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INFM 206
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MyHealthUHN Project Execution.

Introduction:

MyHealthUHN is the grandiose project that will allow the University Health Network to embrace big data through secondary data use. The project is a health information system infrastructure, with web dashboard platform that allows the storage of survey data from UHN patients. The project also allows the data to be connected with electronic health records. Anonymity, as well as security, is built in place from the ground up. The robust functionality allows the data to be pulled from public policy organizations, medical specialists, researchers and others. MyHealthUHN carries UHN's strategic priority initiative #7: "UHN will lead in science and medicine with technology to deliver a new Health Information System/Platform to re imagine the way meaningful relationships are built with patients, communities, philanthropists, industry and peer organizations" (Daulby, 2020).

MyHealthUHN is resource light and coexists with the current OpenEMR system used by UHN. The heart of the platform is the document based database called CouchDB that allows structured data to be easily stored, and retrieved within a distributed grid system. The NYU Langone health center has stated that; "Integration of patient-reported outcome measures in electronic health records may be fundamental for advancing clinical care to improve patient engagement and health outcomes by providing quantitative, objective patient data regarding patients' health status for use in the clinical encounter" (Gold, et. Al 2018). MyHealthUHN is a novel way of bringing about a secure, robust, and simple way of secondary data use for the University Health Network, and the world.

Preliminary Planning:

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The initial planning of the MyHealthUHN project proposed a grid computing infrastructure, in that many computers run the database software and sync with each other. There is one central computer that keeps the master database, and many other computers that keep a copy of the database. This makes the data storage safe and access robust. The use of CouchDB as a database enables the ability to replicate information, even when the systems go offline. CouchDB also allows for individuals to anonymously query information using a REST API. Due to its REST API nature, it allows easy integration with web base applications. A web dashboard created for patients and researchers allow data to be entered, and downloaded with ease. It was also planned that MyHealthUHN would utilize the PouchDB JavaScript web framework. It was created to help web developers build applications that work as well offline as they do online (PouchDB). Twitter's Bootstrap web development library was also added to initial planning. Twitter informs us that "Bootstrap is an open source toolkit for developing with HTML, CSS, and JS. Quickly prototype your ideas or build your entire app with our Sass variables and mixins, responsive grid system, extensive prebuilt components, and powerful plugins built on jQuery" (Bootstrap). The use of PouchDB, which enables applications to store data locally while offline and then synchronize it with CouchDB, and Twitter Bootstrap allows modern web standard to be used in contrast to NYU Langone use of PHP. MyHealthUHN was planned to be self contained inside of a light weight virtual machine using Oracle's Virtualbox software, and the OpenBSD operating system inside of the virtual machine. These VM containers could then be replicated and deployed on any host hardware or operating system that has support for VirtualBox. This would make the setup seamless, and the security robust due to OpenBSD's focus on the subject. The initial plans for the MyHealthUHN infrastructure allows for a system that can be deployed on most hardware platforms.

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Information Security Requirements

The security requirements for this project are fairly strong and concise. The documents themselves must not contain any identifiable patient information. The only thing that can be permitted inside of the raw survey data is a string data type that can be connected to a patient's EHR, from OpenEMR. This string is a metadata hook called a UUID, and it is similar to a medical record number although much more secure. UUIDs, also known as Universally Unique Identifier is 128 bit long value that can guarantee uniqueness across all space and time. UUIDs were originally used in the Apollo Network Computing System (IETF, 2005). It is easy to anonymized the data when allowing it to be downloaded outside of the network, due to the UUIDs being the only thing connecting the EHR to the survey data inside of MyHealthUHN, As stated by Oachs & Watters; "Secondary data will need to remove identifying data so that data can be used without violating the patient's privacy" (Oachs & Watters, 2016).

Another security requirement is to containerize the running instance of the infrastructure away from the host operating system. This is accomplished by Virtualbox. It is a powerful virtualization product for enterprise as well as home use. Virtualization also allows for process isolation. Process isolation is a way of creating an environment so that if a computer application becomes compromised- it can not hurt the infrastructure associated with it (Scott 2014). It is used in security quite often. OpenBSD also helps due to the fact that it is an open source operating system that was built for security first. This means that it has been hardened to thwart computer hacking, and use some of the best encryption technology available.

Information Storage / Infrastructure Considerations

Although the memory and processing requirements are not high for this software stack, using this software will require a computer system that was purchased within the past 7 years in order to use the virtualization extensions provided by modern processors. Using this method allows for any computer, and any operating system that supports Virtualbox to run a secured version of the database. This also allows for security in patient records no matter if the host operating system is compromised. The technology requirements for implementing project MyHealthUHN is not very in depth. A new server will need to be purchased in order to centralize the database. Also the requirements assume that the computing systems being used were purchased within the past 7 years. Otherwise the only hard requirement is the use of open source software for standardization and security reasons.

100 gigabytes of free hard drive space is needed in order to future proof and keep the service running. This metric is used because of how much the total compressed data store that Wikipedia contains. It was reported in June 2015, that a dump of all pages inside of Wikipedia is around about 100 GB compressed (Wikimedia Foundation, 2020). This is significant because the records in MyHealthUHN is all text based, and text compression is relatively cheap. It should be noted that this is all of Wikipedia includes many languages other than English.

The hard requirements for MyHealthUHN are:

- Any system connected to the health network, that is used in sending EHR through internal or external network, that were purchased in the last 7 years.

