

#securemanufactureui

CSC 591, Spring 2020

Stage 2 - Generate Phase

Team:

#	Name	Unity Id
1	Tushar Himmat Dahibhate	tdahibh
2	Yang-Kai Chou	ychou3
3	Rajshree Jain	rjain27
4	Satanik Ray	rray7
5	Ankit Arvind Tiwari	atiwari4

Ankit Arvind Tiwari:

There are not many UI that are available which recognizes how products that implement Industry 4.0 look like. So, I looked at different products which focus on particular parts of the map we made in the “research” phase.

1. CREMA, RES-COM, it's OWL (The whole map):

These are one of the largest projects related to Industry 4.0.

Here (<https://www.youtube.com/watch?v=ONkxjql8luI>), I was able to find an example of where car manufacturers can share the status of their supplies online via cloud storage. Suppliers can see this data and provide them the supplies as and when needed. They can lease out their unused machines for a particular price and time. This helps them to reduce downtime and scale up or down as they like.

Here, they have data visualization, remote assistance and other features to assist the manufacturers.

2. Acuity, Setmore, VCita, And Square (job scheduling)

Many of them are on different platforms (web and mobile). This enables them to be viewed and edited with full independence of location and platform. They have integration with applications like Google Calender, Office 365, etc.

3. MailChimp, Gmail, Github:

Here I am talking about a specific image on their site which appears when the users are about to publish a campaign (<https://brandastic.com/wp-content/uploads/2018/09/mailchimp-button-gif.gif>). This is a highly

praised image because it implies the importance and the irreversibility of the action with great impact. Such imagery can help drowsy operators who work night shift to understand the consequences of their action more effectively than a confirm dialog box can.

Similarly, Gmail lets you undo your sent mail in a few seconds of sending it (forgiveness); Github makes you write a whole command to delete a repository so as to not let accidental delete spoil your months of work. I think such implementations have their place in our project, too.

Idea:

As many of the companies are looking to optimize the running time of their machines, they can upload information about the parts, which make their product, to the cloud. And share them securely with factories that make them. So, as soon as some of those parts are getting depleted, the related factories may start to produce those parts.

The job is sent to the scheduler. As with our talks with Dr. Binil Starly suggested, the access to the scheduler and the authorization to edit it would be with the floor manager. The floor manager (FM) will look at the schedule and may approve or disapprove of the new job. The FM may also try to reschedule the job to an earlier or a later date. For this purpose, I think that the FM must have a touchscreen as then the FM can drag and drop the jobs for rescheduling or to put it into the queue of a different machine. There must also be a keyboard attached for convenience.

The screen must look similar to a google calendar but when one may open a date, it will have columns representing different machines. So, if there are five machines, they must be having five columns. If columns won't fit on a screen, they may overflow to another page. The rows will be time slots, which would be customizable.

The scheduler must have some kind of login system with 2 factor authentications, to recognize it is being handled by the right person. This can also allow for a floor manager to access schedules anywhere with the help of a mobile app (android or iOS). So, the FM can go anywhere and still be able to do their job. This can also let the FM monitor a task happening personally.

System updates are normally postponed a lot because the machines are normally used when they are needed and hence no one wants to waste their time with installing updates. The FM then can also remotely schedule a system update at a time they may seem fit and proper, for example, when the machines are not normally used and not let the normal workflow be interrupted. Also, schedules can be exported to normal google calendars for sharing with others or as a reminder.

The SAMM controller then can keep track of the contents in the machine and recommend automatically when to fill the content up again. Or alert them to contact manufacturers which supply them with those contents. If there is some error in starting or scheduling the job, the SAMM should initially show just the code, its meaning and an option to show more information. Only when "more information" is pressed, the step-by-step instructions on how to solve it should be displayed, where pressing single instructions can show a graphical/

animation representation on how to execute that instruction. If the problem still persists, there should be an option for remote/ virtual technical assistance.

The other concerns like “drowsy operator” during night-time shifts can be addressed by using over-the-edge graphics (like the MailChimp gif) to imply the severity of the operations that the operators are doing. Usage of such graphics can be limited to late-night hours as such graphics may cause unintended stress in day hours.

The FM will configure all the configurations of the machine. The operator that will be at the proximity of the machine will only just check all the configuration and the machine and will allow the job to start. To provide accountability, the operator would have to swipe their ID card or provide a biometric proof before allowing the job to start. At every step, paper-trail must be made.

Crazy 8:

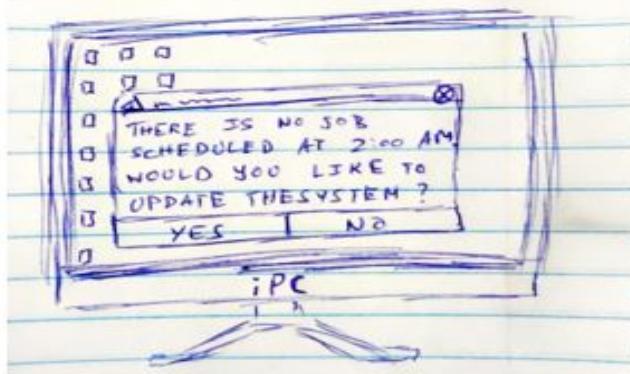
The scheduler



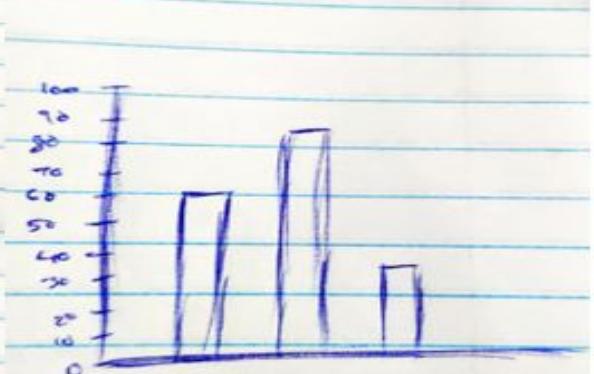
The FM can access scheduler anywhere



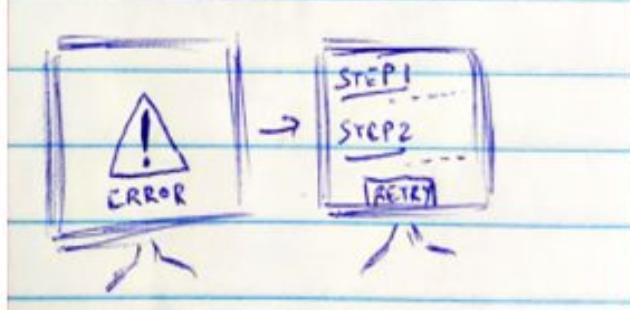
Recommends for system update at idle time.



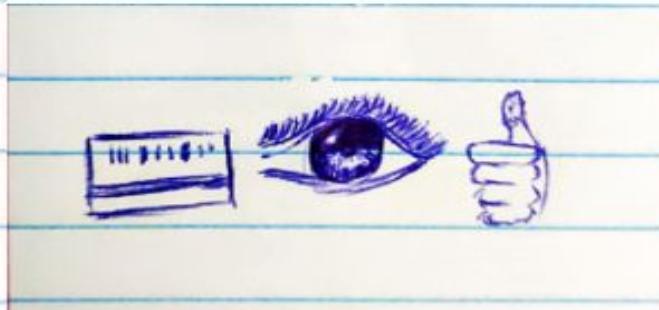
Status of machine is stored and visualized for use.



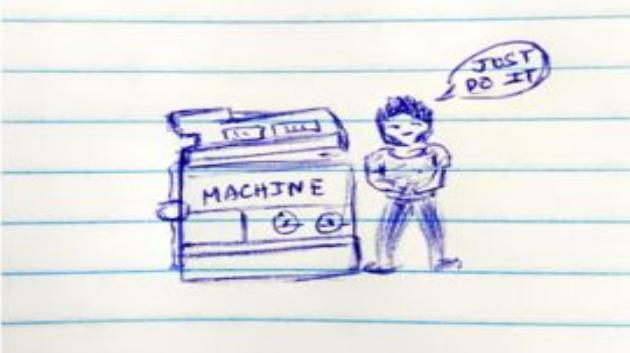
Errors can be short or elaborated.



