







Compiled by David Bingham
GE Software External Engagements
Version 4 – May 26, 2015

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Goals & Objectives

LIXIL
トータルサービス

Gain a deeper understanding of LIXIL's business problems, user definition, and process. Work together as a collaborative team to generate initial personas, journey maps, and MVP definition to address these problems and contribute to scoping the overall project.

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Agenda

The workout spanned 4 days from Tuesday May 12 to Friday May 15 at LIXIL Total Service's Tokyo branch office. Each day was broken up into morning 10:00-12:00 and afternoon 3:00-6:00 sections. At LIXIL's request, this allowed participants to catch-up on email or other work at the beginning of each day and during the mid-day break. The session moved through the following topics:

- Users, Problems, and Context
- Current Process and Opportunities
- Desired Process & MVPs
- MVP Capabilities & Next Steps

The agenda on the following pages is as was originally written and not a retrospective account of each activity. It was used to guide the team before and during the workout with flexibility given to new findings and needs.



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Agenda – Day 1

Users, Problems, and Context

Tuesday May 12

9:00-10:00- Set up
Team arrives early to set up session.

10:00-10:30- Introductions
Describe association to project, roles, & expertise.

10:30-10:45- Goals & Objectives
Outline the workout's goals, discuss the process and answer any questions. Set expectations for day 1.

10:45-12:00- Users & Problems
Outline the primary users of the system beyond the provided personnel document. Understand their roles and detailed problems in relation to bathroom installation and scheduling. Output is a rich definition of the people interacting with a solution and their key problems.

Questions to explore:
- Are we considering the correct set of individuals or are there others?
- Do any users have problems in direct conflict with one-another?
- What are the motivations for each persona?

12:00-2:00- Afternoon break

2:00-3:00- GAIA demo
Sato-san will provide an overview and demo of the existing GAIA system.

3:00-6:00- Analyze Workflow
Using the provided LIXIL workflow, the team will distill the diagram to clarify and agree upon the most challenging process areas, key users within those areas, and details around their tools and interactions. The team should also note areas that are mandatory, regulated, or generally difficult to change, and what activities are highly manual versus automated or augmented. We will use this annotated workflow to inform the journey map.

6:00-6:30- Close & Record
Team photographs and records the day's work.

7:00- Team Dinner

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Agenda – Day 2

Current Process and Opportunities

Wednesday May 13

10:00-10:15- Recap

Briefly review prior day's work and expectations for day 2.

10:15-12:00- Day in the Life (Current)

Using persona definition from our morning session, we will create a journey map of the current scheduling process. This will use a combination of team expertise and the current workflow to clearly map users to interactions and pain points. This exercise will focus on how the system works today.

Questions to explore:

- How does the process operate chronologically?
- What information is input and output between users?
- What is the location/context from which these users operate?
- How are existing tools being used by various personas?
- Which areas of the system cause the most scheduling pain?
- Can some areas of the system benefit more or less from scheduling?

12:00-3:00- Afternoon break

3:00-5:00- Site Visit

The site visit will be in the same building as our workout, on different floor. The site visit will be with installation managers during their work routine. We can expect them to be busy calling installers, scheduling jobs, and generally occupied. Iinuma-san and Ueda-san will be participating in the workout and can guide our visit with the installation managers. At LIXIL's request, a very small group will attend the site visit.

5:00-6:00- Site Visit recap

The site visit group will meet in another conference room to discuss our observations.

6:00-6:30- Close & Record

GE facilitation team photographs and records the day's work.

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Agenda – Day 3

Desired Process & MVPs

Thursday May 14

10:00-10:15- Recap

Review prior day's work, current state journey map, and expectations for day 3.

10:15 -12:00- Day in the Life (Desired)

Building on the journey map created in the morning, the goal of this exercise is to identify areas in which the system should operate differently in the future. Here we focus on an area and try to understand how it could be improved to work better within the system. A morning break can be taken as needed.