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- A new server system with a lot of central processing units, vast amount of memory, and high speed networking hardware.
- All computers having 100GB of free space to use for the database.
- The use of secure operating systems (OpenBSD or others), with cryptography for securing information.
- Deidentified data that can be pulled from shareholders, and the public.
- A system that can work with multiple clients, and work if offline as well.
- A web interface that can be used on all different kinds of computing platforms.
- Document data that won't affect current health records in OpenEMR system.
- Redundant copies in case of imminent data loss.
- Easy to use user interface.
- Easy to program interface with rapid deployment in an agile methodology.

Metadata/Taxonomy & Data Models

The documents in CouchDB are native in the JavaScript Object Notation language, otherwise known as JSON. This declarative language, much like HTML, allows for the data to be retrieved, stored, and read by many computer applications. The data format is structured (in JSON format) with a metadata key attaching the survey documents to an electronic health record. The key can be dropped for deidentification easily. Outside of the database is a mobile formatted website that allows patients to input data, and another website for public health organizations that allow pulling of anonymized health

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surveys from downloaded. The current model of data, in JSON format is:

```
{
  "myhealthuhn_id": "07b4f72b-674f-4a34-b822-9e8da159c6e3",
  "_id": "0",

  "surveyData":
    [{
      "q": "Can you walk up the stairs properly",
      "a": ""
    },
    {
      "q": "Are you having problems breathing?",
      "a": ""
    },
    {
      "q": "Can you touch your toes?",
      "a": ""
    },
    {
      "q": "Do you often have a lapse of memory?",
      "a": ""
    }
  ]
}
```

Data definitions:

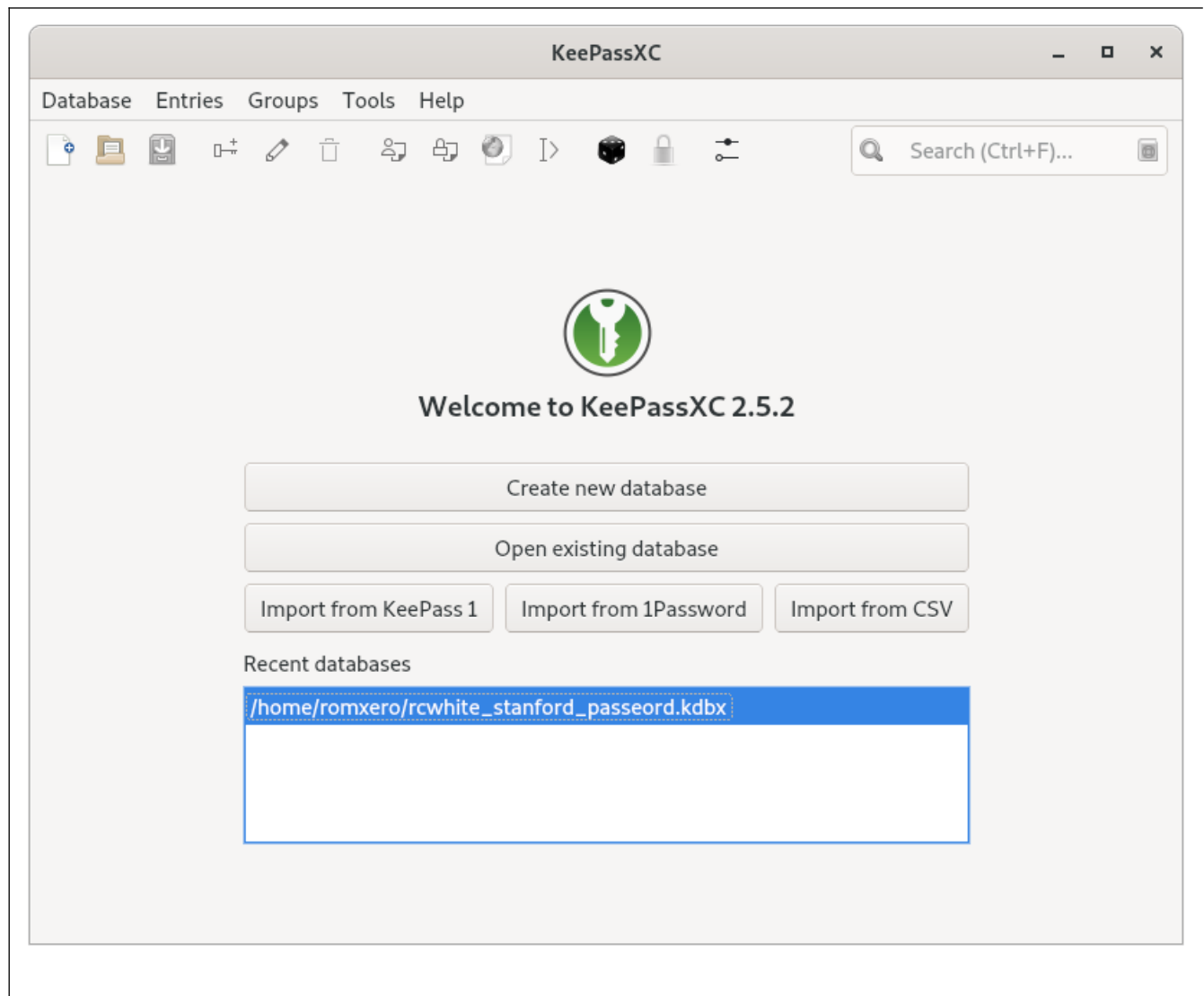
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myhealthuhn_id	The UUID metadata tag
_id	The database id record required by CouchDB, it is a time stamp.
surveyData	The questions, and answers to the surveys. These are indexed and can be iterated in the web page.