Eyes, finger or ID scan can be used for verification



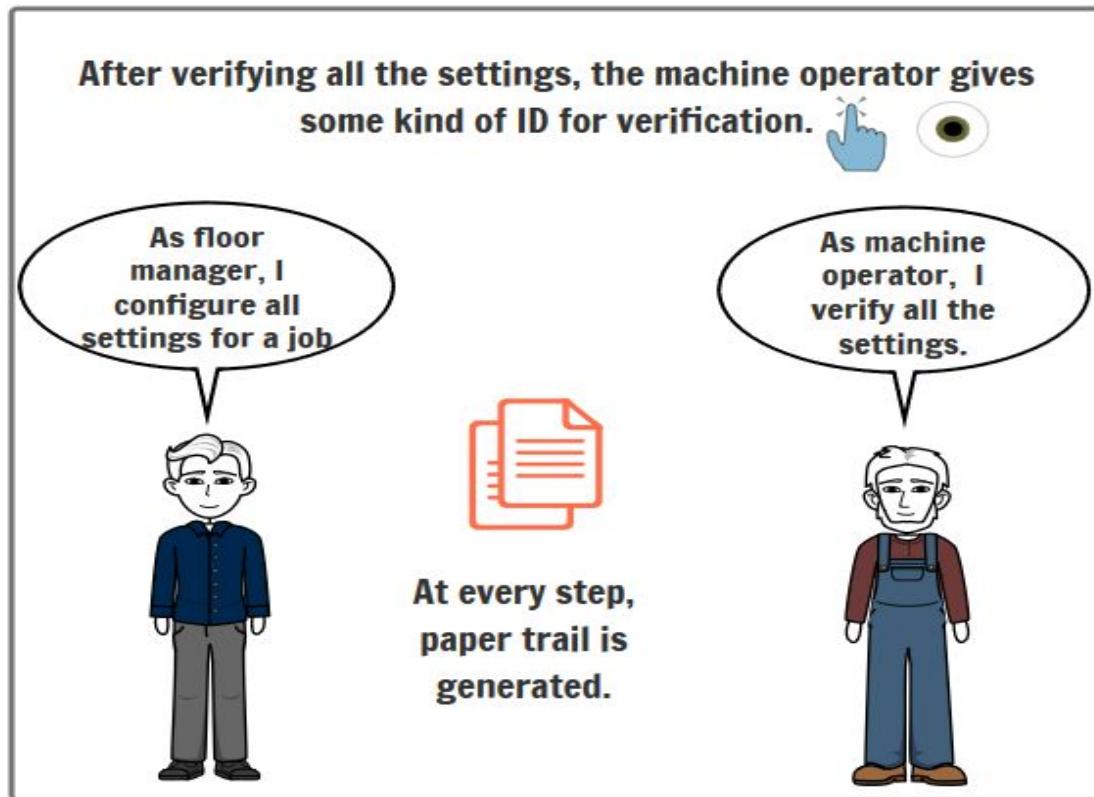
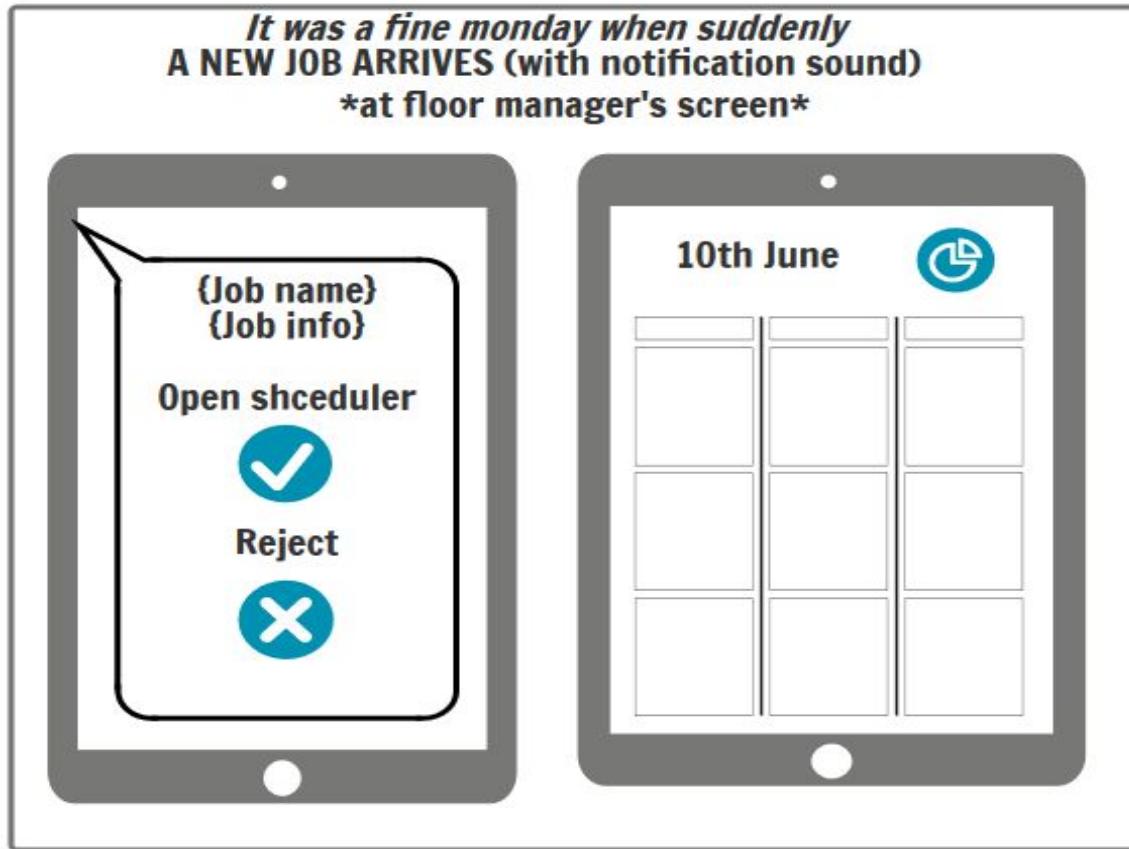
Animated/graphical troubleshoot instructions



Over-the-edge graphics for drowsy operators

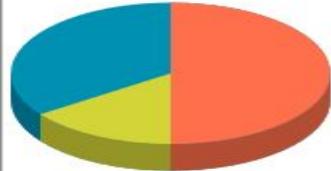


Storyboard:





The floor manager and the operator can switch to over-the-top graphics for ease.



The data about the machine status is saved for future use.



All the instructions to the floor manager or operator can be displayed in an animated or graphical manner.

Rajshree Jain

1.Amazon Web Services, Identity and Access Management Service

Considering the security features that we expect to have in the SAMM, I felt that this application would be really helpful in access management, access control and help in determining what actions a particular type of user can perform.

This service allows users to provide particular types of access to particular users, based on what they should be allowed to perform.

The main features which fascinated me are as follows:

- Shared access to various accounts: This feature can be used in our SAMM machine also where various operators who have to interchangeably perform tasks can have a shared access.
- Granular access: It allows micro level permissions to the users. The same way we could have for our operators who have specific access permissions.
- Extra authentication using the multi factor authentication: This may even be utilized in our SAMM machine where no one gets easy access by just knowing the credentials.

The above features look a bit complicated but when they would be incorporated in the User Interface they would be able to provide a better understanding to the Operators and prevent them from facing trouble with extra buttons, taking care of what all tasks they are allowed to perform and what all they are authorised to perform. Although the security policies would look a bit strict to everyone, they would aid in proper functionality and better understanding of tasks.

Also the FM would be able to easily assign different security accesses to different operators and different people in the hierarchy.

Link to the IAM service of AWS: <https://docs.aws.amazon.com/IAM/latest/UserGuide/introduction.html>
Demo: <https://www.youtube.com/watch?v=Ul6FW4UANGc>

2. Ninite

This application that I found online is basically an interface for managing various Windows PCs using a Web Browser. The key features of this application which I felt would aid the functionality and user experience of our SAMM machine are as follows:

- The Ninite application shows each of the Personal Computers in a separate row where particular softwares can be installed or set up on different machines by choosing them.
- Another good feature is that even if you are far away from the actual Machines, you can roam around and send commands to your personal computers.
- The Web application allows to filter, sort and tag various machines based on different criterias.
- An overview tab of the application helps keep a track of the machines and their condition.
- A good thing is the user interface that is self explanatory and helps in performing the tasks step by step instead of going through mundane manuals and big notes or CLI commands.
- Even though there is a command line option available, it is always better to have a better User Interactive space that helps all kinds of users, irrespective of their knowledge.

Link to the Ninite service: <https://ninite.com/pro>
Demo: <https://www.youtube.com/watch?v=KoIeCruVdNw>

3. Fabpilot

This application is kind of an example of what we are trying to design for our SAMM machine. It is a Cloud based collaborative 3D printing software. It helps in the easy management of all kinds of tasks like Uploading of tasks, analysis and optimization, Job preparation, post process work smoothly.

Another factor that is good and relatable is that the users can share the 3D codes and files on a collaborative secure platform that has only authorized people who can view and edit the files.

Further, the users are allowed easy access from anywhere to the 3D printing data (desktop or mobile).

Some more features that provide a more visual and interactive appeal to the users is:

- File repair - This feature would automatically detect any issues in the underlying STL files and make corrections.
- Job Management - Timely update and graphical representation of the performance of the machines
- Automatic orientation - This would help in analysing the actual orientation of the final build by looking into the visual aspects, by just a few clicks.

Link to the Fabpilot: <https://www.fabpilot.com/3d-printing-services/>

Demo: https://www.youtube.com/watch?v=U_5Itcq0kCI
<https://www.youtube.com/watch?v=FxuLKHBLQCM>

4. sendsafely

We looked into the above Fabpilot application that the issue of transferring the file insecurely using flash disks can be avoided by using a secure cloud platform. However, this is another yet easy to use software that safely lets you send and easily exchange encrypted files and information with authorised people on the device.

