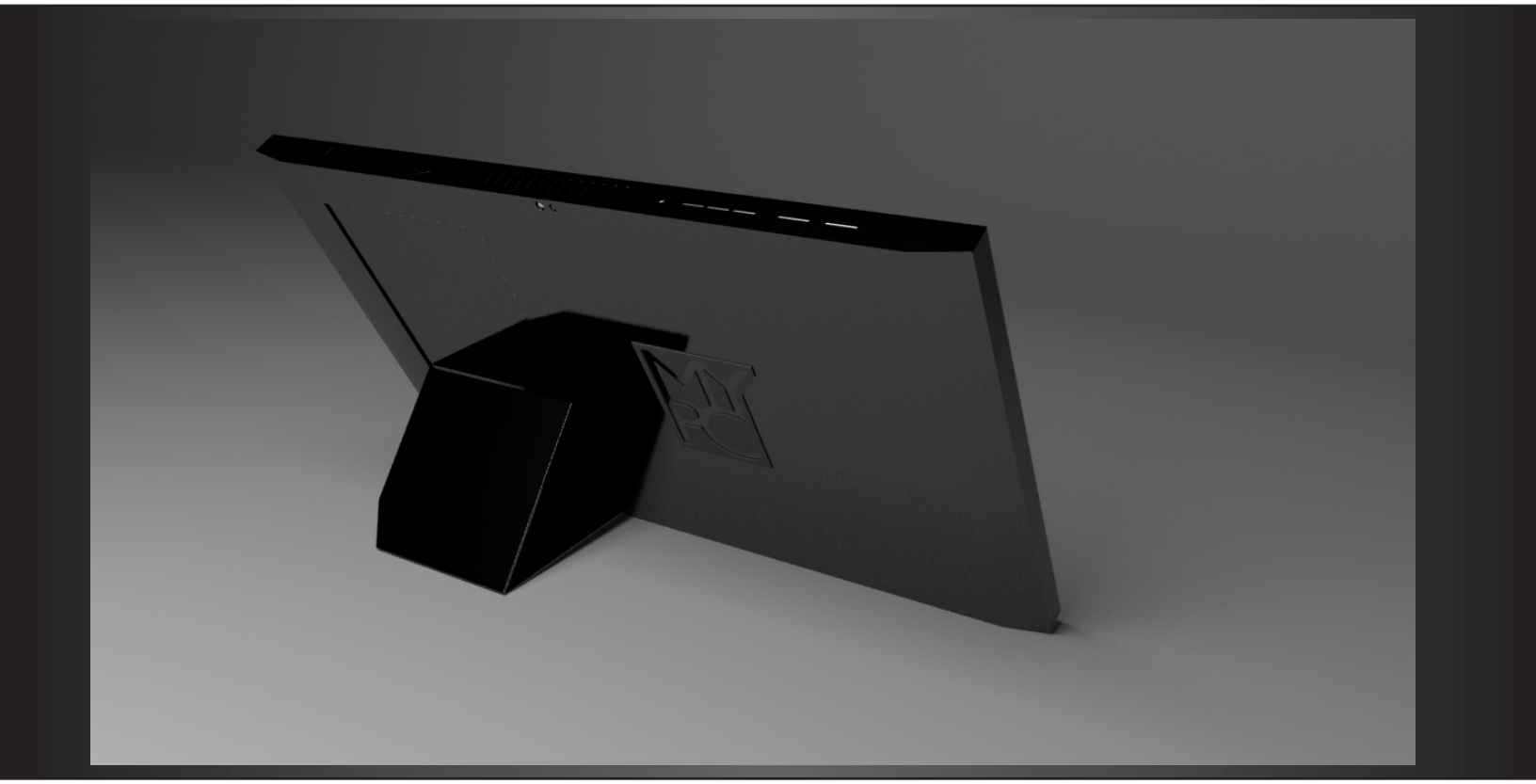

Notifications
New Email
Jane Doe
10:33 AM
New Text Message
David Smith
10:25 AM
Facebook Comment
John Doe
9:51 AM
Missed Call
Stacy Smith
9:49 AM
System Updates Available
3 Updates
9:30 AM
New Email
Bruce Wayne
9:07 AM
Facebook Friend Reqest
Peter Parker
9:04 AM
New Text Message
Eddie Brock
8:55 AM
Search
3G
12/22/2010 10:45 AM
Car Home
Clock
Contacts
Dictionary.co
Digg
Document S
doubleTwist
Earth
Email
Epocrates
ES Task Man..
Facebook
Gesture Sea..
Gmail
Goggles
Google Buzz
Applications
Web
Mail
Videos
Tablet (Mouse)