Data Steward and Custodianship Factors

Centralized password wallet will be used, and a singular random password hash will be generated for the entire system, database, and virtualized OS guest. The password hash will be stored using the program KeePassXC. It is a native cross-platform open source password wallet with the goal to provide a feature-rich, fully cross-platform and modern open-source password manager (Team). Using wallets will allow people to take care of the project, the data, and the virtual machine and shared with ease.

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Business Continuity Management Plans

Due to the planned use of a grid computing infrasturcture, and very little, if any identifiable data being present, there are very business continuity contingencies are next to zero. The only issue that

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could cause the application from working properly would be lack of storage space, but this is addressed in the planning phase of the project.

Development and Delivery:

Issues

There were several issues when trying to put the project together from the initial project plan. One of the most serious issues was that OpenBSD could not be used anymore due to the fact that CouchDB was no longer supported on the platform. It was either change the operating system, or change the database. It was decided to change the operating system, due to the planned use of the PouchDB web front-end, to use CouchDB on the back-end. So instead of using OpenBSD, NetBSD was used. OpenBSD was at one point a fork of NetBSD. Due to the similarities, it was easy to deploy CouchDB on NetBSD. According the the official website; “NetBSD is a free, fast, secure, and highly portable Unix-like Open Source operating system. It is available for a wide range of platforms, from large-scale servers and powerful desktop systems to hand held and embedded devices” (The NetBSD Project).

A minute issue was the chosen web server. OpenBSD had a secure web server that shipped with the software stock. While NetBSD did not have the same kind of affair. Research was done, to find a resource light http server, and the one that was chosen was Lighttpd. According to the official documentation; “Lighttpd is a secure, speedy, compliant, and very flexible web-server

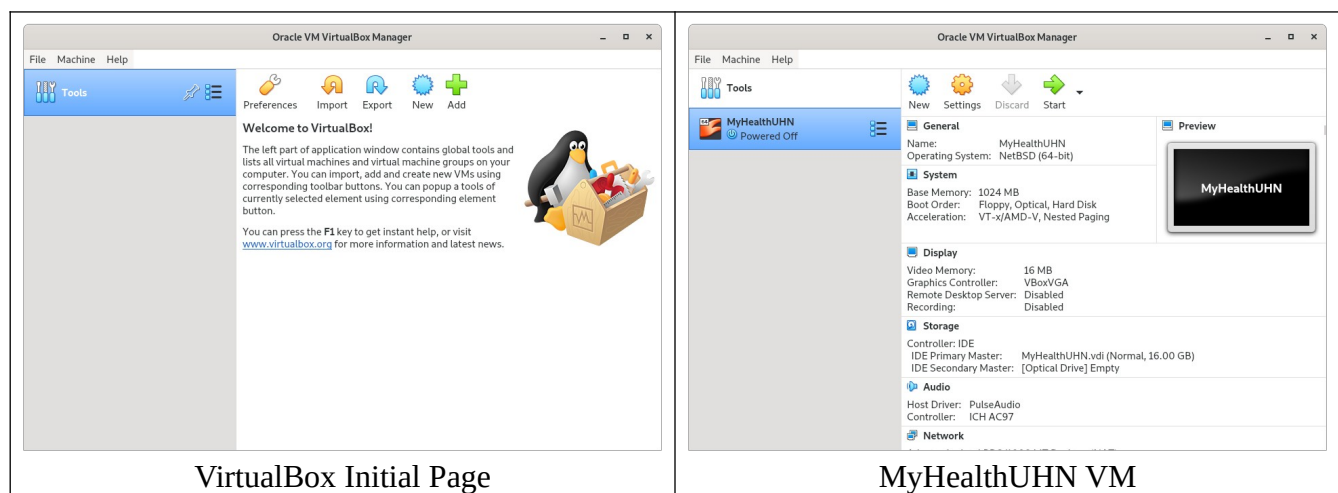
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which is designed and optimized for for high-performance environments... with a small memory footprint compared to other web-servers” (The NetBSD package collection).