Questions to explore:

- What areas contribute the most pain to the scheduling process?
- What is the business benefit/impact of addressing that pain?
- How can new technologies and application features ease that pain?

12:00-3:00- Afternoon Break

3:00-3:45- MVP & LOFA Overview

Brief the team on the meaning and purpose of "Minimum Viable Products" and "Leap of Faith Assumptions". Explain the Predix maturity model in order to frame LIXIL's opportunities.

3:45-6:00- MVP Priority

Reviewing our current and desired journey map, we will organize and prioritize the potential application MVPs to be developed. The team will help generate the prioritization of these MVPs, a possible roadmap, and record our leap of faith assumptions.

6:00-6:30- Close & Record

GE facilitation team photographs and records the day's work.

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Agenda – Day 4

MVP Capabilities & Next Steps

Friday May 15

10:00-10:30- Recap

Briefly review prior day's work and expectations for day 4.

10:30-12:00- MVP Capabilities

Starting with our highest priority application, we will outline the various use cases and their context. Through sketching and associating various interface components (tables, maps, navigation, charts, notifications, etc) we will create an initial understanding of how a new Predix application will look and act. A morning break can be taken as needed.

12:00-3:00- Afternoon Break

3:00-4:00- MVP Capabilities (continued)

Moving down the priority list to other users and applications, we will continue to define the potential capabilities of our scheduling solution.

4:00-4:30- Next Steps

Wrap up, discuss achieved outcomes vs initial goals. Organize and document work.

4:30-5:00- Close & Record

GE facilitation team photographs and records the day's work.