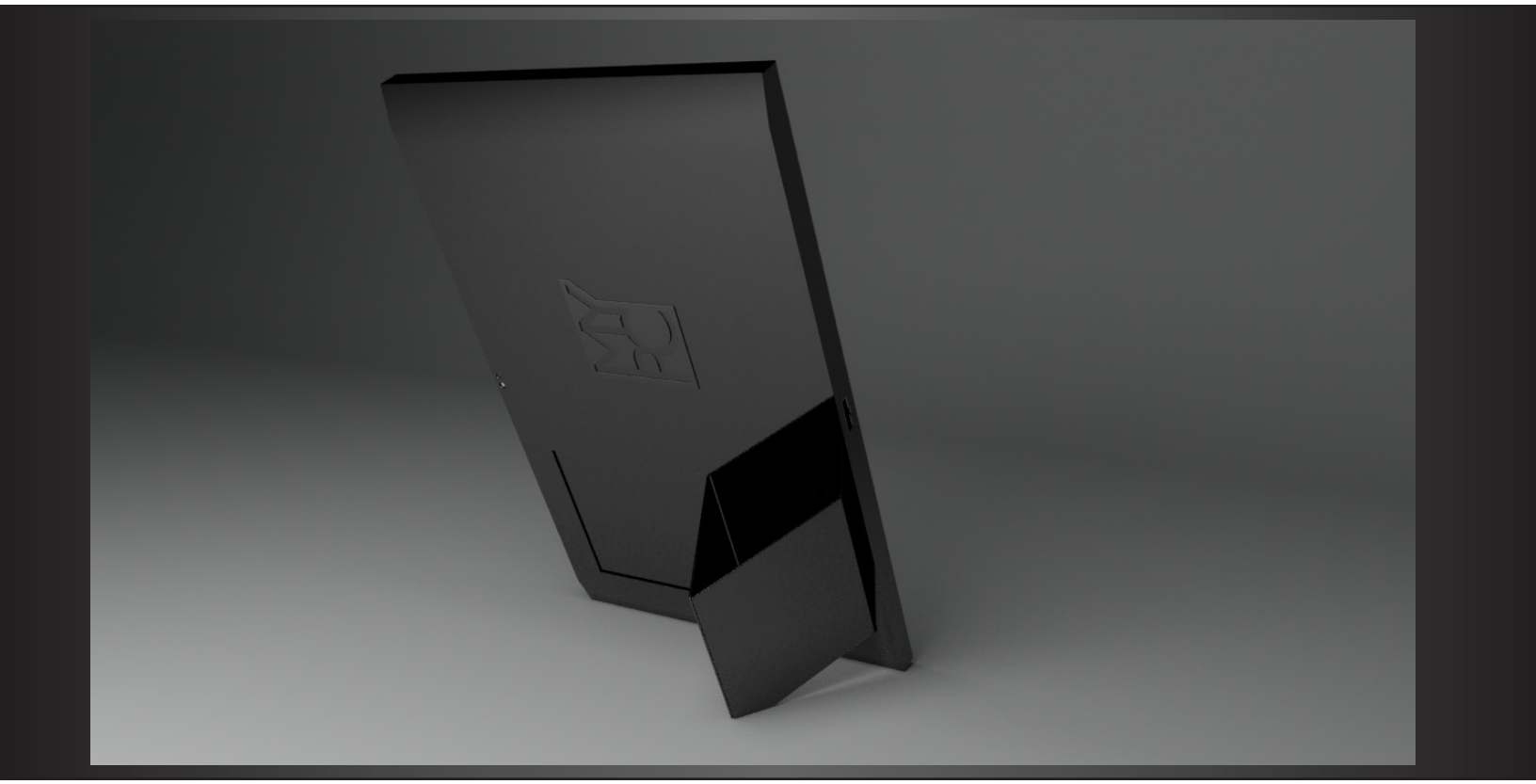



MY
PC



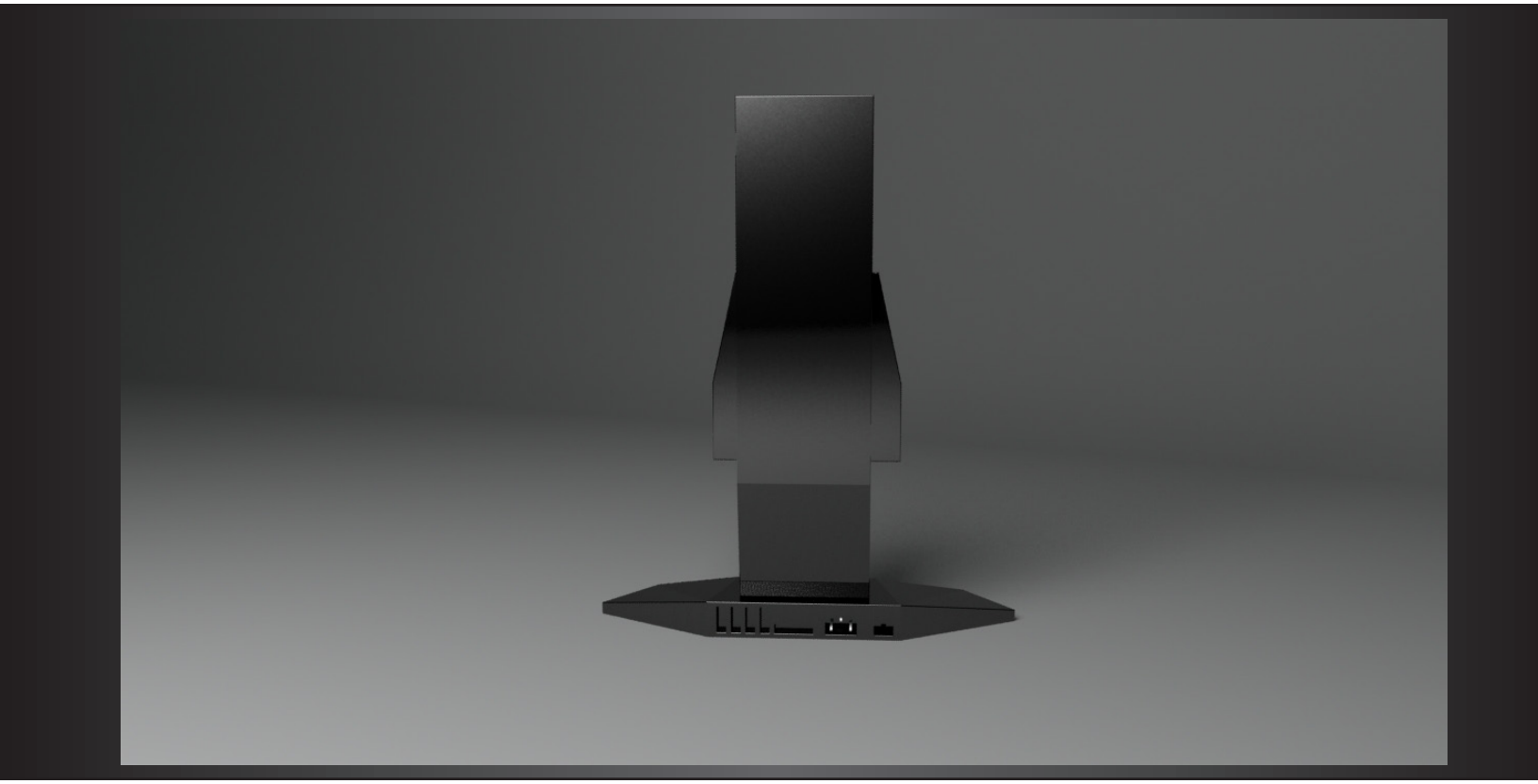

Search

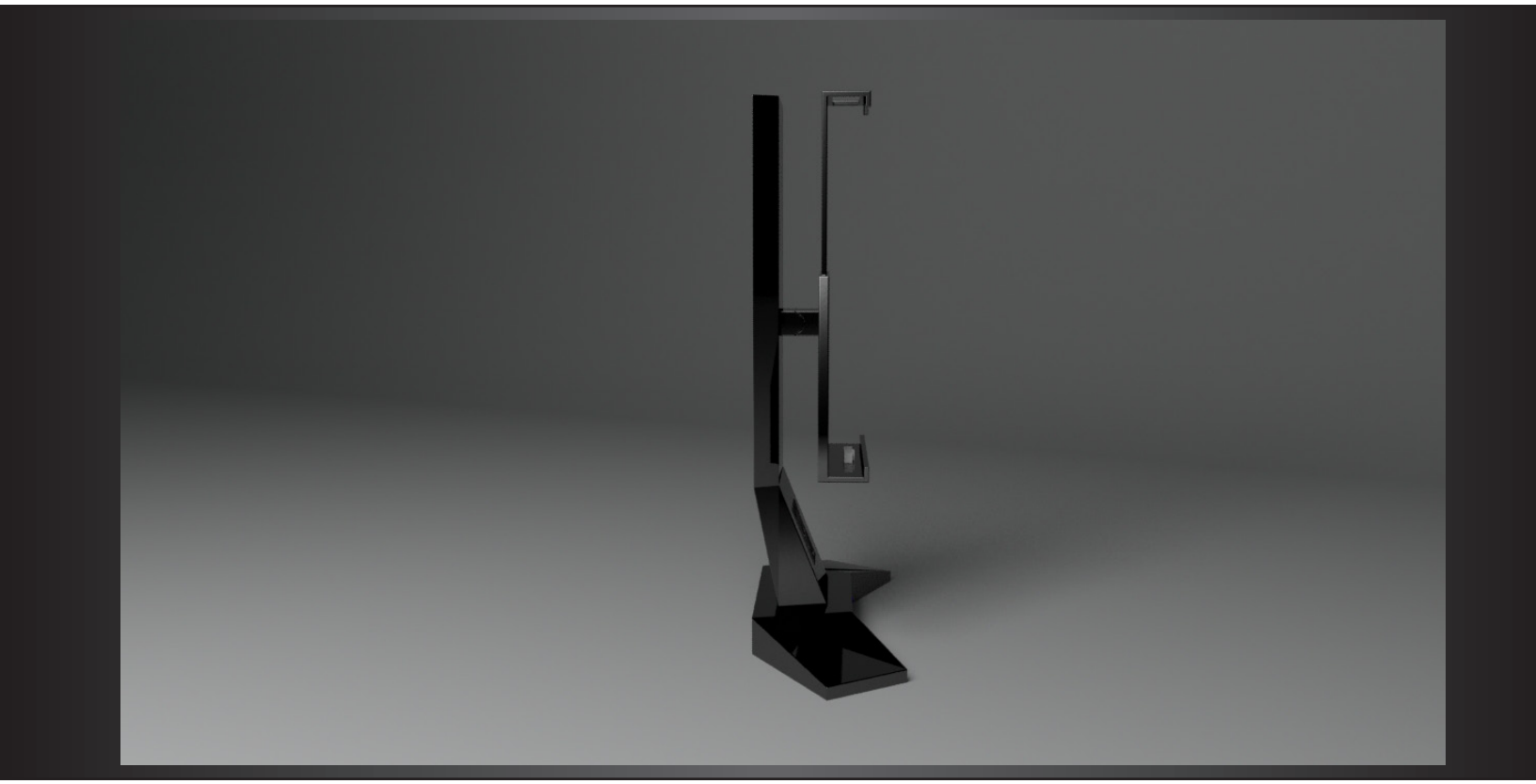




DESKTOP/DOCK

Current desktop systems already function within form factors and allow hardware flexibility, so they just need to be incorporated into the SystemLink system. A standalone desktop could be added into the system with a SystemLink cable or a dock with a SystemLink connection for attaching the tablet or handheld. To help visualize this, imagine a dual monitor desktop system with one of the monitors being a tablet docked into the system. The dock has more connectors than the tablet (including additional USB ports and a network port), but an attached desktop is needed for full hardware flexibility (sound cards, special hardware, ESATA, Firewire, RAID, etc.). The dock has height and rotation support for both landscape and portrait viewing. Here too the market could provide other styles and sizes of docks.





DATA

Data could be handled in numerous ways depending on the users preferences and technical knowledge. When a profile/account is linked between multiple devices, each device is mapped to the attached devices and certain information is synchronized between them: music, pictures, videos, contacts, appointments. The user can specify what data should be synchronized. Then the data is either synchronized to a local disk or to a web based service (Microsoft Live, Yahoo, Google, Mac, etc.).

If a workstation is present in the system, it can be used to store data and act as a web server for the linked hand-held and tablet devices (similar to Pogoplug). This provides the user with the benefits of a cloud based service but with the added security of controlling the source data. The obvious benefit of using a cloud based service is that the service will manage data consistency/synchronicity. If a cloud based service (either public or private) is not used then the user will have to manage the data between devices on their own.

SOFTWARE

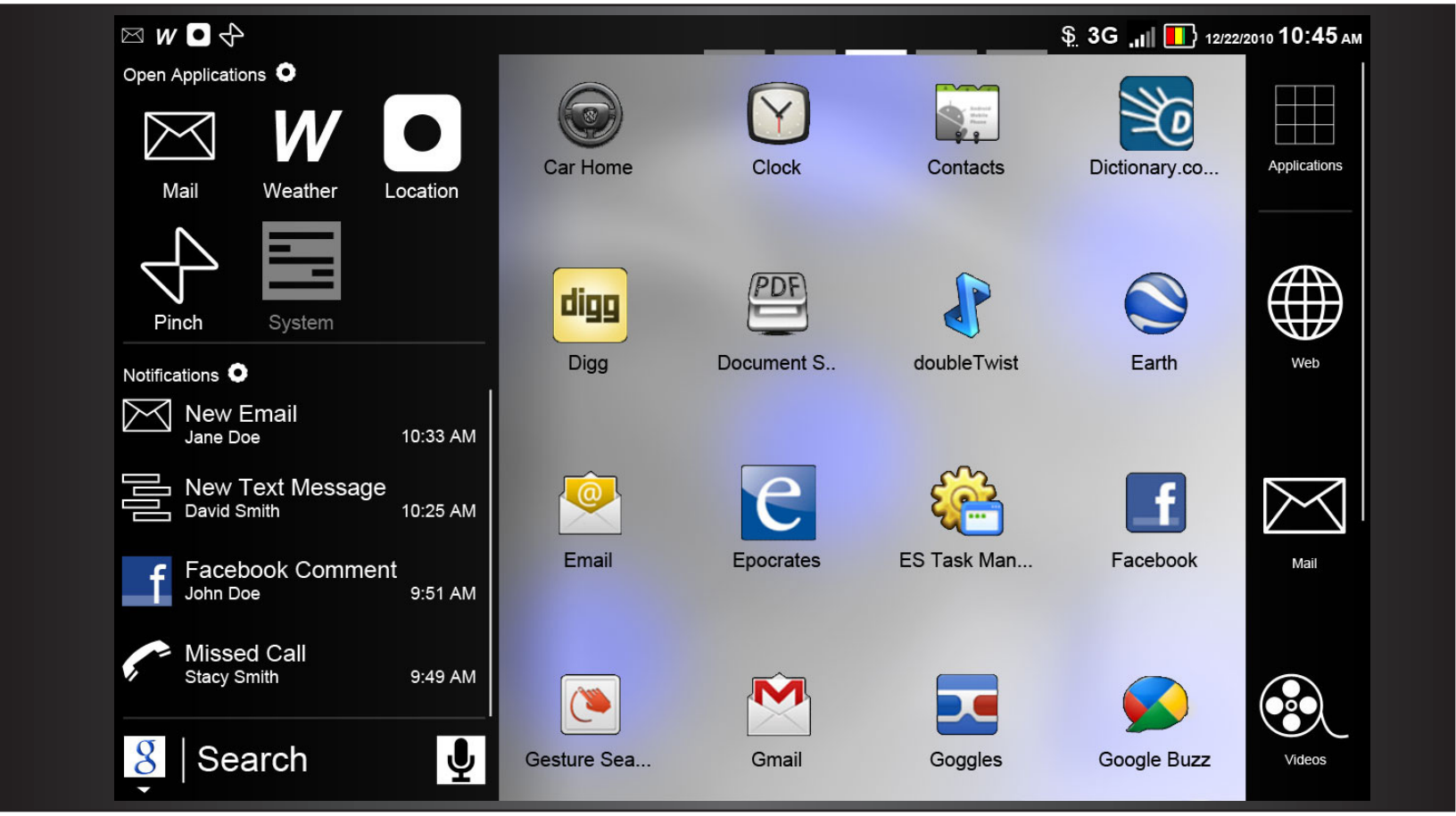
The various touch based operating systems such as Android, iOS, Windows Phone 7, Meego, etc are all very capable and usable solutions. However, I have proposed a solution which takes what I consider the best of these devices.