The major easy to use features are:

- Easily integrate the third party applications to share files
- Easily secure and download files from any platform

Link to the application: <https://www.sendsafely.com/>

Demo: <https://www.youtube.com/watch?v=3R48nm7Bj1E>

Idea

1. The Floor Manager should have easy access to the authorization policies so that he can manage people with different levels of access. Hence, there should be a separate section that can only be used by the top users, who can assign tasks to people and also approve the scheduled jobs in times of need. Hence, there should be various access levels based on the requirement of the organization that define the various tasks of people. And the Floor manager or a person of top priority must be able to assign a particular access level to a particular user.

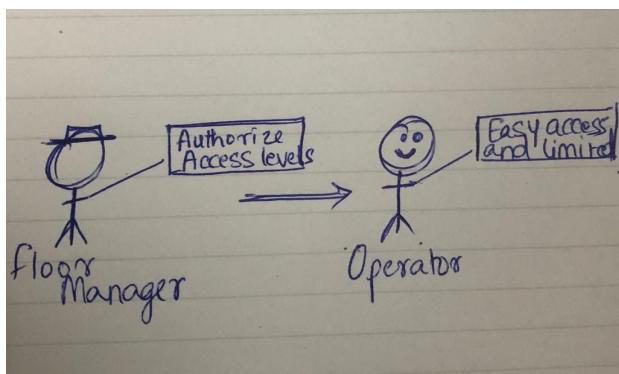
This makes it easy for the Floor Manager to keep up with the security policies and restrictions and further, also when the operators come up they only see appropriate content on their screen and not a whole lot of content that was initially visible to all the users. Further, this makes the process less complicated for the operators. This is similar to what is there in the IAM service where we can assign particular policies to particular users.

2. Then once all the kinds of users have themselves assigned to particular security levels, the security concerns can be upgraded by introducing a multi factor authentication check. This would only allow them to login if they have accepted a push notification or message on their personal mobile device. This way the operators would not have to be extra careful of who they are giving their credentials or they are forgetting it somewhere.
3. Once logged in they would be shown a screen with various graphic options which would show what all tasks can be performed using the user interface. An easy option to add the machines, delete the machines would be provided. Once a machine is added the basic configuration and setup would be done by self depending on the type of printing machine being added. Then the operator would be prompted with the necessary information that he would be required to fill with recommendations of answers. This is a good takeaway from the ninite application.
4. Another option just as shown in Fab Pilot is that as the operator enters the printing CAD file, there would be a graphic visualization of the orientation of what is being printed which would help even the naive operators fill in correct information.

5. Also, based on previous file inputs and data, there would be options that would help you in just updating the file or making minor changes.
6. Since the application can be used anywhere on phone or laptop the operator might be able to send any kind of updates and tasks to the machines.
7. Further, another option would be to continually monitor the machines remotely from anywhere and we would get to know about the following updates:
 - Any kind of software or hardware issues that might occur while the printing process
 - Error that might arise due to faulty input
 - Prompt in case the filament is less or the plastic finishes
 - Have the capability to determine if the plate where the printed material is kept is empty or not and inform accordingly
8. Then since the operators need a secure channel to transfer the files without becoming corrupt, there would be a secure channel to help in the transfer of files as inspired from the Cloud base of Fabpilot and sendselfly.
9. Also there would be easy documentation in the form of recommended folders and links to self train the operators on how to use the application and fix any kind of issues.

