



# vDesk

(Written Report)

Your desktop, on the web

## **Project Members:**

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# 1. Introduction

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## Description of Idea

vDesk is a web app that will let users gain access to a full-featured web-based desktop, capable of storing their apps, files, preferences and whatnot no matter where users use it. The interface will scale seamlessly on devices ranging from mobile phones to 73" Surface Hubs.

## Rationale / Description of Issue (Portability)

Even with laptops getting progressively smaller and lighter, and ever-more-powerful devices in netbook form factor emerging, there are still people who do not like bringing laptops around (or even many people who do not even have laptops, opting to use powerful desktops with RGB), for reasons ranging from small screen sizes to poor ergonomics.

Many workplaces and schools possess their own computers, yet for many, bringing along a laptop is essential to bring along their files, preferences, high-powered hardware and in some cases, programs.

What if this was not the case?

## Description of Solution / Focus of Project (A Portable Desktop Environment)

Instead of bringing around the device, bring around the desktop environment, data, programs and all on a much smaller device.

vDesk does exactly that. Instead of only keeping files or the like on the web, vDesk aims to move the user's entire desktop experience to the web - files, programs, preferences, privacy and

all. vDesk also allows collaboration on the desktop level - multiple users not only see, but also use the same desktop at the same time.

### **Target Audience / Project Scope**

vDesk is targeted at anyone who wants an easier way to bring around a desktop environment which can run on even the least powerful of computers.

vDesk is expected to be used by predominantly students or adults who need to bring their computing environments around to many places, from low-powered budget (student) netbooks to the school computers.

# 2. Literature Review

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## Existing Case Studies

There are already existing methods that allow users to take around their entire desktop environment. However, they have serious drawbacks.

### Case Study 1 - Remote Desktops

Remote desktop connections allow users to use their devices set up for remote use away from home. Remote desktop clients stream in video output from the remote desktop servers (computers configured for remote use) and provide keyboard and mouse passthrough to remote desktop servers. However, this method does have several drawbacks:

- Network dependency - both client and server need to be online
- Bottlenecking - slower networks reduce quality of user experience
- Quality - due to amount of data being transmitted, remote desktop solutions use much bandwidth and even then, may not offer good resolution
- Ports - some school or work networks block remote desktop ports.

### Case Study 2 - Bootable USB Sticks

Bootable USB drives allow users to put a bootable OS on USB drives. These can be plugged in to modern computers and booted up from to access a full desktop OS environment. However, this does have drawbacks:

- Storage – affordable USB drives do not come with lots of storage space
- Ports - some schools and workplaces lock out USB boot
- Speed - installing programs takes a very long time on bootable USB systems
- Longevity - flash memory chips in USB drives generally are lower quality than those in SSDs, wearing out and malfunctioning sooner

- Technical know-how - making a bootable USB stick requires a fair amount of technical knowledge

# 3. The Study & Methodology

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## Needs Analysis

- Conducted survey among classmates
- 60% of students carried their laptops to school
- Of those, 58% brought laptop to school twice or more per week, while the remaining 42% brought their computer to school once a week
- Most of them felt that it was cumbersome to do so - their computers were too heavy
- From the survey, we concluded that:
  - An overwhelming majority of respondents who brought their laptops to school at least once a week found it cumbersome.
  - Those who didn't, felt restricted when using school computers, as the school computers lacked the apps they wanted to use.
- Presented with vDesk as a solution, almost all respondents said they would be interested in using vDesk, should it work well.

## Programming Languages and Platforms

- PHP
- Firebase (database)
- HTML, JavaScript, CSS
- Web App
- **IDEs**
  - Visual Studio Code
  - Sublime Text
  - Android Studio

## Members Role and Job Distributions

- Jonathan Koh: **Programmer**
- Theodore Lee: **Programmer**
- Samuel Lim: **Designer**

## Ideas

- **Cloud Desktop Environment**
  - Portable, Collaborative, Lightweight
  - Shifting desktop to cloud
- **vPool**
  - Allows spare / old phones to be used to run Android apps in vDesk windows, utilising otherwise ‘wasted’ computing power (pooling of computing power)
- **Design**
  - Making a high-quality, aesthetic interface
- **Running + Streaming of Native Apps**
  - The use of native Ubuntu (or maybe even Windows) apps in vDesk windows may be possible, even allowing for pass-through to the user’s filesystem