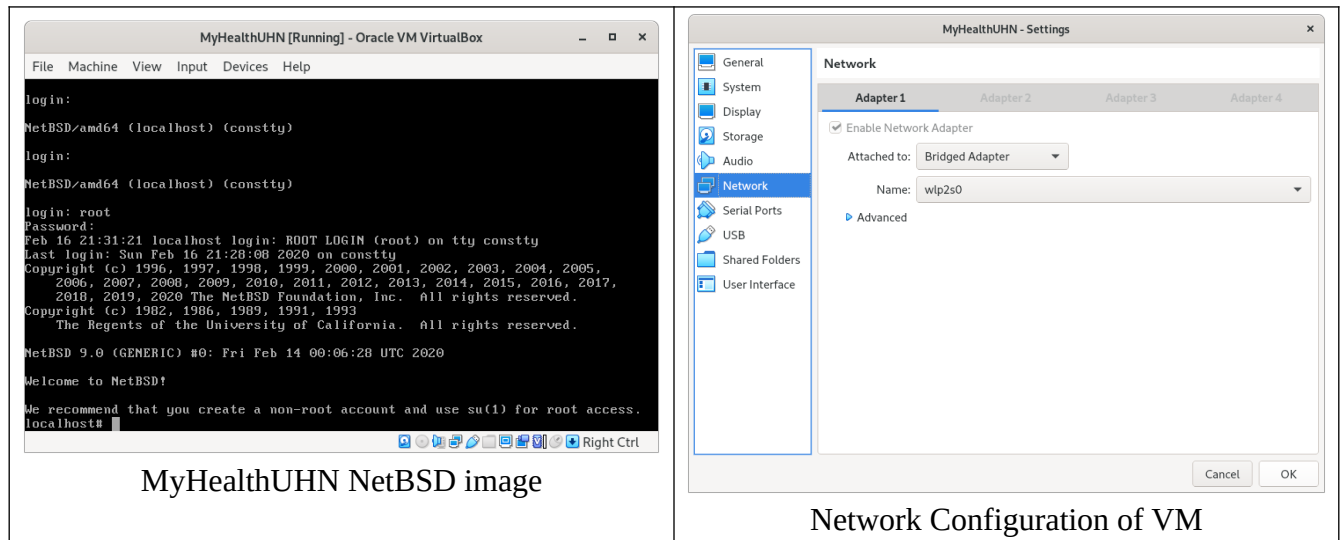
Another big unforeseen issue was Cross-Origin errors with using different servers, ports, and different libraries located in secure and non-secured locations. CORS is implemented on all modern web browsers for security reason. This required re configuring the client software, and server software in order to enable it. It took a significant amount of time. After these issues were taken care of, the actual building part was seamless.

Build and Testing Strategies

In order to start building the virtualmachine image with NetBSD, the NetBSD installation disk had to be downloaded and installed inside of a virtualbox instance. The install cd is around 400MB, and the latest stable version (NetBSD 8.1) was used. Windows 10 is a 7GB download, for comparison. The full installation on NetBSD takes less than 10 minutes, which is very fast compared to other modern operating systems.



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After the software was installed, many different files needed to be configured, and packages needed to be downloaded in order to get everything up and running. This required a lot of Unix know how. The OS environment needed to be modified first in order to download the packages:

```
export  
PKG_PATH="http://ftp.netbsd.org/pub/pkgsrc/packages/NetBSD/amd64/8.1/ALL/"
```

Afterwards the packages were installed with the program “pkg_add”

```
$ pkg_add curl wget lighttpd couchdb nano lynx openssl
```

Then the package configurations need to be copied over to the default OS locations:

```
cp /usr/pkg/share/examples/rc.d/couchdb /etc/rc.d/couchdb  
cp /usr/pkg/share/examples/rc.d/lighttpd /etc/rc.d/lighttpd
```

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```
ln -s /usr/pkg/bin /opt/local/couchdb/bin
```

The Lighttpd folder, configuration, and initial page was then added:

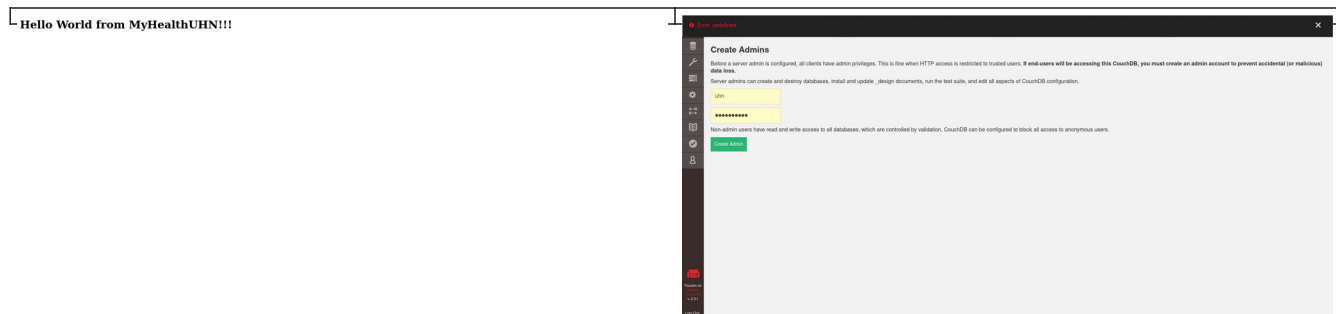
```
mkdir -p /srv/www/htdocs  
echo "<h1>Hello World from MyHealthUHN!!!</h1>" >>  
/srv/www/htdocs/index.html  
chown -R lighttpd:lighttpd /srv/www
```

The CouchDB configurations then needed to be modified, and the server was then tested on the command line:

```
$ curl http://127.0.0.1:5984  
{  
  "couchdb": "Welcome",  
  "version": "2.3.1",  
  "git_sha": "c298091a4",  
  "uuid":  
    "472fe607921dd1c07399dd9a9fbc3e39",  
  "features": ["pluggable-storage-  
engines", "scheduler"],  
  "vendor": {"name": "The Apache Software  
Foundation"}}}
```

Once the configuration was changed, the entries to the programs were added to the UNIX file:

“/etc/rc.local” which allows for the applications to run when the VM starts up. After a reboot, a web browser was used to test the home page and the CouchDB admin page:



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Hello World Document	Initial Admin page for CouchDB
----------------------	--------------------------------

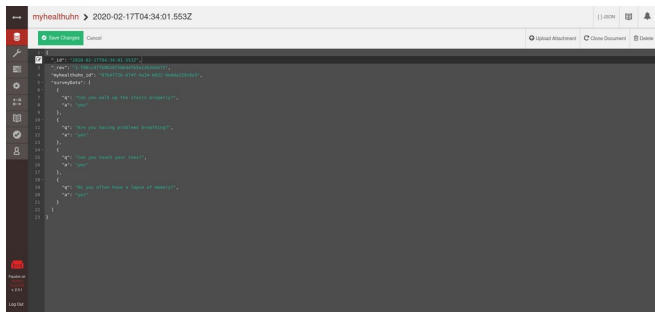

Once the virtual machine was deployed, the virtual machine appliance was exported, and then the dashboards were worked on remotely, uploading the data via the application “SFTP” on the Linux platform.

The patient facing interface was created with a test case for user named “Joshua”. The user has a default UUID that is tied to the session. The user is prompted with a question as soon as the page loads, two radio buttons allows the patient to choose either yes or no and then a next button allows the patient to goto the next question to be answered. Once all the questions have been answered, the use will be prompted to submit the information. When the user presses the submit button, it saves the data to an internal PouchDB database, and then it replicates the data to the CouchDB server. The page then reloads.

The researcher facing interface, is similar to the patient interface. It uses PouchDB to query the CouchDB database. It pulls all the data, and then presents it in an unordered HTML list with a download button to grab the json data. On the back-end, these are stored in CouchDB exactly in the same data scheme it is used to present. The means there is literally no data translations involved when sending from client to serve, and vice-verse.

<div>MyHealthUHN</div> <div>Welcome to MyHealthUHN</div> <div>Hello Joshua!</div> <div>Can you walk up the stairs properly?</div> <div><input type="radio"/> Yes <input type="radio"/> No</div> <div>Next</div> <div>• Details</div>	<div>MyHealthUHN - Data Download</div> <div>MyHealthUHN Data Download</div> <div><div>Time 2020-02-17T04:34:01.503Z Can you walk up the stairs properly? yes Are you having problems breathing? yes Can you touch your toes? yes Do you often have a lapse of memory? yes</div><div>Download</div><div>Time 2020-02-17T04:37:27.683Z Can you walk up the stairs properly? yes Are you having problems breathing? yes Can you touch your toes? yes Do you often have a lapse of memory? yes</div><div>Download</div><div>Time 2020-02-17T04:37:41.138Z</div></div>
--	---

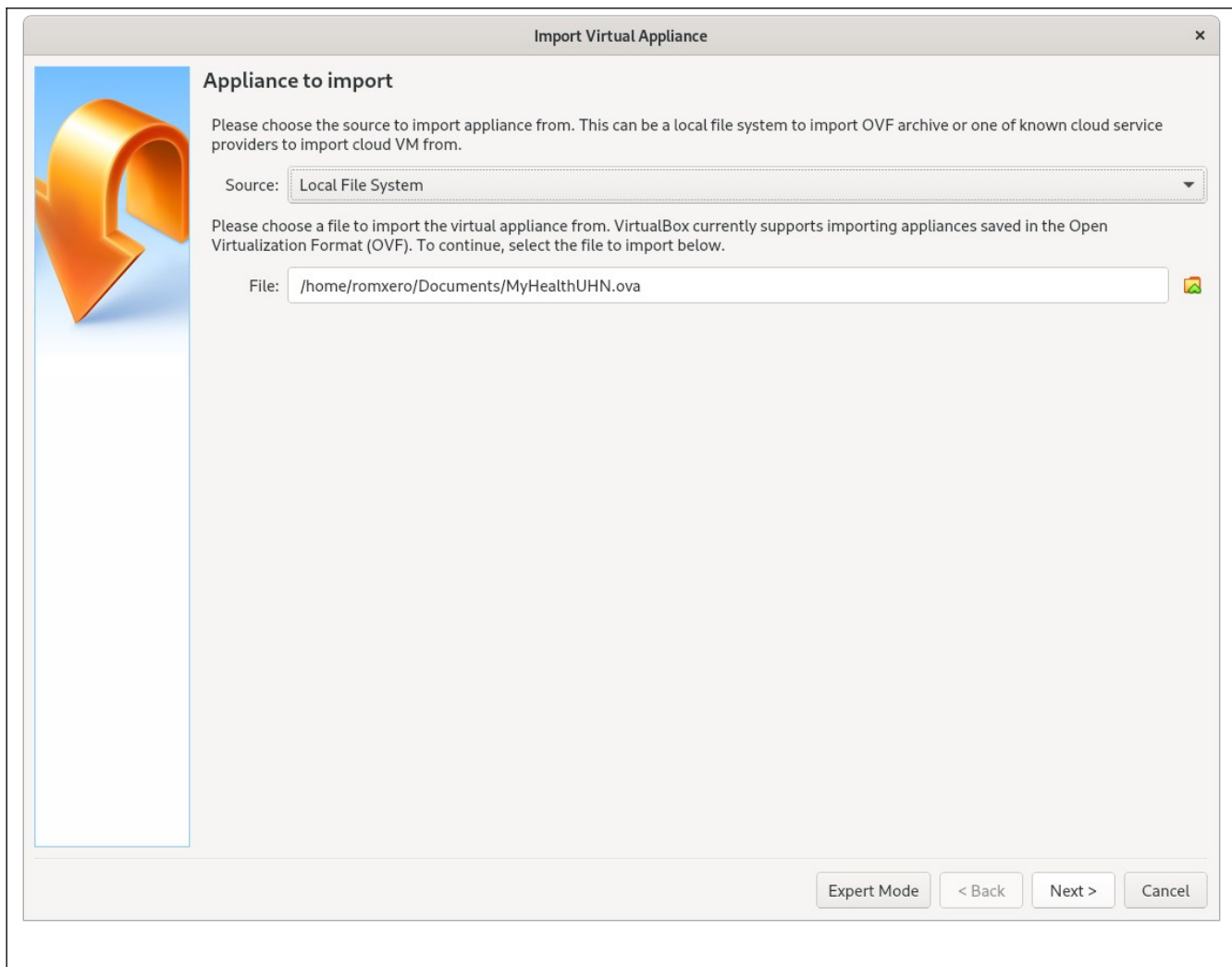
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Main Patient Page	Main Researcher Download Page
 <p>How the Data appear in CouchDB on the Back-end</p>	 <p>List of all databases on CouchDB Back-end</p>

Packaging and Pre-Deployment Staging

The entire VirtualBox Image has been exported as a VM appliance. After the configuration is done, it only needs to be imported onto any computer with VirtualBox and it will run the server without any intervention or configuration.

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Release and Change Management Matters