Krazy8

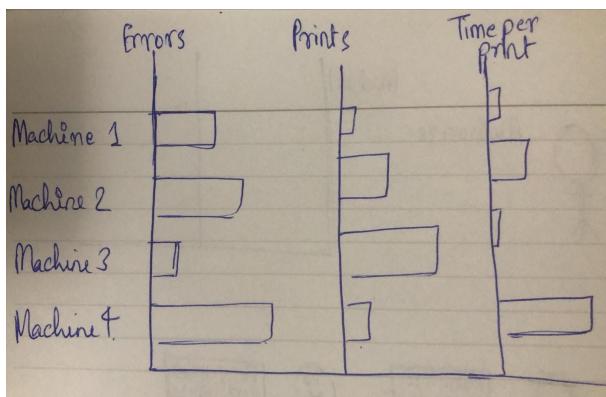
Assigning security levels



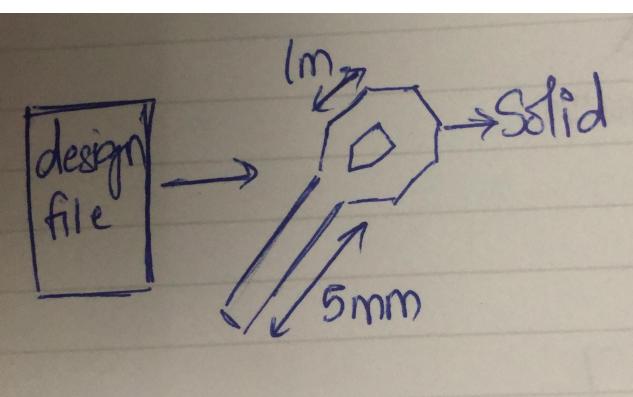
Ability to transfer the files securely



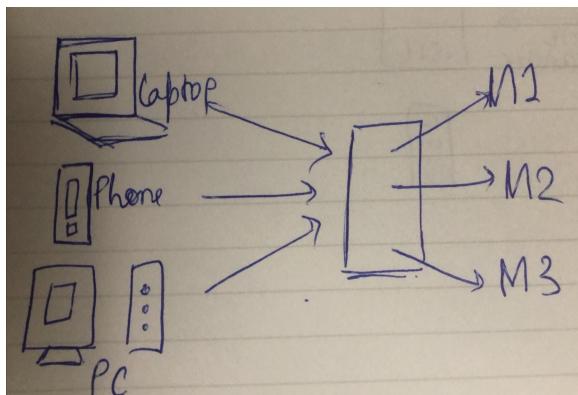
Monitoring all machines



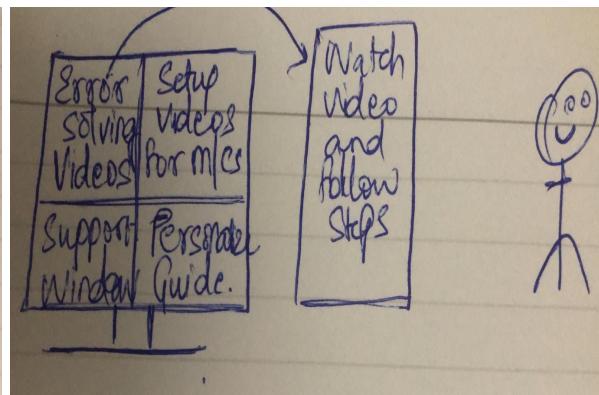
Visual orientation of the prints



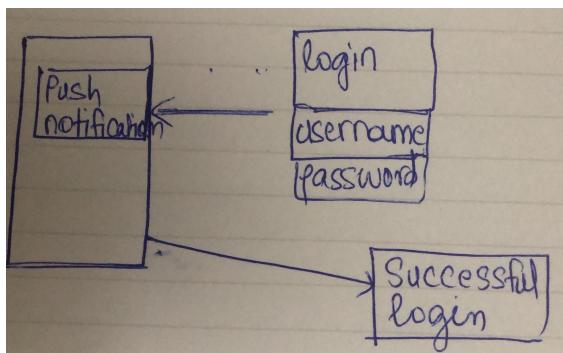
Sending updates from any location



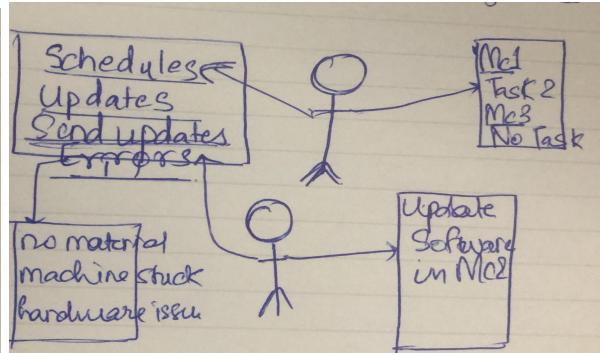
Easy guide for errors and setup



MultiFactor Authentication



Regular updates about errors and schedules

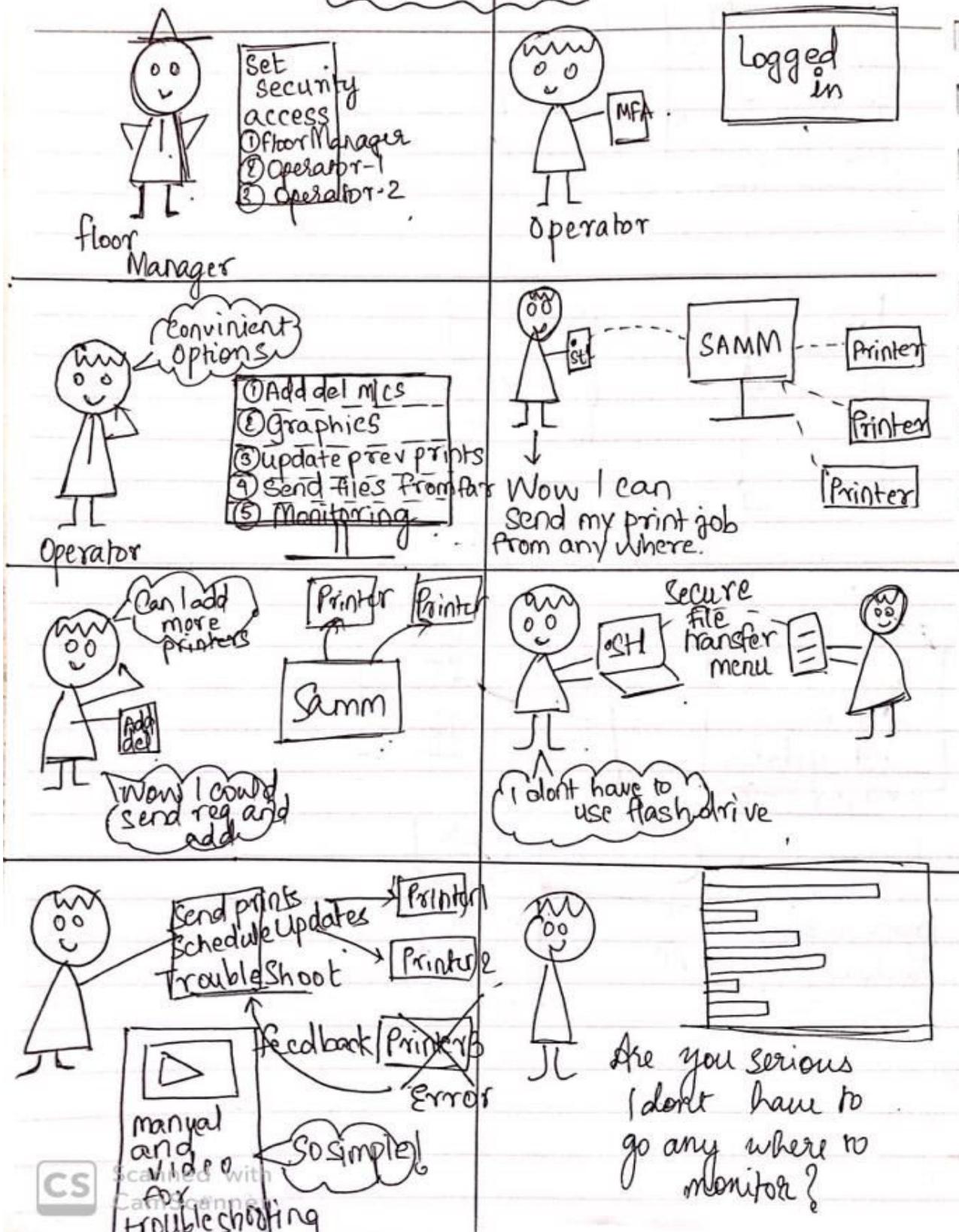


Story Board

Add machines	See Machines	-	+	Sign in
Send print jobs	Mange Prints			
Share files	Secure file sharing			
Troubleshoot Videos	Need help	Fix Bugs	Send updates	
Monitoring	M1 stats	M2 stats	M3 stats	Combined stats

How interface looks

STORY BOARD



Yang-Kai Chou

1. Scheduling (Field Square)

Here is a quick introduction for field square (<https://www.youtube.com/watch?v=ATwuJpVxwWo>) This app that I found is a scheduler.

The scheduler remain real time status and can visualize the status. It can also see the queue for each worker. The idea is we can switch the worker to machine so that we can know who will use the machine and how much workload does the machine have.

2. User management (Auth0)

This service I found is a simple user management. The floor manager can be the root user with multi factor authentication. He can easily add or remove user and modify authorization attributes.

The link for Auth0: <https://auth0.com/docs/getting-started/overview>

3. Security (google 2-step verification)

This service is one of the multi factor authentication. The user must not only have the password but also have the temporary code to log in. Or if the user has a security key that can insert it into the computer's USB port. This will prevent the malware task if all of the users use multi factor authentication.

Links for 2-step verification: <https://www.google.com/landing/2step/#tab=how-it-works>

Idea

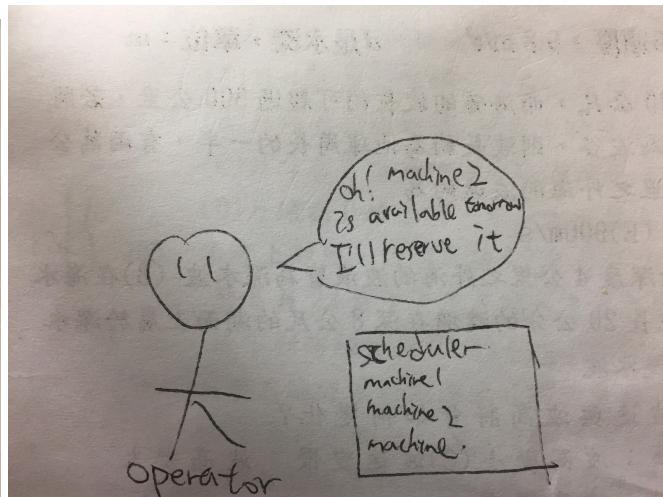
1. All of the people including the floor manager need to use multi-factor authentication to log in the system so that we can prevent the malware task.
2. The floor manager can assign each operator different levels of access so that the operator will not have high authority to access other data.
3. By using the user manager system, the floor manager can easily add the new operators and tell them what they can access. Also, if the operator quit, the floor manager can easily remove the account.
4. The scheduler can make the operator know which machine is available and they can reserve their task.
5. The floor manager can monitor the scheduler of all machines and check the status in real time.
6. If an error occurs, there might be some suggestion of fixation options such as windows OS.
7. Log file is necessary in the backend to track not only error but also recovery of data when the machine accidentally shuts down.

Crazy 8

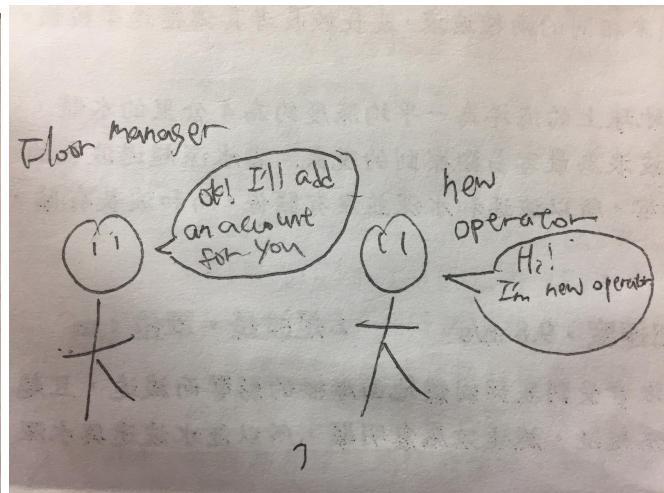
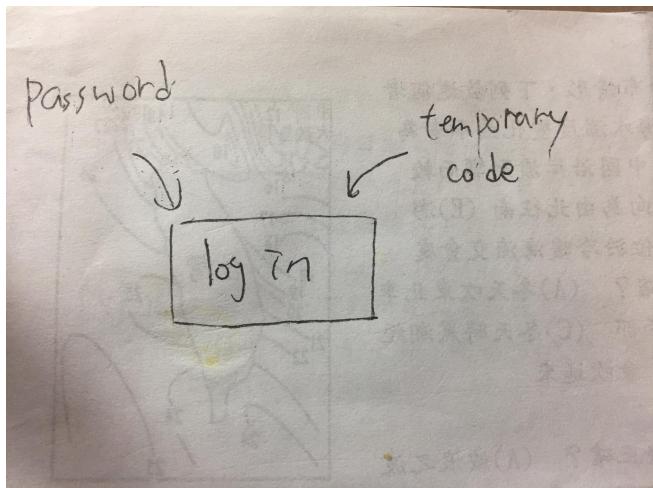
Monitor the scheduler

reserve the task based on scheduler

	10am	11am	12pm	1pm
Machine 1	operator			
Machine 2	operator	operator		
Machine 3				
Machine 4	operator			
Machine 5		operator		
Machine 6	maintenance			