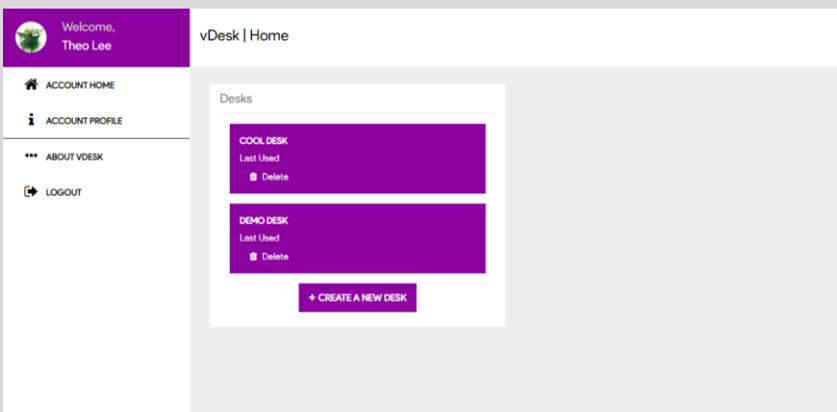
## vDesk Timeline

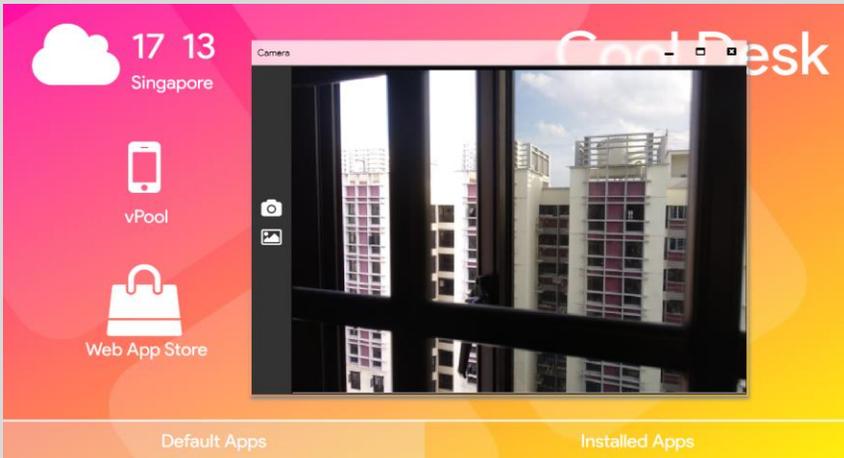
<b>March</b>	Account Systems Completed
<b>April</b>	Account Systems Rework + Redesign
<b>May 1<sup>st</sup> – May 20<sup>th</sup></b>	Desk Manager, Default Apps Work begins
<b>June 1<sup>st</sup></b>	vPool Android App Ready, vPool Manager Web App Ready
<b>June 4<sup>th</sup></b>	vPool Improved
<b>June 5<sup>th</sup></b>	Redesigns implemented, Settings Design Draft ready, vDesk Window Manager reworked
<b>June 6<sup>th</sup></b>	Settings Designs implemented

<b>June 7<sup>th</sup></b>	vDesk File Manager and Filesystem Implemented (Google Drive, vDesk Storage); All Settings designs ready
<b>June 11<sup>th</sup></b>	Settings Backend implemented
<b>June 20<sup>th</sup></b>	vPool, vDesk Files and other default apps improved
<b>July 1<sup>st</sup></b>	vDesk Desktop missing features added; Web App Installer works start
<b>July 8<sup>th</sup></b>	Web App Installer Functional
<b>Mid-July</b>	Design changes
<b>Late-July</b>	vDesk Over SSH works start
<b>Early August</b>	vDesk Photos and Camera improved
<b>Mid-August</b>	vPool vastly improved
<b>10<sup>th</sup> August</b>	Testing on schoolmates begins
<b>16<sup>th</sup> August</b>	Report submitted