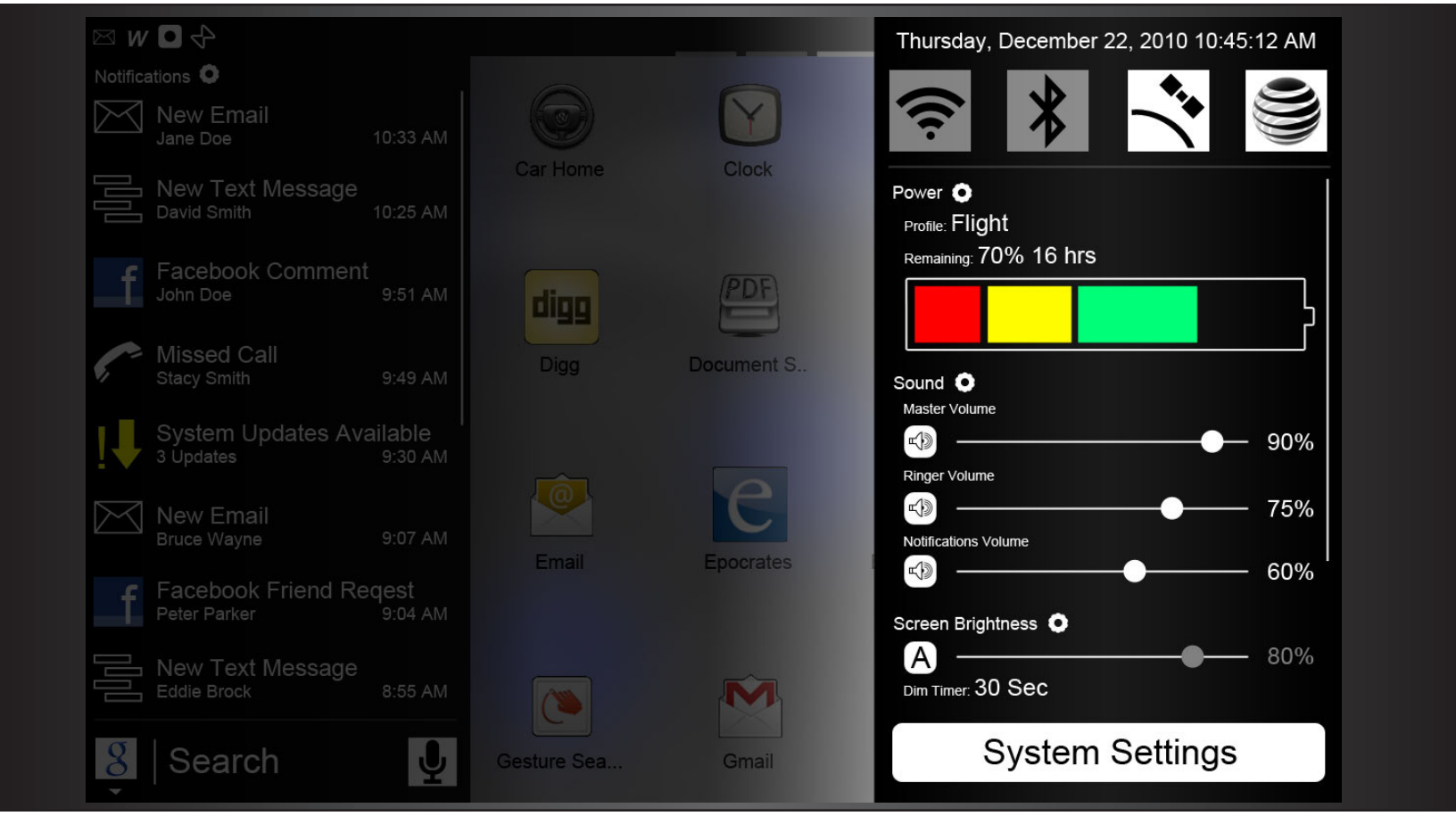
USER INTERFACE

The basic structure of the UI would be divided into 3 sections: system settings in top right, notifications in top left, and applications below that. Pulling down in the top right will display the system home screen consisting of the most commonly used system settings: wireless, ringer/vibrate, battery life, screen brightness, and options to dig deeper into settings. Pulling down the top left will display notifications for email, IM, calls, and applications. Both the notification panel (including open apps) and the system panel serve as places to make common tasks but also allow the user to jump directly into deeper system settings.