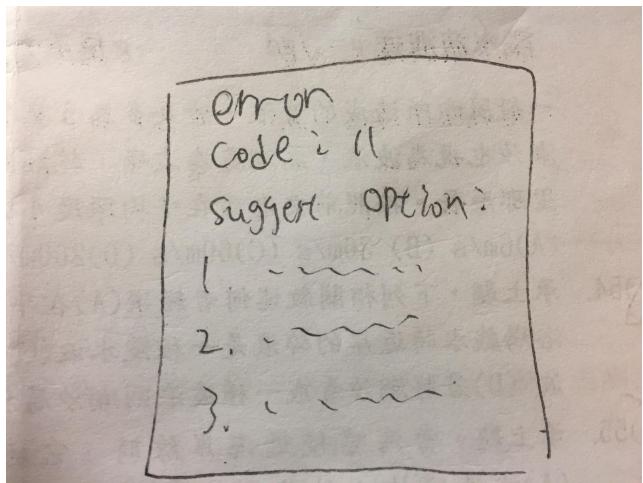


Multi factor Authentication



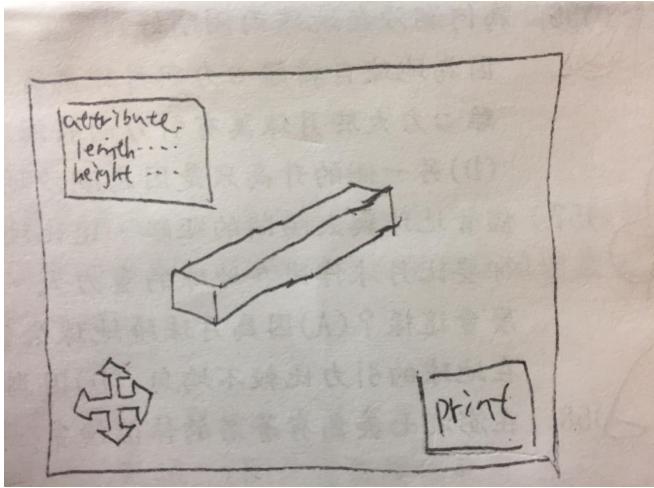
Suggestion when error occurs

Log file for recovery

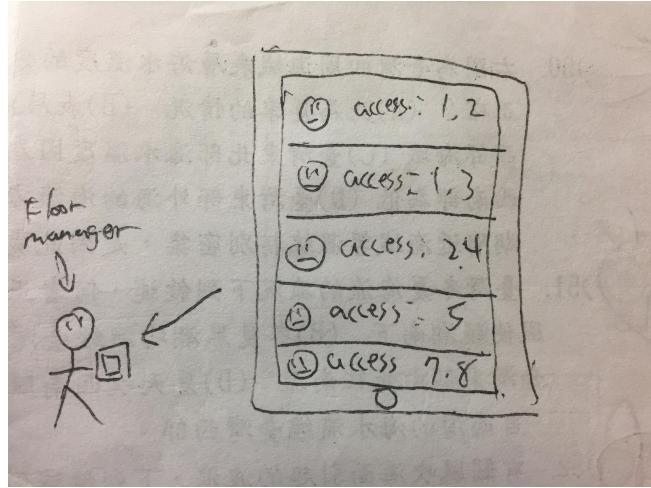


log file	03/02/2020	- - - - -
	02/09/2020	- - - - -
	01/05/2020	- - - - -
	09/30/2019	- - - - -

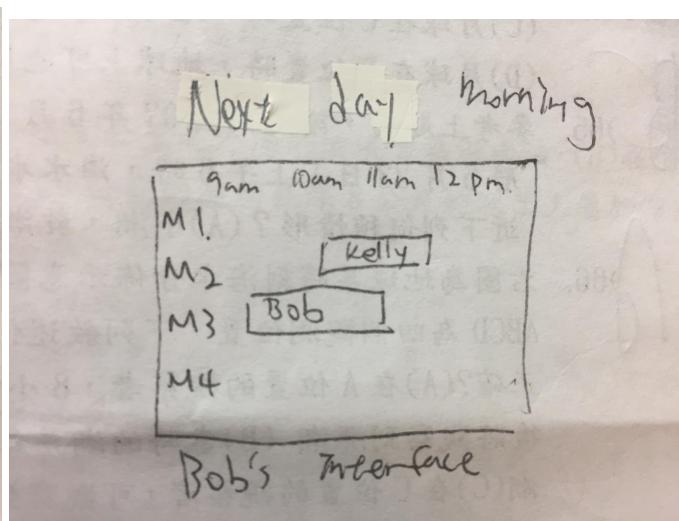
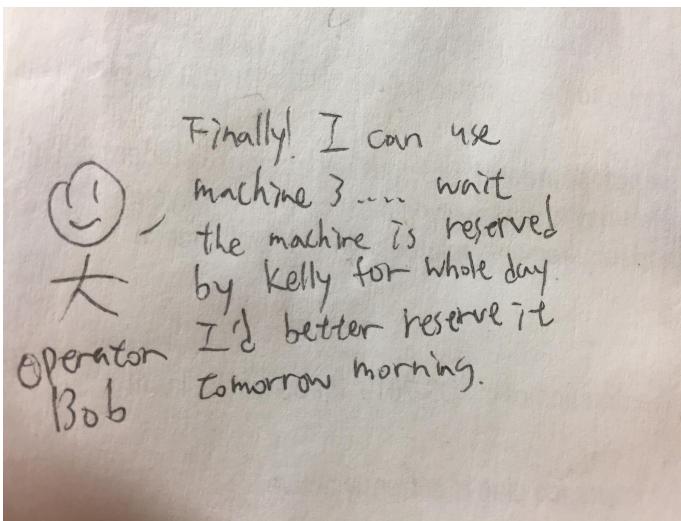
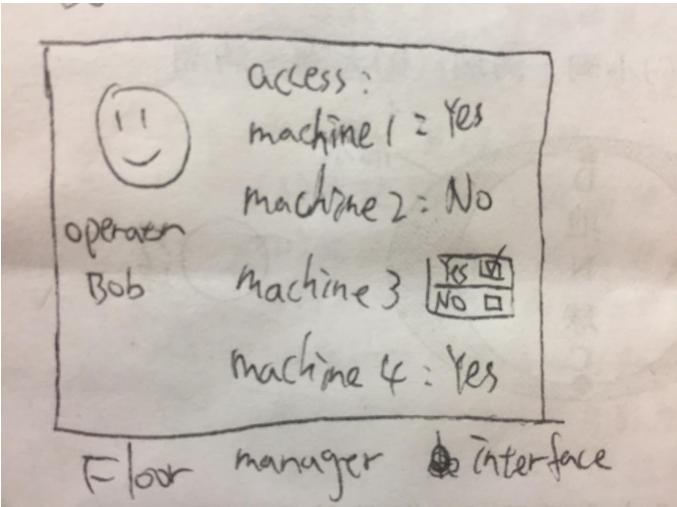
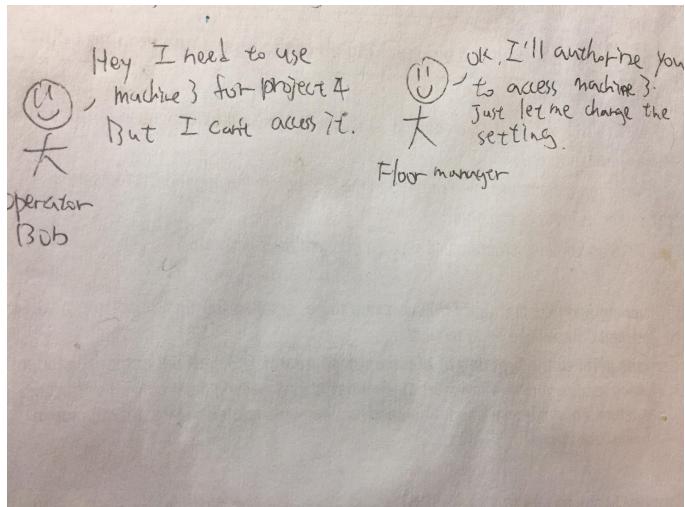
Easy manipulate panel for operator

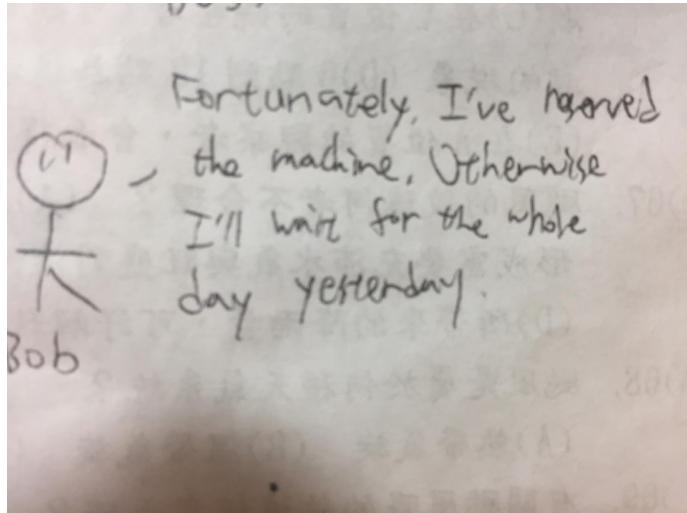


assign security level



Storyboard





Tushar Himmat Dahibhate:

Existing prototypes/Product lists

1. Thingworx

1. Controls Advisor

Controls Advisor is a tool to remotely monitor and troubleshoot machine connectivity. This tool provides the operators to monitor the status of the machine and provides notifications when connection is lost. There are features like alarms and diagnostics to know the status and remotely troubleshoot.