The configuration scripts, web dashboard, and virtual machine recipes are hosted on GitHub. According to TechCrunch; “GitHub is a Git repository hosting service, but it adds many of its own features. While Git is a command line tool, GitHub provides a Web-based graphical interface. It also provides access control and several collaboration features, such as a wikis and basic task management tools for every project” (Finley 2012). By using GitHub as a software repository, we keep many eyes

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on it. People can write changes, and advancements, and put in a request. Our developers can then review the request, and then allow the modifications if needed. These, coupled with the release of this software as open source- is a win win situation. The repo is hosted here:

<https://github.com/romxero/MyHealthUHN>.

Conclusion:

Aside from some setbacks, MyHealthUHN is a solid project going forward. It has a small footprint, its open source, it addresses storage, redundancy, deployment, cost, and technology to embark in big data. More enhancements are needed, and more iterations will be processed in order to achieve one of the best secondary data infrastructure platforms for health informatic systems.

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module_item_id=10475724](https://sjsu.instructure.com/courses/1364488/assignments/5183596?module_item_id=10475724)

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front- lines-of-healthcare-work/](https://blog.couchdb.org/2017/09/19/couchdb-takes-medic-mobile-to-the-front-lines-of-healthcare-work/)

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Patient Dashboard Source Code:

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN"
"http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">
<html xmlns="http://www.w3.org/1999/xhtml" xml:lang="en" lang="en">

<head>
<meta charset="utf-8">
<meta name="viewport" content="width=device-width, initial-scale=1, shrink-to-fit=no">
<title>MyHealthUHN</title>
<link rel="stylesheet"
href="https://stackpath.bootstrapcdn.com/bootstrap/4.4.1/css/bootstrap.min.css"
integrity="sha384-Vkoo8x4CGsO3+Hhxv8T/Q5PaXtkKtu6ug5TOeNV6gBiFeWPGFN9MuhOf23Q
9Ifjh" crossorigin="anonymous">

<script src="https://code.jquery.com/jquery-3.4.1.slim.min.js" integrity="sha384-
J6qa4849bIE2+poT4WnyKhv5vZF5SrPo0iEjwBvKU7imGFAV0wwj1yYfoRSJoZ+n"
crossorigin="anonymous"></script>
<script src="https://cdn.jsdelivr.net/npm/popper.js@1.16.0/dist/umd/popper.min.js"
integrity="sha384-
Q6E9RHvblyZFJoft+2mJbHaEWldlvI9IOYy5n3zV9zzTtmI3UksdQRVvoxMfooAo"
crossorigin="anonymous"></script>
<script src="https://stackpath.bootstrapcdn.com/bootstrap/4.4.1/js/bootstrap.min.js"
integrity="sha384-
wfSDF2E50Y2D1uUdj0O3uMBJnjuUD4Ih7YwaYd1iqfktj0Uod8GCExl3Og8ifwB6"
crossorigin="anonymous"></script>
<script src="https://cdn.jsdelivr.net/npm/pouchdb@7.1.1/dist/pouchdb.min.js"></script>
<script src="https://ajax.googleapis.com/ajax/libs/jquery/3.4.1/jquery.min.js"></script>

<script>

//make sure to set up cross domain access with jquery
$.ajaxSetup({
crossOrigin: true
});

//remote server
var remoteCouch = 'http://uhh:E95C5C980AD2EEE710CFCD56E398E896@' +
location.hostname + ':5984/myhealthuhn';
var opts = {live: true}; //options for syncing
var db = new PouchDB('myhealthuhn'); //the database name
```