The icon/widget based home screen most similar to Android is joined by a prominent notification bar. This notification bar restricts the home screen icons to a 4 x 4 grid and will enabled the home screens to easily support both landscape and portrait mode. Desktop widgets would also be restricted to squares for this same reason. Providing the user with an almost identical experience in either position minimizes searching for relocated screen elements. The home screen format would be the same for the tablet, but with larger text and graphics. The 5 home screens allow the user to organize the most frequently used apps/widgets.

The quick launch area (which is restricted on Android and iOS devices) will be flexible and allow the user to set their most frequently used apps. The one exception is the Application icon is always present. I suspect most users would use the default icons, but it is flexible for those that want it. The quick launch area would scroll to display additional icons if they were added. Both the quick launch area and the notification bar would always scroll vertically and the home screens would scroll horizontally regardless of the device orientation, again for the benefit of consistency.





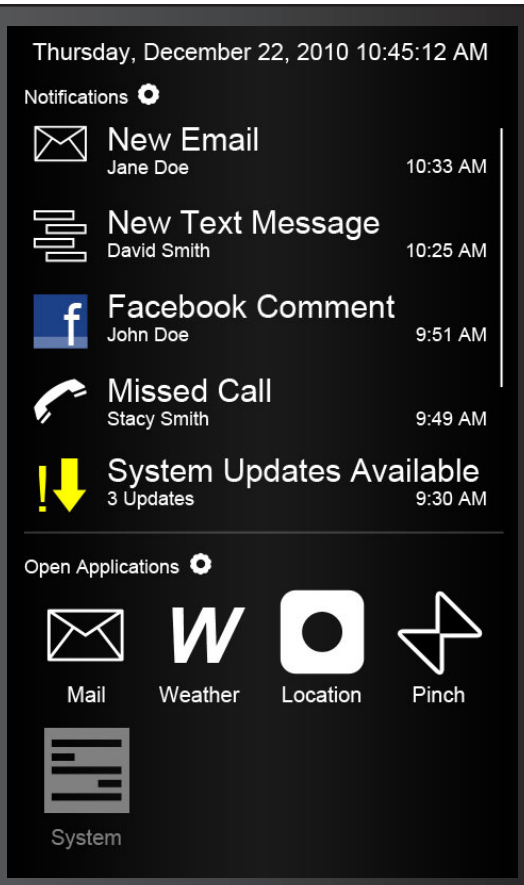
Whether or not the top system bar is visible is controlled by the application. For example games often require the full screen but more simple applications would keep it visible.

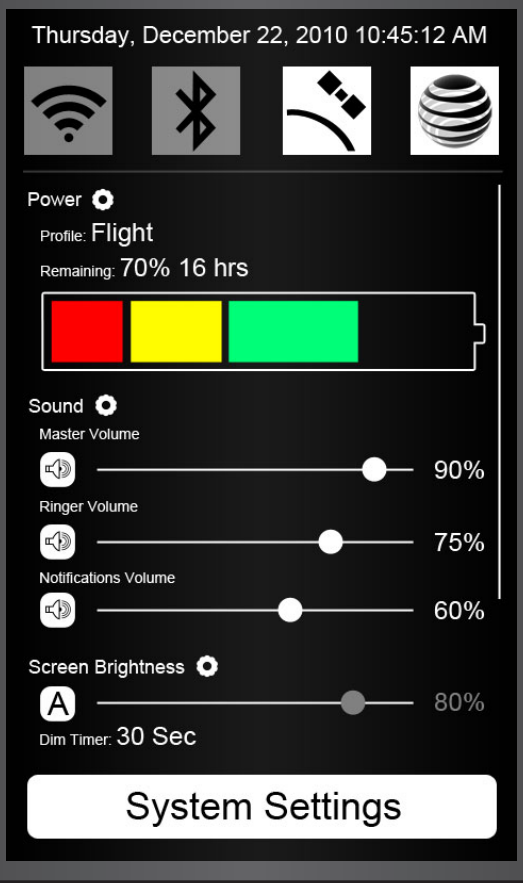
The tablet home screen is identical in layout with a few alterations because of the nature of a tablet: primary holding position is landscape, much larger notification bar which includes a permanent search box. With such a large area for notifications on the home screen there is no need for an additional notifications panel. Dragging down from the top left will pull the Open Applications panel into view and slide the notifications panel down.

When a device is connected a window appears prompting the user for action. This new window appears over the current application so the user can be keep their train of thought.

The screenlock for both the tablet and the handheld is treated the exact same by hiding the home screens and quick launch bar. The notifications are still displayed to allow the user to stay current without having to fully engage the system. Power use is kept to a minimum by reducing the brightness of the screen. For added privacy the user can disable the notifications visibility when the device is locked.