Resource: <https://www.ptc.com/en/thingworx-applications/controls-advisor>

2. Asset Advisor

Asset monitor is a tool used for real-time asset monitoring, providing better visibility into machine status, health, utilization, and sensor details. It provides automated alerts if any anomalies are detected. There are features like dashboards for displaying device details.

Resource: <https://www.ptc.com/en/thingworx-applications/asset-advisor>

3. Operator Advisor

Operator Advisor is an app that provides work order, work instruction, machine, and smart tool data. It provides data to the operator by connecting various manufacturing systems like ERP, MES, PLM, and CMMS, and capturing machine data from HMIs and PLCs.

Resource: <https://www.ptc.com/en/thingworx-applications/operator-advisor>

Demo: <https://www.youtube.com/watch?v=7HrAnEubxf0>

2. Azure IoT

1. Remote monitoring

The remote monitoring offering from Microsoft Azure provides a remote monitoring dashboard for the various devices connected. It also provides functionality to provision new devices, upgrade firmware, and respond to alerts

Resource: <https://www.azureiotsolutions.com/Accelerators#description/remote-monitoring>

Demo: <https://demos.azureiotsolutions.com/demos/remotemonitoring>

2. Predictive maintenance

This offering from Azure provides a predictive maintenance facility. Predictive maintenance enables just in time replacement of components. This approach only replaces those components when they are close to a failure. This extends component lifespans and allows business to get a competitive advantage. It also reduces unscheduled maintenance and labor costs.

Resource: <https://www.azureiotsolutions.com/Accelerators#description/predictive-maintenance>

Demo: <https://demos.azureiotsolutions.com/demos/predictivemaintenance>

Idea:

Machine Installation:

1. The floor manager will have the access to add or remove a machine from the SAMM. This functionality will come under the interface for asset management.
2. While the actual physical installation of the machine will be done by the vendor or any 3rd party technician, the floor manager will supervise the process.
3. Floor manager will authenticate the technician that will be doing the installation process to ensure accountability.
4. The floor manager will be shown a list of steps that need to be followed. He will mark every step as 'completed' as the installation proceeds.
5. There will be an entry about the machine installation activity in the 'Recent logs section'. The log will contain the details about the machine installed and the technician involved in the installation. This will ensure that a paper trail is maintained.
6. This log will also contain all the steps that the floor manager marked as 'completed'. This will provide some insight while troubleshooting the machine in case of any service interruptions.

Machine maintenance:

1. The SAMM interface will provide an automated alert to the floor manager when a machine needs to be serviced and calibrated.
2. There could be an option of sending an automated email to the technician and schedule the maintenance activity. Floor manager can use this option as per his/her discretion.

3. The maintenance activity will also contain a series of steps that need to be marked as 'completed' to ensure that nothing is amiss.
4. Floor manager will authenticate the technician.
5. The machine status will be marked as 'Inactive' by the floor manager to ensure that this machine is not used by any operator.
6. The log of the maintenance activity will be stored in the recent logs tab.
7. Any calibrations that could be done via software will be done by navigating to :
Asset Management > Active Machines > Machine1 > Machine Options
8. Calibrations include changing the speed, temperature of material, shape, diameter of the filament, etc.
(These calibrations are for a 3D printer)
9. The log of any calibrations will be also stored in the recent logs. This log will contain the previous state of the machine and the new state. The time stamp along with the credentials of the floor manager will be stored to ensure accountability.
10. After completion of any maintenance activities of calibrations, the machine status will be changed to 'Active' by the floor manager.
11. Any critical operations like the ones mentioned above will need some form of user authentication. These operations cannot be performed by people without the necessary access.

Machine Status:

1. The machine status will be available by navigating to the following path:
Asset Management > Machines
2. Active machines will be present in the Active machines section. This section will list down all the machines that are functioning and will also contain the dashboards which highlight the Key Performance Indicators like the number of jobs performed, amount of time for which a machine was active, etc.
3. By clicking on a particular machine, the user will be able to see every detail about the machine (Depending on the clearance level). These details also include the statistics of the machine including the quantity of material present(in case of a 3D printer).
4. Alerts will be shown when the machine runs out of any machine supplies that are required for production.
5. Inactive machines will list down all the machines that are currently scheduled for maintenance, calibration or are supposed to be decommissioned.

Krazy 8

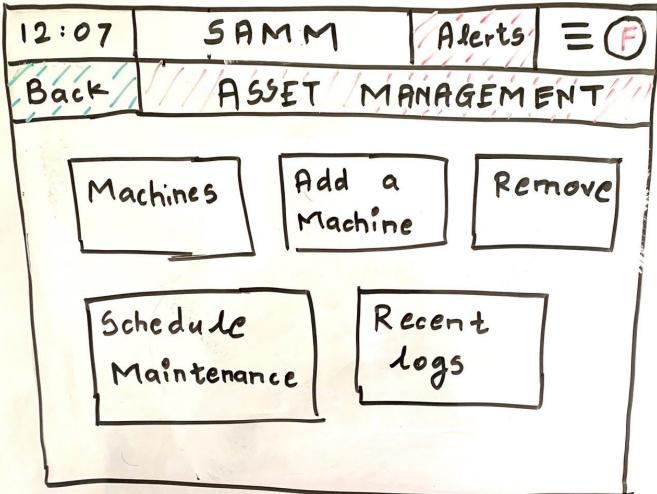
<p>12:07 SAMM Alerts ⚡ F</p> <p>Asset Management</p> <p>Job Scheduling</p> <p>User Management</p> <p>...</p>	<p>12:07 SAMM Alerts ⚡ F</p> <p>Back ASSET MANAGEMENT</p> <p>Machines</p> <p>Add a Machine</p> <p>Remove</p> <p>Schedule Maintenance</p> <p>Recent logs</p>
<p>12:07 SAMM Alerts ⚡ F</p> <p>Back ASSET MANAGEMENT</p> <p>Home / AM / Machine</p> <p>Active Machines</p> <p>Inactive machines</p>	<p>12:07 SAMM Alerts ⚡ F</p> <p>Back ASSET MANAGEMENT</p> <p>Home / AM / Machines / Active</p> <p>M1 M2 M3 M4 M5 M6</p> <p>Graphs: Line chart with green and red lines, Bar chart with three bars.</p>
<p>12:07 SAMM Alerts ⚡ F</p> <p>Back ASSET MANAGEMENT</p> <p>Home / AM / Add</p> <p>STEP 1 STEP 2 STEP 3 ⋮ ⋮ STEP N</p> <p>Add a Technician</p> <p>Name : <input type="text"/></p> <p>ID : <input type="text"/></p> <p>SSN : <input type="text"/></p> <p>COMPANY : <input type="text"/></p> <p>CONTACT : <input type="text"/></p> <p>SAVE CLEAR</p>	<p>12:07 SAMM Alerts ⚡ F</p> <p>Back ASSET MANAGEMENT</p> <p>Home / AM / Add</p> <p>STEP 1 STEP 2 STEP 3 ⋮ ⋮ STEP N</p> <p>Machine Details</p> <p>Detail 1 : <input type="text"/></p> <p>Detail 2 : <input type="text"/></p> <p>⋮</p> <p>SAVE CLEAR</p>

12:07	SAMM	Alerts	<input checked="" type="radio"/> F																									
Back	ASSET MANAGEMENT																											
Home / AM / Recent logs																												
<table border="1"> <thead> <tr> <th>ID</th> <th>ACTIVITY</th> <th>M-ID</th> <th>V-ID</th> <th>TIME</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>ADD</td> <td>24</td> <td>JOHN DOE</td> <td>22:00</td> </tr> <tr> <td>2</td> <td>MAINTAIN</td> <td>2</td> <td>JANE DOE</td> <td>1:00</td> </tr> <tr> <td>:</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>N</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>				ID	ACTIVITY	M-ID	V-ID	TIME	1	ADD	24	JOHN DOE	22:00	2	MAINTAIN	2	JANE DOE	1:00	:					N				
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Page 1 of 20																												

12:07	SAMM	Alerts	<input checked="" type="radio"/> F			
Back	ASSET MANAGEMENT					
Home / AM / Recent logs / 1						
<p>ID : 1 USER : JOHN DOE MACHINE : Formlabs Form 3 L Machine id : 1234ESX Technician : JOHN WICK <input type="button" value="VIEW"/></p>						
<input type="button" value="View Activity Log"/>						

Story Board





12:07 SAMM Alerts ⚡ (F)

Back ASSET MANAGEMENT

Home / AM / Add

STEP 1
STEP 2
STEP 3
⋮
STEP N

Add a Technician

Name : (Up arrow)
ID : (Down arrow)
SSN :
COMPANY :
CONTACT :

SAVE CLEAR



12:07 SAMM Alerts ⚡ (F)