# 4. Outcomes, Analysis & Discussions

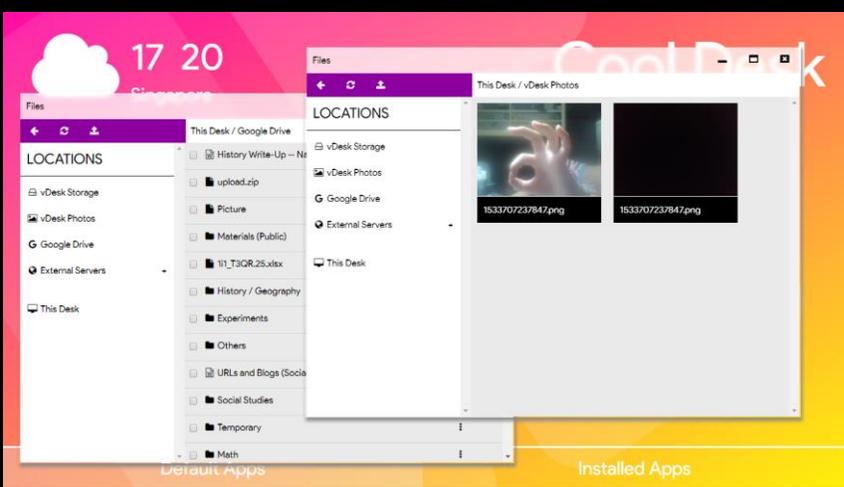
## Features

 The homepage features a vibrant pink-to-orange gradient background. The 'vDesk' logo is prominently displayed in white, with the tagline 'Your Desktop, Anytime, Anywhere' below it. At the bottom, there are two buttons: 'Create Account' and 'Log In', separated by the word 'or'. A 'Help' link is visible in the top right corner.	<p><b>HOMEPAGE</b> Login / Register</p>
 The desk manager interface shows a user profile for 'Theo Lee' on the left. The main area is titled 'vDesk   Home' and contains a 'Desks' section with two entries: 'COOL DESK' and 'DEMO DESK'. Each entry includes 'Last Used' and a 'Delete' button. A '+ CREATE A NEW DESK' button is located at the bottom of the desks list.	<p><b>DESK MANAGER</b> User can manage multiple desks from here</p> <p>Add Desks Delete Desks</p>
 The program launcher displays the time '17 03' and location 'Singapore' at the top left. The title 'Cool Desktop' is at the top right. Below are icons for 'vPool', 'Files', 'Browser', 'Web App Store', 'Camera', and 'Settings'. A bar at the bottom distinguishes between 'Default Apps' and 'Installed Apps'.	<p><b>CLOUD DESKTOP</b> Program Launcher.</p> <p>Users can launch Default Apps (apps preinstalled with vDesk) and Installed Apps (apps installed from Web App Store)</p>



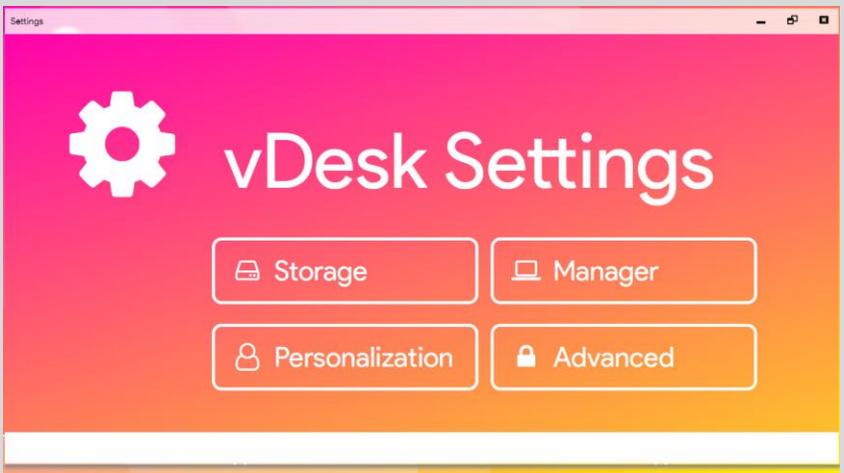
**CAMERA**

vDesk Camera – able to utilise dual cameras found on tablet-PCs such as Microsoft Surface



**vDESK FILES**

Allows user to access Google Drive Files, FTP Files, vDesk Photos all in one place