3G
10:45 AM
New Email
Jane Doe
10:33 AM
New Text Message
David Smith
10:25 AM
Car Home
Clock
Contacts
Dictionary.co..
Digg
Document S..
doubleTwist
Earth
Email
Epocrates
ES Task Man...
Facebook
Gesture Sea...
Gmail
Goggles
Google Buzz
Mail
Phone
Web
Applications


Thursday, December 22, 2010 10:45:12 AM
Notifications
New Email
Jane Doe
10:33 AM
New Text Message
David Smith
10:25 AM
Facebook Comment
John Doe
9:51 AM
Missed Call
Stacy Smith
9:49 AM
System Updates Available
3 Updates
9:30 AM
Open Applications
Mail
Weather
Location
Pinch
System


Thursday, December 22, 2010 10:45:12 AM
Power
Profile: Flight
Remaining: 70% 16 hrs
Sound
Master Volume
90%
Ringer Volume
75%
Notifications Volume
60%
Screen Brightness
80%
Dim Timer: 30 Sec
System Settings

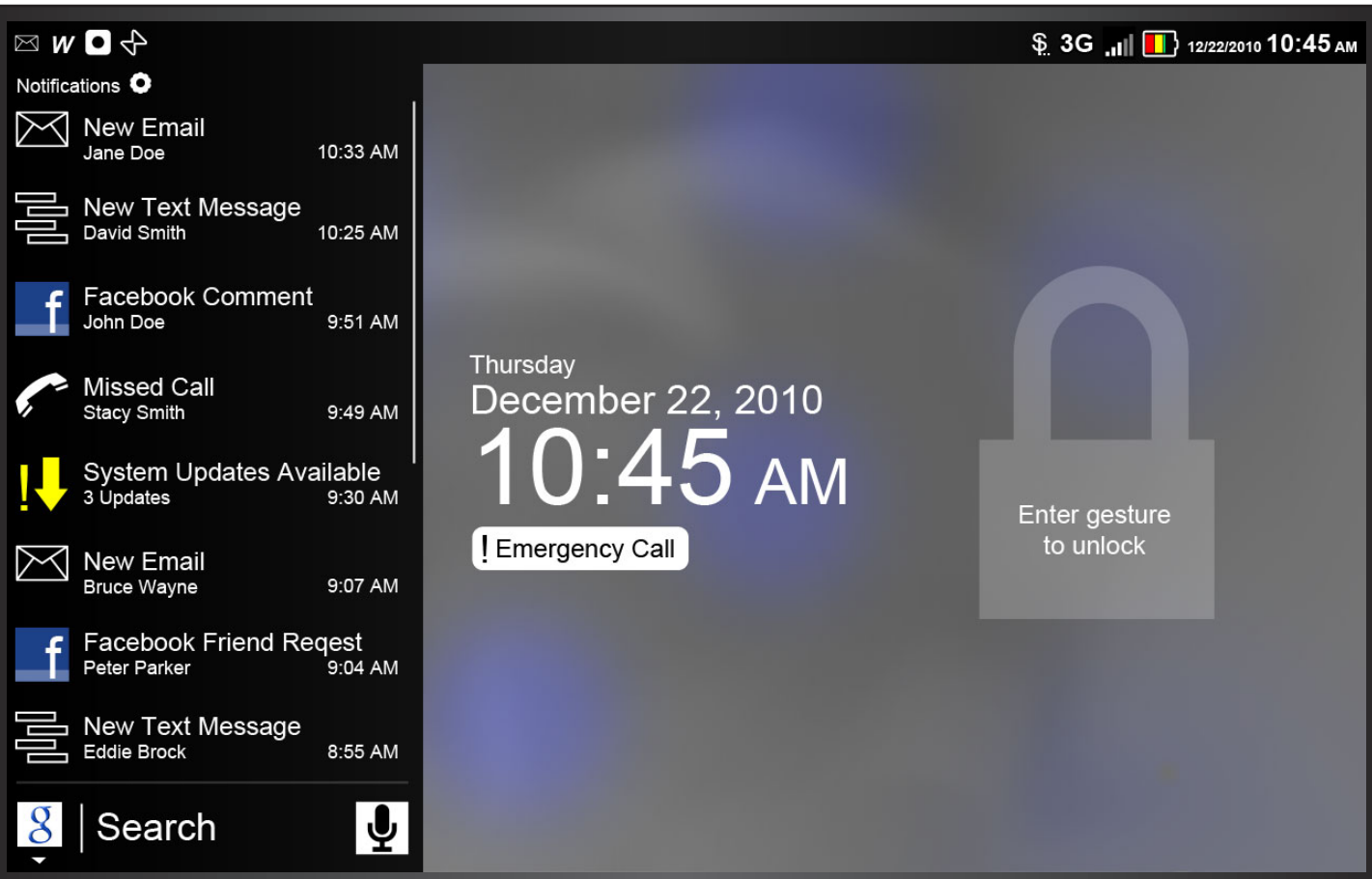
TOUCH

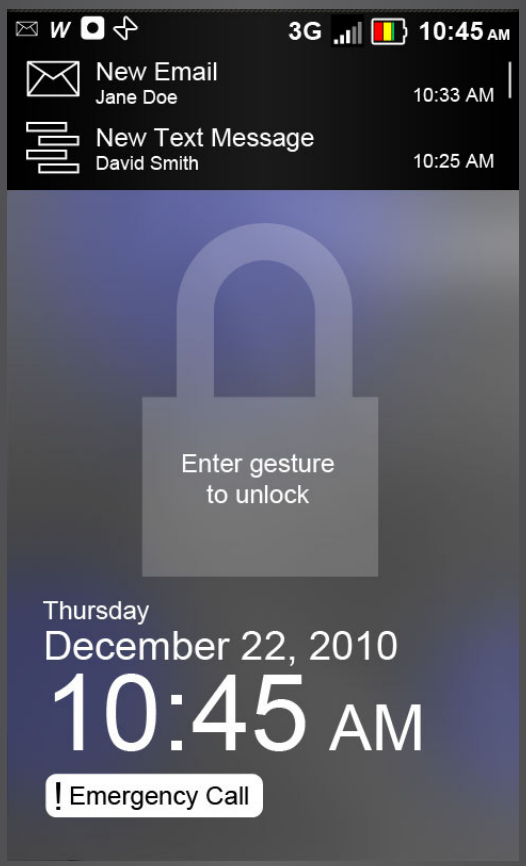
While the UI must adjust for the larger screen size of a tablet, the basic touch controls are the same between all the devices. The obvious on screen touch input will suffice for 90% of users, but including some more advanced touch controls will satisfy advanced users.

- Single finger movements screen specific
- Double finger movements application specific
- Triple+ finger movements OS specific

Here are some OS specific touch commands.

1. Triple finger pull down = quit application and go to home screen
2. Triple finger tap = home screen
3. Triple finger tap and hold = open application gallery/list
4. Triple finger drag left to right = previous open application
5. Triple finger drag right to left = next open application
6. Triple finger pull up = system settings


3G
12/22/2010 10:45 AM
Notifications
New Email
Jane Doe
10:33 AM
New Text Message
David Smith
10:25 AM
Facebook Comment
John Doe
9:51 AM
Missed Call
Stacy Smith
9:49 AM
System Updates Available
3 Updates
9:30 AM
New Email
Bruce Wayne
9:07 AM
Facebook Friend Reqest
Peter Parker
9:04 AM
New Text Message
Eddie Brock
8:55 AM
Search
Thursday
December 22, 2010
10:45 AM
Emergency Call
Enter gesture
to unlock


3G
10:45 AM
New Email
Jane Doe
10:33 AM
New Text Message
David Smith
10:25 AM
Enter gesture
to unlock
Thursday
December 22, 2010
10:45 AM
Emergency Call

MOUSE

Since the tablet can be docked to function more like a desktop with keyboard and mouse, the system has a mode for both touch and keyboard and mouse input. This would have a minor impact on the UI by moving the physical buttons (back, home, search) into the left of the system bar.

UI PASS-THROUGH

When the handheld is docked within the tablet, the handheld software will pass through the tablet to the user. For example, if a phone call is received when the handheld is docked, the tablet will prompt the user to take the call, at which point the user could use the speaker (or headphones if connected) and mic on the tablet to answer the call OR could undock the handheld to answer the call with additional privacy.

SECURITY