Back ASSET MANAGEMENT

Home / AM / Add

STEP 1
STEP 2
STEP 3
⋮
STEP N

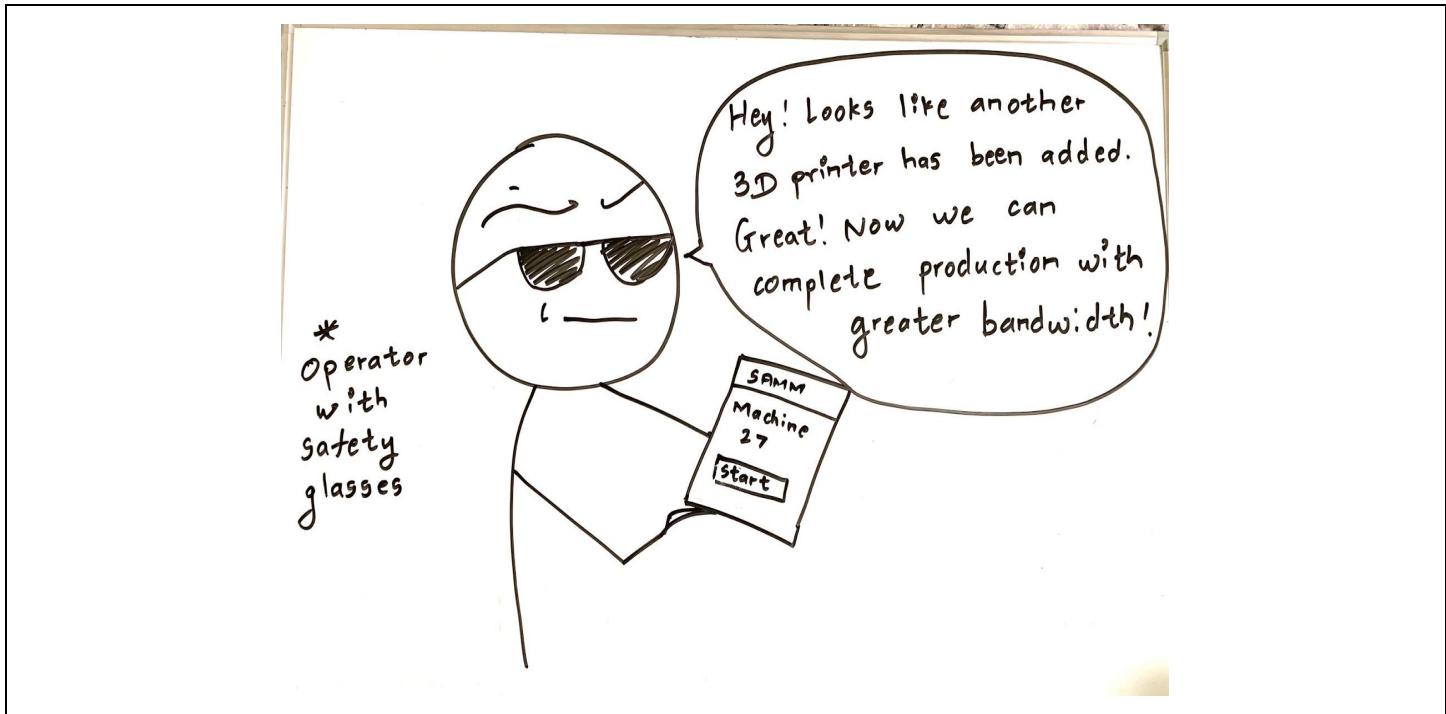
Machine Details

Detail 1 : (Up arrow)
Detail 2 : (Down arrow)

⋮

SAVE CLEAR





Satanik Ray

Idea

Scheduler to maintain jobs and a dashboard to manage it

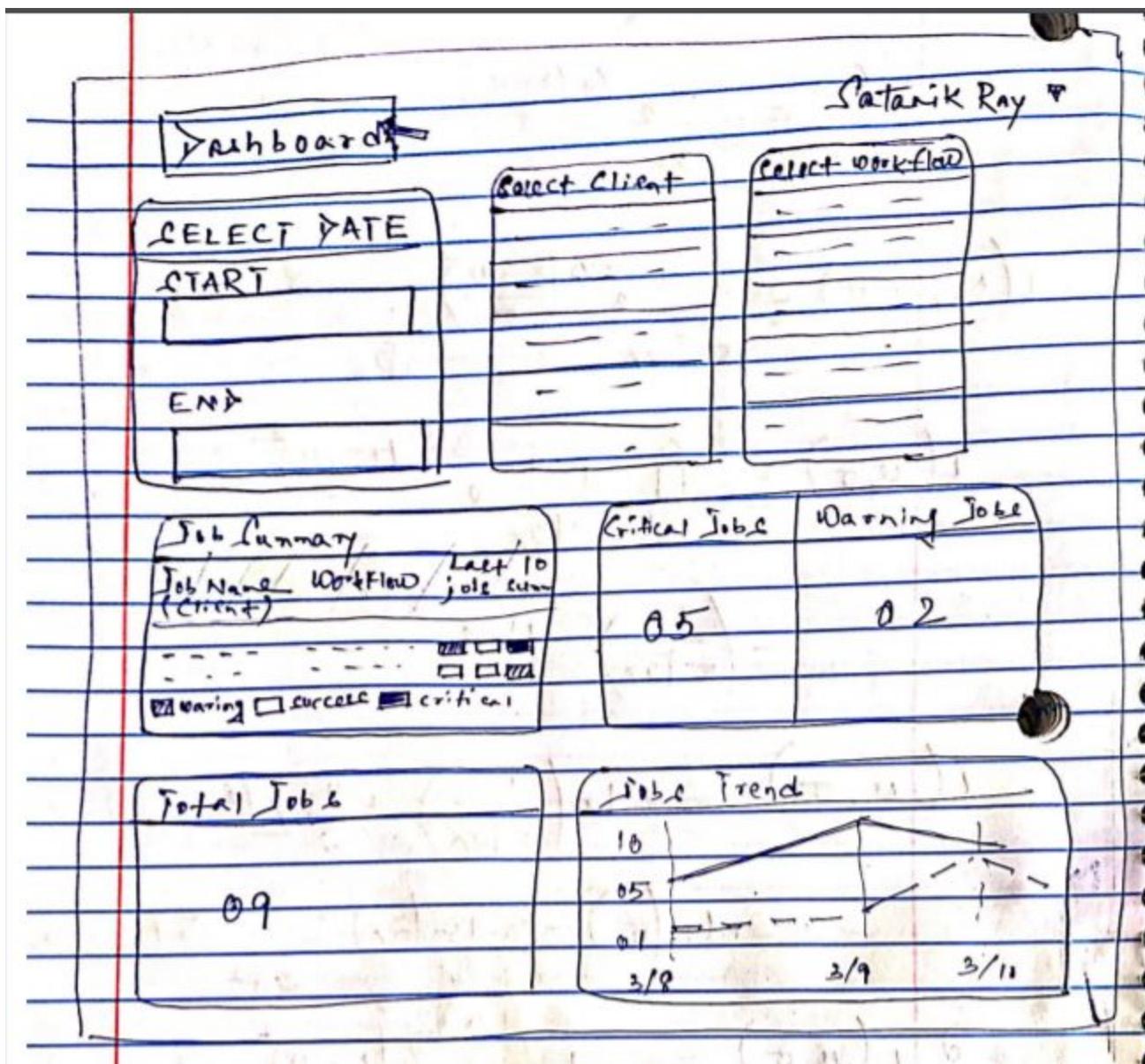
The idea is derived from the conductor or workflow/schedule management platform that Smartlink Health Solution uses.

Smartlink Conductor : It's essentially an interface between automated agents (nodes) and backend but also serves the purpose of a scheduler with information on every job - status, node its running on, count of payloads, and step by step status for every flow. The interface also has tabs for Nodes which has line items for Node Name, Instance ID, Instance IP Address, Dedicated Job Name (if any), Instance Status, Check for In Use and Action Buttons (such as Start, Stop, Edit, Delete, etc.). Then there's tab for Configuration which houses the config params for jobs (could serve as prerequisites in our case maybe) and then there's the Schedule tab which has Job Type, Maps (job type to practices, in our case could very well be job type mapping to client/customer), Scheduled Time and Cron Expression (which is nothing but a regular expression for effectively managing the schedule for any given mapping). Link to Smartlink Conductor -