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Attendees

LIXIL
トータルサービス

Corporate Headquarters



Isao Hihara
Head of Construction



Seiichi Baba
Housing & Equipment Group



Yuichi Sato
Information Technology

Tokyo Branch



Mitsuhiro Takeuchi
Head of Construction



Takayuki Iinuma
Construction Manager



Yasumune Ueda
Construction Manager

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SoftBank

Attendees



Hiro Akabori
VP IoT & New Business



Makoto Minemura
Director Sales



Ikki Hayashi
Manager Global Alliance



Hiroshi Ishida
Predix Group Manager



Masashi Fukuda
Global Alliance



Natsuko Igari
Predix Group



Naoya Shitara
Sales Development

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Attendees

GE Japan



Tetsuya Nakamura
Global Growth Executive



Kei Toda
Predix Sales Engineer

GE San Ramon, CA
Software



David Bingham
Senior Design Manager

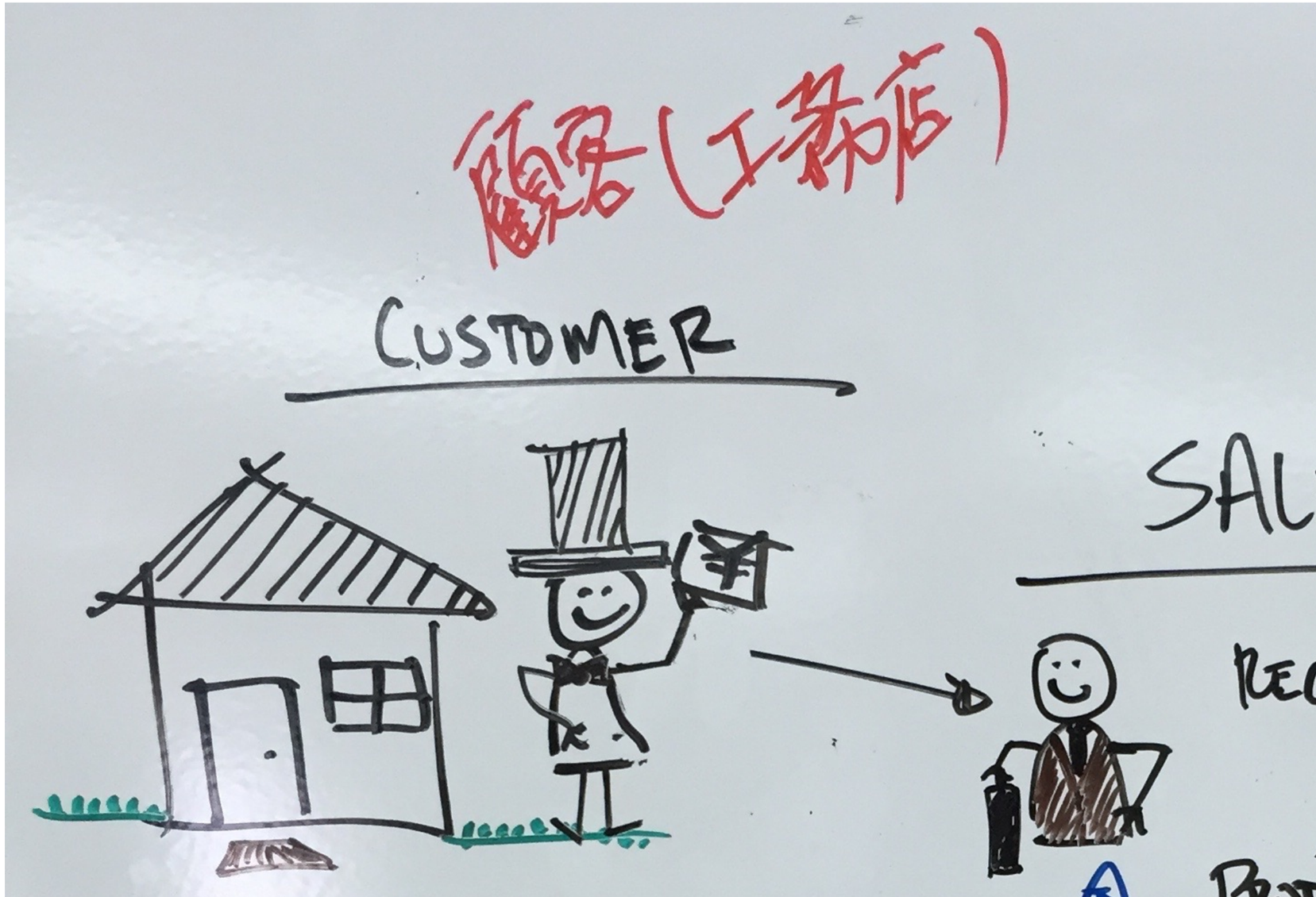


Jeremy House
Technical Product Manager

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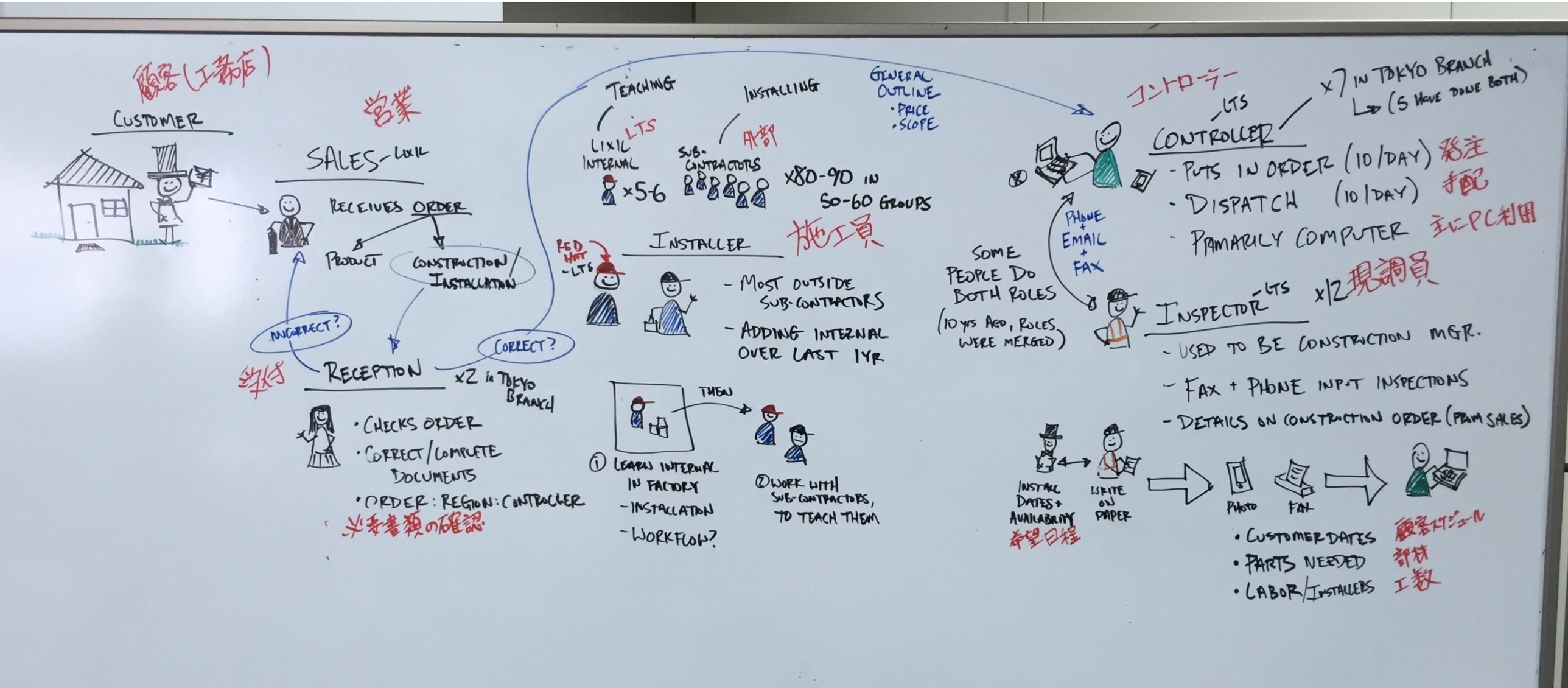
Personas