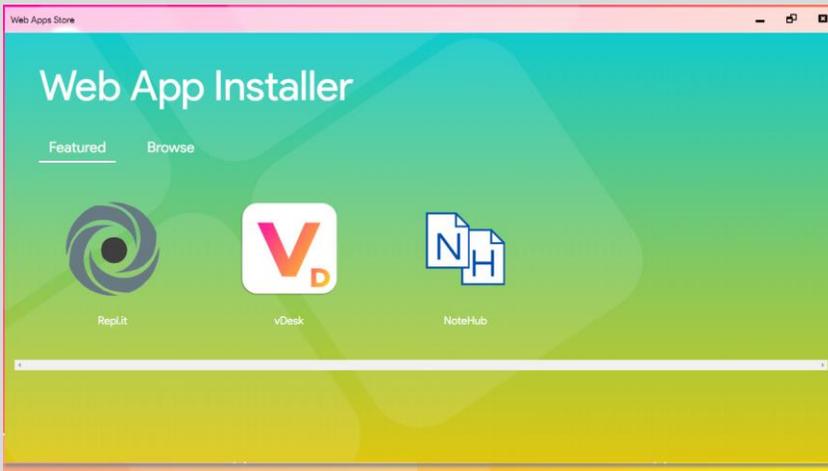


**SETTINGS**

Settings App for configuring a desk.

**vPOOL – MAIN FEATURE**

Users can remotely control smartphones. Useful as more apps and learning tools go mobile-only. Can also be used to utilise otherwise wasted computing power on old phones.



**WEB APP STORE**  
Allows users to install web apps to their Desk.

### **vDESK OVER SSH – MAIN FEATURE**

vDesk can be linked to an SSH server, providing a GUI for management of said server

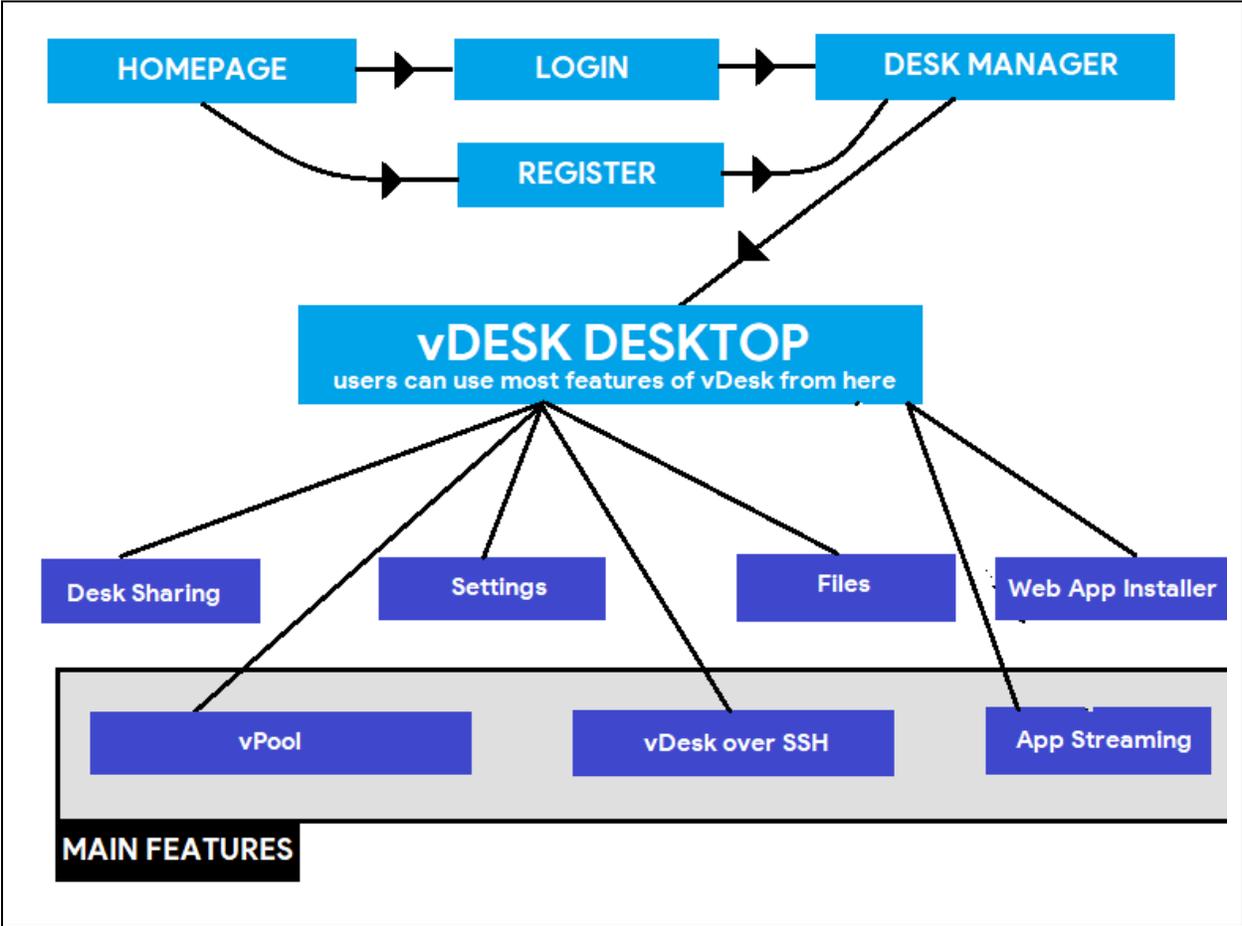
### **DESK SHARING**

Allows two users to view the same desk at the same time, with the same apps and same windows open, allowing for easier collaboration.