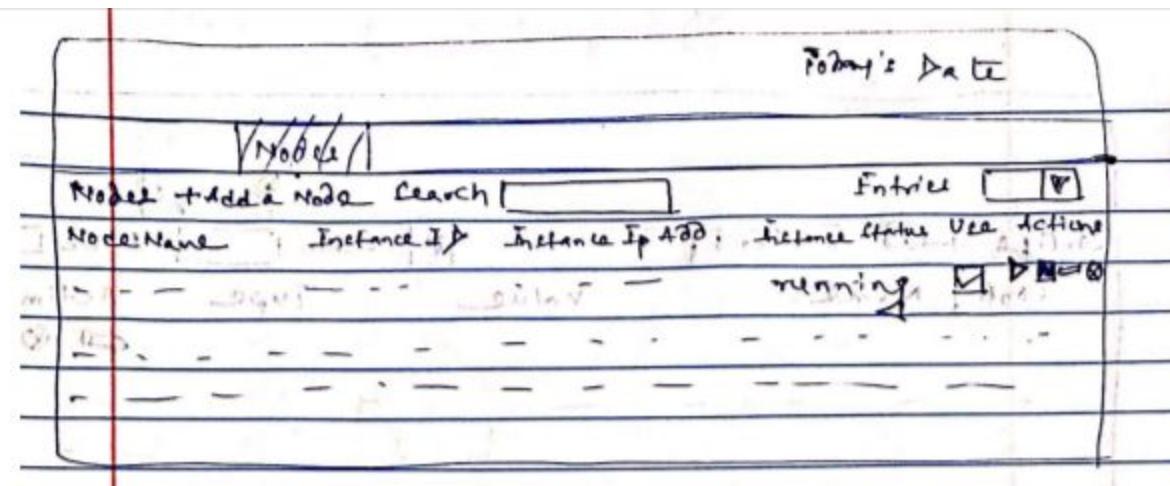
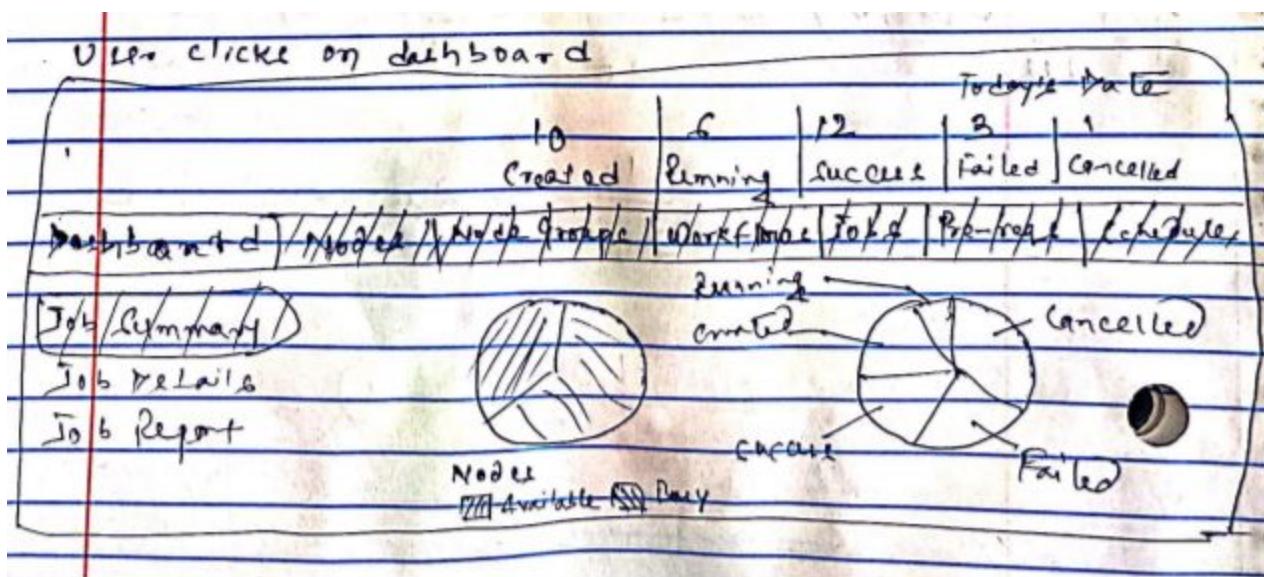
<https://login-sdc.smartlinkhealth.com/>

This idea could be translated for the purpose we are serving. The UI representations below attempt to capture that.

Krazy 8



User click on dashboard

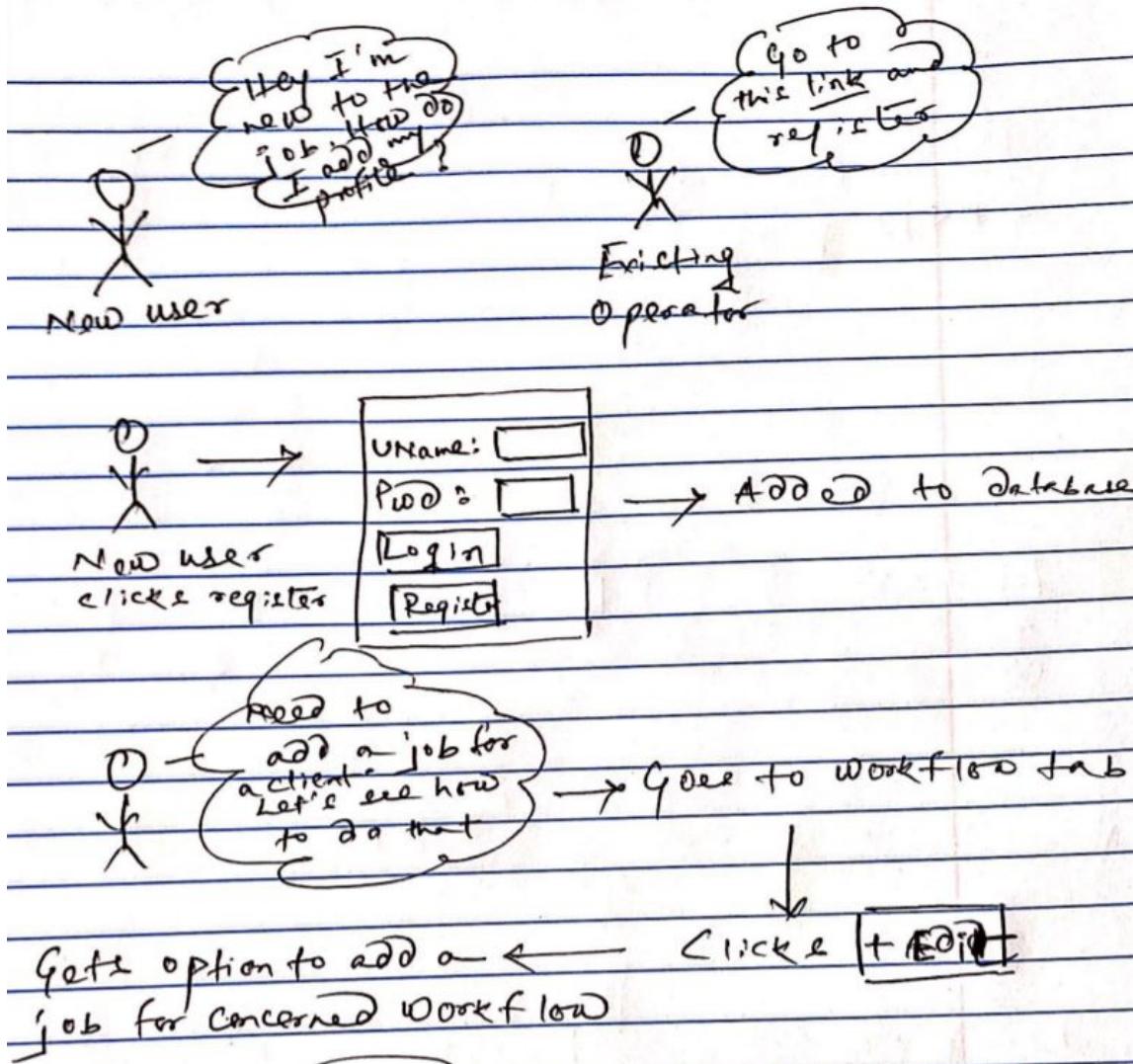


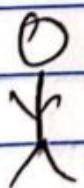
Node Group					Today's Date
Node Group + Add Search <input type="text"/>			Entries <input checked="" type="checkbox"/>		
Node Group Name	Nodes	Capabilities	Action		
- - -	- -	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> X
test group 32	- - -	- - -	- - -	- - -	- - -
- - -	- - -	- - -	- - -	- - -	- - -

Workflow		
Workflow + ADD Search	Entries	
Workflow Name	Description	Actions
- - -	- - -	
- - -	- - -	- - -
- - -	- - -	- - -

Jobs						
Jobs + Start Job □ Apply Filter □ Search □				Refresh Entries □		
ID	Node Name	Client Name	Workflow Name	Status	Success	Action
-	-	-	-	Failed	<input type="checkbox"/>	<input checked="" type="radio"/> <input checked="" type="checkbox"/>
-	-	-	-	Success	<input checked="" type="checkbox"/>	
-	-	-	-	Running	<input type="checkbox"/>	

Storyboard



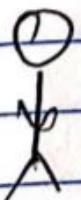


Now add a
new kind of
Workflow

→ Goes to Workflow tab



Click + Add



Start
a job
(now)

→ Goes to Job tab



Click + Add



For adding config
or pre-req's go to
Pre-req's tab, and
Nodes tab for
Nodes



Let's see how
Jobs are
running by
going to Job
tab