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```
</script>
```

```
<script>
```

```
var currentIndex = 0; //to iterate the index of data elements  
var sendData = 0; // a conditional to send data elements to server
```

```
//below is the main json element to send information  
var mainPatientJson = {
```

```
"myhealthuhn_id": "07b4f72b-674f-4a34-b822-9e8da159c6e3",
```

```
"_id": new Date().toISOString(),
```

```
"surveyData":
```

```
[{  
  "q": "Can you walk up the stairs properly?",
```

```
  "a": ""
```

```
},
```

```
{
```

```
  "q": "Are you having problems breathing?",
```

```
  "a": ""
```

```
},
```

```
{
```

```
  "q": "Can you touch your toes?",
```

```
  "a": ""
```

```
},
```

```
{
```

```
  "q": "Do you often have a lapse of memory?",
```

```
  "a": ""
```

```
}]
```

```
]
```

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```
};
```

```
</script>
```

```
</head>
```

```
<body>
```

```
<header>
```

```
<nav class="navbar navbar-dark bg-dark">
  <a class="navbar-brand" href="#">MyHealthUHN</a>
  <button class="navbar-toggler" type="button" data-toggle="collapse" data-
target="#navbarSupportedContent" aria-controls="navbarSupportedContent" aria-
expanded="false" aria-label="Toggle navigation">
  <span class="navbar-toggler-icon"></span>
</button>
<div class="collapse navbar-collapse" id="navbarSupportedContent">
  <ul class="navbar-nav mr-auto">
    <li class="nav-item active">
      <a class="nav-link" href="#">Home <span class="sr-only">(current)</span></a>
    </li>
    <li class="nav-item">
      <a class="nav-link" href="#">Link</a>
    </li>
    <li class="nav-item dropdown">
      <a class="nav-link dropdown-toggle" href="#" id="navbarDropdown" role="button" data-
toggle="dropdown" aria-haspopup="true" aria-expanded="false">
Dropdown
      </a>
      <div class="dropdown-menu" aria-labelledby="navbarDropdown">
        <a class="dropdown-item" href="#">Action</a>
        <a class="dropdown-item" href="#">Another action</a>
        <div class="dropdown-divider"></div>
        <a class="dropdown-item" href="#">Something else here</a>
      </div>
    </li>
    <li class="nav-item">
      <a class="nav-link disabled" href="#">Disabled</a>
    </li>
  </ul>
  <form class="form-inline my-2 my-lg-0">
```

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```
<input class="form-control mr-sm-2" type="search" placeholder="Search" aria-label="Search">  
<button class="btn btn-outline-success my-2 my-sm-0" type="submit">Search</button>  
</form>  
</div>  
</nav>  
</header>
```

```
<script>  
  
</script>
```

```
<div id="mainContentArea">
```

```
</div>
```

```
<script>  
  
</script>
```

```
<div class="alert alert-dark" role="alert">
```

```
<h1> Welcome to MyHealthUHN </h1>
```

```
<br>  
<h2>Hello Joshua!</h2>  
</div>  
<br>
```

```
<div id="mainFormDiv" class="text-center">
```

```
<h3 id="questionData"></h3>  
<br>
```

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```
<br>
<div id="radioB">
  <div class="form-check form-check-inline">
    <input class="form-check-input" type="radio" name="inlineRadioOptions" id="yesRadio"
value="yes">
    <label class="form-check-label" for="yesRadio">Yes</label>
  </div>
  <div class="form-check form-check-inline">
    <input class="form-check-input" type="radio" name="inlineRadioOptions" id="noRadio"
value="no">
    <label class="form-check-label" for="noRadio">No</label>
  </div>

</div>

<br><br>
<br><br>

<button type="button" class="btn btn-primary" onclick="grabNextQ();"
id="nextButton">Next</button>

</div>

<script>
//first loading
//appends questions to form element
document.getElementById('questionData').innerHTML =
mainPatientJson.surveyData[currentIndex].q ;
</script>

<script>
//for getting yes or no values
function returnYesOrNo()
{
if (document.getElementById('yesRadio').checked == true)
{
return "yes";
```


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```
}  
else  
{  
  
return "no";  
}  
  
return "N\A"; //this means we got something really bad =/  
  
}  
function grabNextQ()  
{  
//grabs the next question  
if (sendData == 1)  
{  
//send the data  
//db.put(,); //  
  
db.put(mainPatientJson, function callback(err, result) {  
if (!err) {  
console.log('Successfully posted!');  
}  
});  
  
db.replicate.to(remoteCouch,opts); //syncs data  
document.getElementById('questionData').innerHTML = "Thank you for your submission!";  
$('#nextButton').hide(); //hide the radio buttons  
setTimeout(() => { location.reload(); }, 5000);  
return 0;  
}  
  
if (currentIndex == (mainPatientJson.surveyData.length - 1))  
{  
mainPatientJson.surveyData[currentIndex].a = returnYesOrNo();  
sendData = 1;  
$('#radioB').hide(); //hide the radio buttons  
document.getElementById('questionData').innerHTML = "Please submit your survey";  
document.getElementById('nextButton').innerHTML = "Submit";  
$('#nextButton').addClass("btn-success");  
}
```

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```
else
{

mainPatientJson.surveyData[currentIndex].a = returnYesOrNo();
currentIndex = currentIndex + 1;
document.getElementById('questionData').innerHTML =
mainPatientJson.surveyData[currentIndex].q ;

}

}

</script>
<br><br><br><br><br><br>
<br>
<footer>

<details>
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</details>

</footer>

</body>

</html>
```

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Researcher Dashboard Source Code:

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN"
"http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">
<html xmlns="http://www.w3.org/1999/xhtml" xml:lang="en" lang="en">

<head>
<meta charset="utf-8">
<meta name="viewport" content="width=device-width, initial-scale=1, shrink-to-fit=no">
<title>MyHealthUHN - Data Download Page</title>
<link rel="stylesheet"
href="https://stackpath.bootstrapcdn.com/bootstrap/4.4.1/css/bootstrap.min.css"
integrity="sha384-Vkoo8x4CGsO3+HhXv8T/Q5PaXtkKtu6ug5TOeNV6gBiFeWPGFN9MuhOf23Q
9Ifjh" crossorigin="anonymous">