Because SystemLink allows both hardware and software (including data) to be shared across many devices, security is a large concern. Each device would have its own security settings defining what can and cannot be shared (i.e. data only; power and RAM only; CPU, pictures, and movies). Which means that this behavior can even be completely disabled for the most security conscious. Once two devices are connected the user can register them together and save the connection information for future use. This would allow the user to share different hardware and/or data with different devices. Connection profiles can also be used to quickly specify security with certain devices or individuals.

USER SCENARIOS

These few scenarios illustrate how this system of shared hardware would work for many types of users.

STUDENT/YOUTH

handheld + tablet

Students and youth are some of the most mobile of our society. As students need to do research, manage course material, and keep an active social life the tablet would be better suited for note taking and extended reading. The docked mobile phone would allow them to take the “digital wallet” with them on social activities. Some students might chose to have a dock but there will be little need for a linked desktop ... unless they are a gamer.

FAMILY

handhelds + tablets + docks

A family will have numerous devices between all the members. Let’s assume this family consists of a father, mother, son, and daughter. They have a handheld for each parent and 1 for the older child (3); a tablet for the parents and a tablet for the children (2); and a dock for each tablet (2). During the day when at work and school, they will use their handhelds to keep in touch. When at home in the evenings, the parents dock a handheld to the tablet and charge the other one, and the younger child uses the tablet while the older one continues to use the handheld.

PROFESSIONAL

handheld + desktop/dock

A professional who doesn’t have to take work home with them (cough, cough) needs a powerful system to do work, so a desktop would be necessary. However, adding a dock for the individual’s personal handheld allows them to integrate their personal contacts and responsibilities more easily into the work day.

MOBILE PROFESSIONAL

handheld + tablet + docks

Many professionals have to stay in touch with their work at all times and have a handheld and/or laptop supplied by their employer. For those professionals who have many locations and often travel, they can use the handheld and tablet as desired on the go and dock them when in an office. Each office would just need a dock for the tablet and there would be no need for multiple desktops or monitors. In addition, peripherals could be purchased to allow more mobile productivity.

CONCLUSION

This approach to computing would bring much greater flexibility and consistency to computer users but would also be much more complex to build than this proposal addresses. It would take many intelligent people to build out the systems and standards to achieve the end product. Hopefully my explanation sets a clear foundation for what others might be able to build towards.