We start understanding LIXIL's business process and problems by understanding the various user personas. Through open group discussion, we built a definition of the types of people involved in LIXIL's business operation. The attributes described on the following pages are encoded to each drawn character and used throughout the rest of the workout.



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Personas



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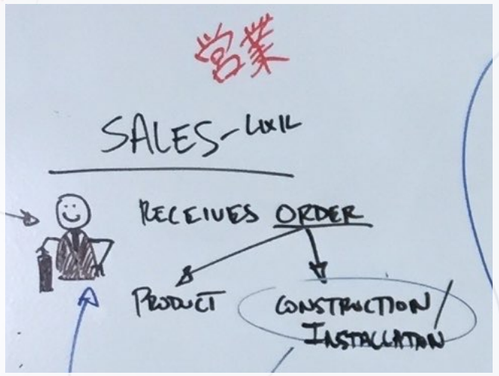
Personas



Our focus is the home-owner **Customer**, though some may own an apartment or an entire building with multiple units. They come to LIXIL through a **Sales** representative to build the initial order, sometimes at the showroom to review product, understand options, and review the order.

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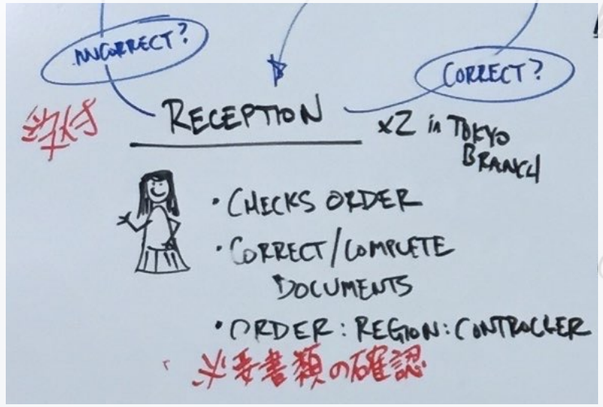
Personas



Sales works from within LIXIL's showroom to service **Customers** in finding products that match their needs. Our project is focusing on bathrooms, but a similar sales relationship works with kitchens, windows, doors, and more. When an order is created, it starts the product bill of materials and notifies LTS of a new construction/installation job.