<script src="https://code.jquery.com/jquery-3.4.1.slim.min.js" integrity="sha384-
J6qa4849bIE2+poT4WnyKhv5vZF5SrPo0iEjwBvKU7imGFAV0wwj1yYfoRSJoZ+n"
crossorigin="anonymous"></script>
<script src="https://cdn.jsdelivr.net/npm/popper.js@1.16.0/dist/umd/popper.min.js"
integrity="sha384-
Q6E9RHvblyZFJoft+2mJbHaEWldlvI9IOYy5n3zV9zzTtmI3UksdQRVvoxMfooAo"
crossorigin="anonymous"></script>
<script src="https://stackpath.bootstrapcdn.com/bootstrap/4.4.1/js/bootstrap.min.js"
integrity="sha384-
wfSDF2E50Y2D1uUdj0O3uMBJnjuUD4lH7YwaYd1iqfktj0Uod8GCExl3Og8ifwB6"
crossorigin="anonymous"></script>
<script src="https://cdn.jsdelivr.net/npm/pouchdb@7.1.1/dist/pouchdb.min.js"></script>
<script src="https://ajax.googleapis.com/ajax/libs/jquery/3.4.1/jquery.min.js"></script>

<script>

//make sure to set up cross domain access with jquery
$.ajaxSetup({
crossOrigin: true
});

var remoteCouch = 'http://uhn:E95C5C980AD2EEE710CFCD56E398E896@' +
location.hostname + ':5984/myhealthuhn';
```

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```
var opts = {live: true};  
var db = new PouchDB(remoteCouch);
```

```
</script>
```

```
<script>
```

```
var currentIndex = 0;  
var sendData = 0;
```

```
</script>
```

```
</head>
```

```
<body>  
<header>
```

```
<nav class="navbar navbar-dark bg-dark">  
<a class="navbar-brand" href="#">MyHealthUHN - Data Download</a>  
<button class="navbar-toggler" type="button" data-toggle="collapse" data-  
target="#navbarSupportedContent" aria-controls="navbarSupportedContent" aria-  
expanded="false" aria-label="Toggle navigation">  
<span class="navbar-toggler-icon"></span>  
</button>  
<div class="collapse navbar-collapse" id="navbarSupportedContent">  
<ul class="navbar-nav mr-auto">  
<li class="nav-item active">  
<a class="nav-link" href="#">Home <span class="sr-only">(current)</span></a>  
</li>  
<li class="nav-item">  
<a class="nav-link" href="#">Link</a>  
</li>  
<li class="nav-item dropdown">  
<a class="nav-link dropdown-toggle" href="#" id="navbarDropdown" role="button" data-  
toggle="dropdown" aria-haspopup="true" aria-expanded="false">  
Dropdown  
</a>  
<div class="dropdown-menu" aria-labelledby="navbarDropdown">  
<a class="dropdown-item" href="#">Action</a>
```

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```
<a class="dropdown-item" href="#">Another action</a>
<div class="dropdown-divider"></div>
<a class="dropdown-item" href="#">Something else here</a>
</div>
</li>
<li class="nav-item">
<a class="nav-link disabled" href="#">Disabled</a>
</li>
</ul>
<form class="form-inline my-2 my-lg-0">
<input class="form-control mr-sm-2" type="search" placeholder="Search" aria-
label="Search">
<button class="btn btn-outline-success my-2 my-sm-0" type="submit">Search</button>
</form>
</div>
</nav>
</header>
```

```
<script>
```

```
</script>
```

```
<div id="mainContentArea">
```

```
</div>
```

```
<script>
```

```
</script>
```

```
<div class="alert alert-dark" role="alert">
```

```
<h1> MyHealthUHN Data Download </h1>
```

```
<br>
```

```
</div>
```

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```
<br>
```

```
<div id="mainFormDiv" class="text-center">  
<ul id="mainList">
```

```
</ul>  
<h3></h3>
```

```
<button type="button" class="btn btn-primary" onclick="" id="nextButton">Next</button>
```

```
<script>  
var theResults;  
db.allDocs({  
  include_docs: true,  
  attachments: true  
}).then(function (result) {  
  console.log(result)
```

```
theResults = $.extend( true, {}, result );
```

```
var i = 0;  
var listElem = document.getElementById("mainList");  
for (i = 0; i < theResults.total_rows; i++)  
{  
  listElem.innerHTML += "<li> Time | " + theResults.rows[i].doc._id + " ";  
  var k = 0;  
  //listElem.innerHTML += "<ul>";  
  for (k = 0; k < theResults.rows[i].doc.surveyData.length; k++)  
  {  
    listElem.innerHTML += " " + theResults.rows[i].doc.surveyData[k].q + " | " +  
    theResults.rows[i].doc.surveyData[k].a + "<br>";  
    console.log(theResults.rows[i].doc.surveyData);
```

```
  }  
  listElem.innerHTML += "<br><button class='btn btn-primary'>Download</button>  
</li><br><br><br>";  
}
```

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```
}).catch(function (err) {  
  console.log(err);  
});
```

```
</script>  
</div>
```

```
<br><br>  
<br><br>
```

```
</div>
```

```
<script>  
  //first loading  
</script>
```

```
<br><br><br><br><br><br>  
<br>  
<footer>
```

```
<details>  
MyHealthUHN from University Health Network
```

```
</details>
```

```
</footer>
```

```
</body>
```

```
</html>
```