### **APP STREAMING**

Allows users to stream apps that their computer may not be able to run well from the vDesk server and use them with their own files

Features Flowchart – How do all these features work together?



# 5. Implications and Recommendations

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## Limitations

- vDesk requires internet access while in use, even though it can run on low-end computers
- Storing large amounts of data maybe unfeasible, which means limiting the amount of data per user
- vDesk will not work on a phone

## Areas for Improvement

- **Code Efficiency**

Some of the code written was written only to work and not with efficiency in mind, thus making it slower than code that was written with efficiency in mind (e.g. Window Manager)

- **Code Extensibility**

Code written early in the project was not extensible – adding functionality would be more complicated than is desirable. This cost time to fix later in the project as functions became more and more dependent on each other.

## Possible Extensions

- **vDesk Mobile**

Brings full functionality of vDesk to handsets

- **Performance**

- **vDesk OS**

A version of vDesk based on Linux that can be installed on computers as an OS

# 6. Conclusion

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## Learning Points

### ➤ Streamlined Workflow

vDesk went well due to how we streamlined the workflow – the functionality of a feature is built, the design is made and finally the design is implemented on top of the functionality. This resulted in a fast and efficient execution of each feature and is something we ought to emulate in future projects.

## Reflections

Jonathan

Throughout this year, I have learnt the importance of working together and learnt to manage my time better. This project has not been an easy one and together with council, my schedule has been really packed. However, we always managed to find time to do the project together, and that helped me get my priorities straight.

That aside, developing vDesk has improved my skills, having me go from coding basic webpages to designing with CSS and programming in server-side-languages (like PHP). I am grateful to my groupmates and mentor for supporting me throughout and hope to work together again!

Theodore

vDesk had me realise that despite my perceived programming prowess built-up over 4 years, I have much to learn.

vPool, a main feature of vDesk, was my first hand at Android app development, and developing vPool let me see the possibilities if I had learnt app development earlier, that I ought not limit myself to web development only.

Reflecting on our workflow, I see that applying this workflow where functionality of a feature is made, design is made and implemented on top of functionality results in drastically fewer bugs. This is something I certainly would apply to future projects.

Samuel

vDesk has been truly a journey for me. As vDesk's graphic designer, I had a drastically different role to play compared to my other group mates. I have learnt much, especially when attempting to design a suitable layout for a specific webpage. This required much contemplation, with my critical and creative thinking coming into play in this project. This also made me realise that group cohesion was of utmost importance. Without the other members, design would just look good on paper. In the future, I would certainly apply these attitudes and skills to strive for a better project.

# 7. Bibliography

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Make Use Of (2018) 4 Reasons Why You Don't Need a Laptop Anymore. Retrieved from <https://www.makeuseof.com/tag/4-reasons-dont-need-laptop-anymore/>

Lockley, S. (2018). 6 Reasons Why BYOD (Bring Your Own Device) Makes Sense. Retrieved from <https://insights.staffbase.com/blog/six-reasons-why-byod-bring-your-own-device-makes-sense-for-todays-top-companies>

Morton, L., & Morton, L. (2018). Remote Desktop Service: The Advantages and Disadvantages. Retrieved from <http://www.esoftload.info/remote-desktop-service-advantages-disadvantages>

Windows To Go: Pros, Cons and the USB bootable | Networks Asia. (2018). Retrieved from <https://www.networksasia.net/article/windows-go-pros-cons-and-usb-bootable-1346056630/page/0/3>

GestureDescription | Android Developers. (2018). Retrieved from <https://developer.android.com/reference/android/accessibilityservice/GestureDescription>

StackOverflow. (2018). How can I reliably simulate touch events on Android without root (like Automate and Tasker)? Retrieved from <https://stackoverflow.com/questions/50775698/how-can-i-reliably-simulate-touch-events-on-android-without-root-like-automate>

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