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Personas

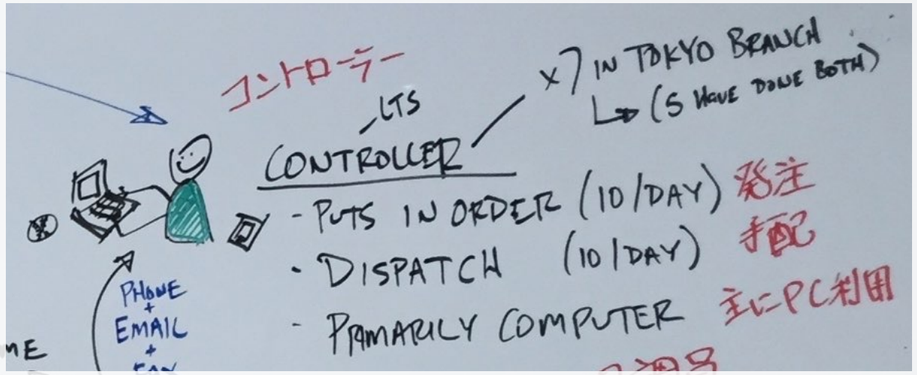


Incoming jobs from **Sales** pass to the appropriate branch office of LIXIL Total Service (LTS). **Reception** checks the order for completeness and either contacts **Sales** for more information or passes the job to the **Controller** responsible for that region. There are 2 **Reception** people employed in the Tokyo branch.

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Personas

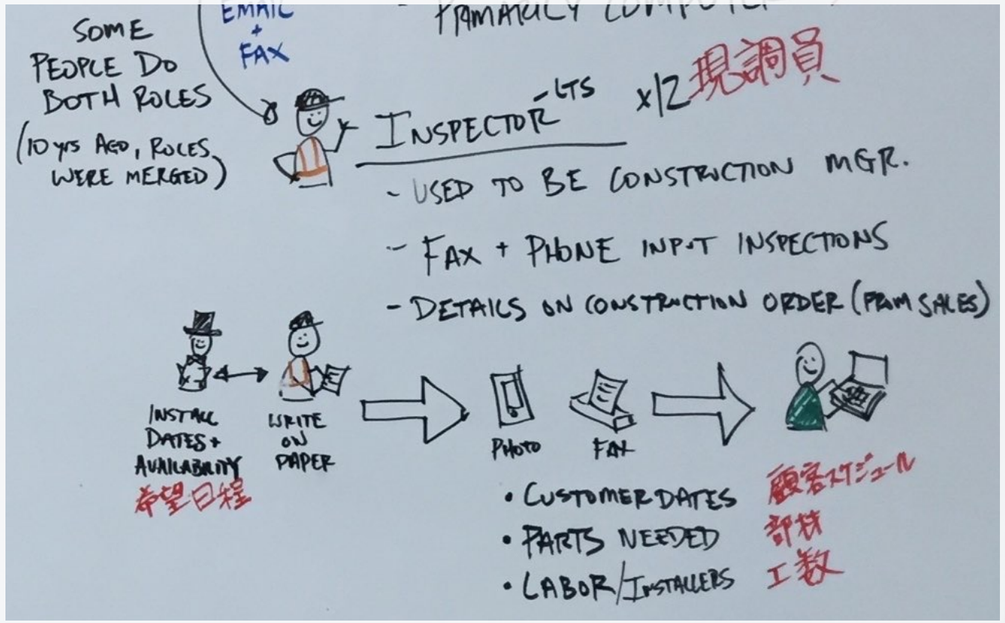
The title of **Controller** is very appropriate to the position. They act as a focal point for jobs connecting with downstream personas and activities. There are 7 **Controllers** in the Tokyo branch office, each responsible for a team of installers within a specific region. Their tools consist of a laptop for email and access to GAIA, phone, and fax machine. A common workload is approximately 10 dispatches per day.



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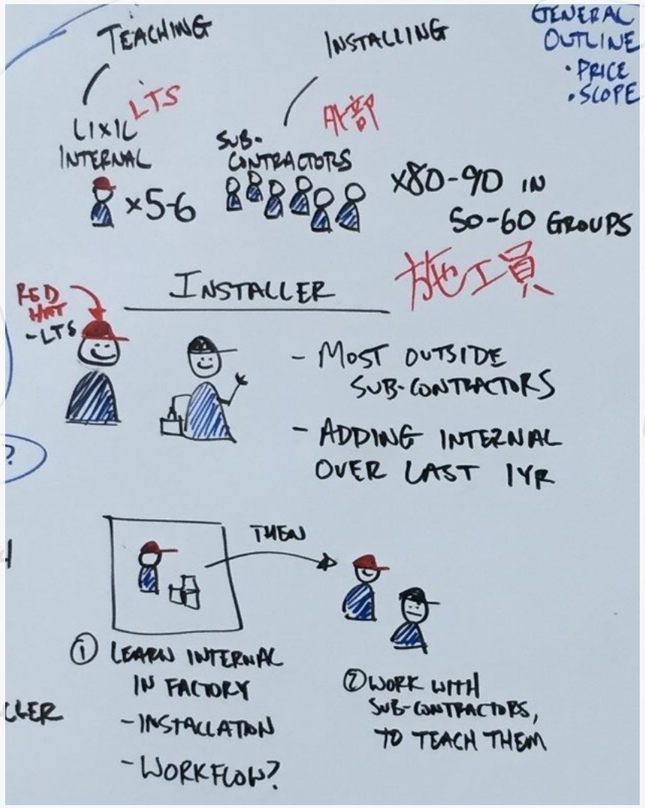
Personas

The **Controller** designates an **Inspector** to visit the job site and create a detailed report for the upcoming construction and installation. Many **Controllers** have had experience as an **Inspector** earlier in their career, so there is a familiarity across the process. The **Inspector** meets with the **Customer** to confirm the date, bill of materials, and any special services needed that **Sales** couldn't foresee from the showroom context. There are 12 **Inspectors** in the Tokyo branch office.



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Personas



Installers are mostly non-LTS employees who take on construction/installation jobs as designated by the **Controller**. There are approximately 80-90 total **Installers** in the Tokyo area across 50-60 groups. A small group of 5-6 LTS **Installers** learn details of new products from the factory, then teach the non-LTS sub-contractors. **Installers** have team associations to **Controllers** and various levels of skill & familiarity with different types of product installations.

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Site Visit

We spent one afternoon visiting LIXIL Total Service's scheduling site, conveniently located downstairs from our workout location. Here we were able to speak with **Reception**, **Controllers**, and **Accounting**.

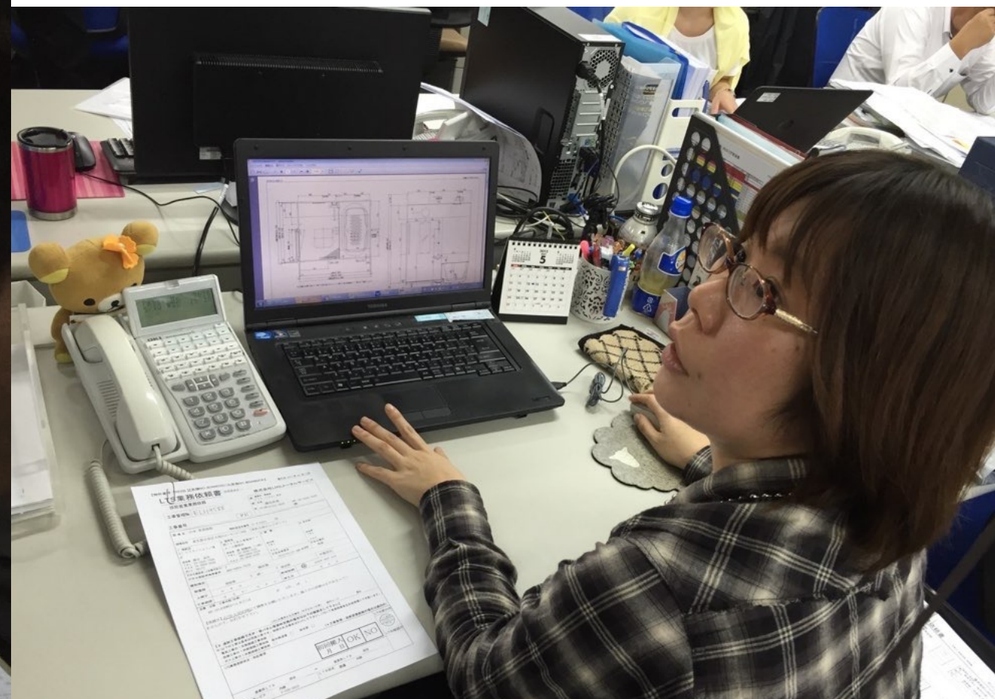
The environment is office desks in groups of 6. Most people work on laptops with lots of paper files, copiers, and storage cabinets. It's not a noisy environment with a fair amount of sunlight from large windows at either end of the office space.



Site Visit



Starting and ending the LTS process is **Reception** (below) and **Accounting** (left). Their jobs require a combination digital forms and printed paperwork requiring manual scrutiny and repeated confirmation stamping. There is only 1 **Accounting** and 2 reception employees in the office.



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Site Visit

Jeremy and Kei followed one controller through their assignment workflow. The following walk through the current process as observed:

14 installations were assigned to Taira-san today.

She selects one to assign to an installer. The requested date is 2015/05/29. Taira-san goes to the installer availability screen and begins selecting installers to filter by. She is selecting ‘her’ installers. There is no storage of who these are. Each controller has ‘their own’ installers.

Taira-san now has all her selected installers assignments up on the calendar on the screen. There are several ‘job’ objects appearing on each day. These correspond to the jobs that are assigned to that installer for that day, both accepted and unaccepted.

The process by which Taira-san calculates availability: If there are less jobs on a day then ‘installer slots’ she can assign a job. ‘installer slots’ is something she must remember from her experience, as the system does not indicate to her how many jobs each installer must take on.

In addition to this Taira-san must consider whether the job requires two staff members or one staff member, whether the staff have the necessary skills, and whether the installer has a good relationship with the client.

continued...



Site Visit



...continued:

If Taira-san finds a slot with an installer who fulfills this criteria, she will assign the job to that day and to that installer. If she does not, she has two choices:

1. Attempt to find an installer outside 'her installers' that is available on that day and capable of completing the job.

2. See if any of 'her installers' are available on adjacent days or other days suitable to the customer.

The logic that occurs when a controller has none of their 'own installers' available on a selected day is a key part of the scheduling process. In the case being observed here, Taira-san went immediately to the next day. I believe in the case of lower ranking controllers this is the choice that is made 90% of the time.

How do you determine which Controller a given Installer 'belongs to'?

In this case, Ueda-San owns the West Side of a given province in Tokyo & Taira-San owns the East Side of a given province in Tokyo.

How often do you assign to other subcontractors?

Maybe less than 10% of the time. Our team assigns jobs to other controllers' subcontractors maybe 30% of the time, which is high. Other teams may assign jobs to other controllers' subcontractors maybe less than 10% of the time, which is low.

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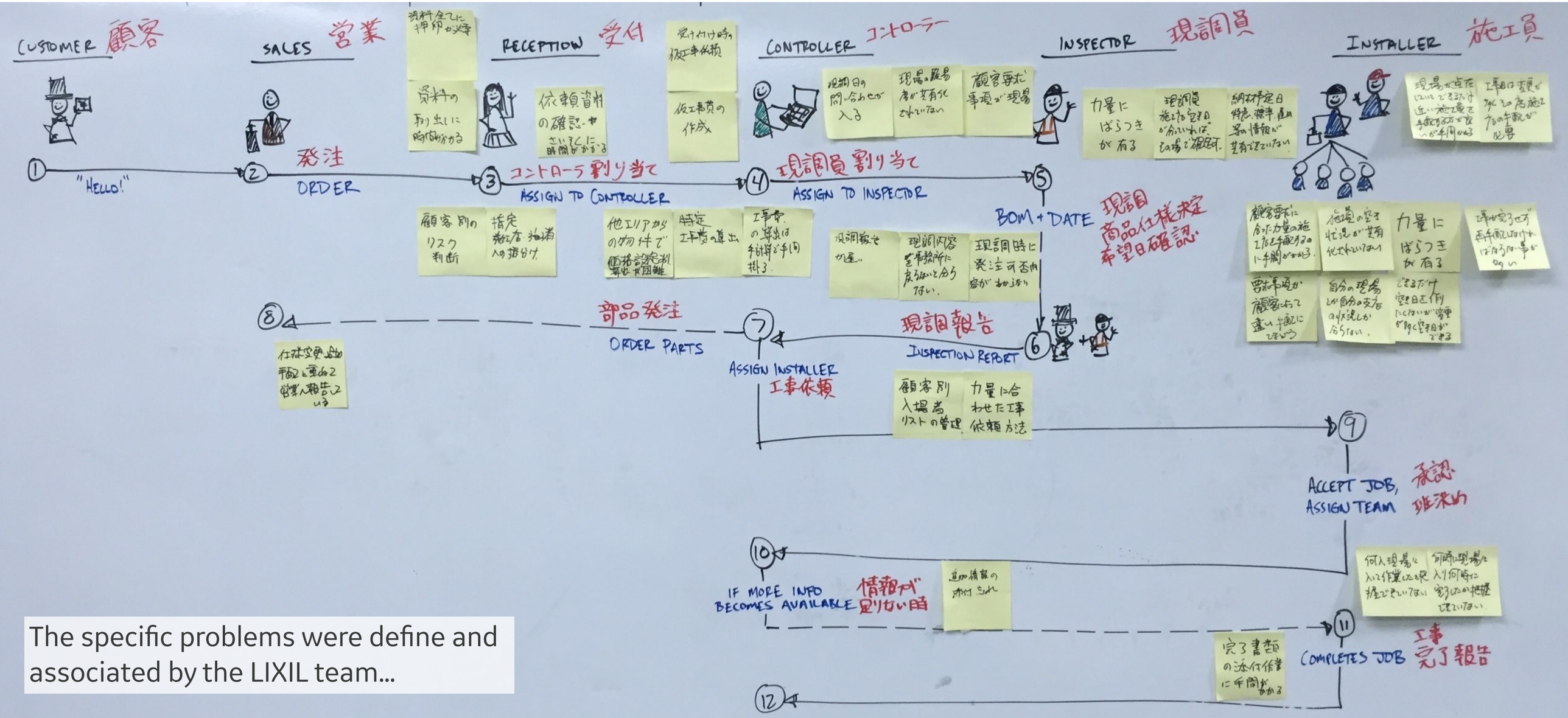
Current Workflow



Using our defined personas, our team rebuilt the current process and numbered each major step across the workflow. The challenge of the exercise was to identify problems, write each onto a note, and post to the corresponding area in the workflow.

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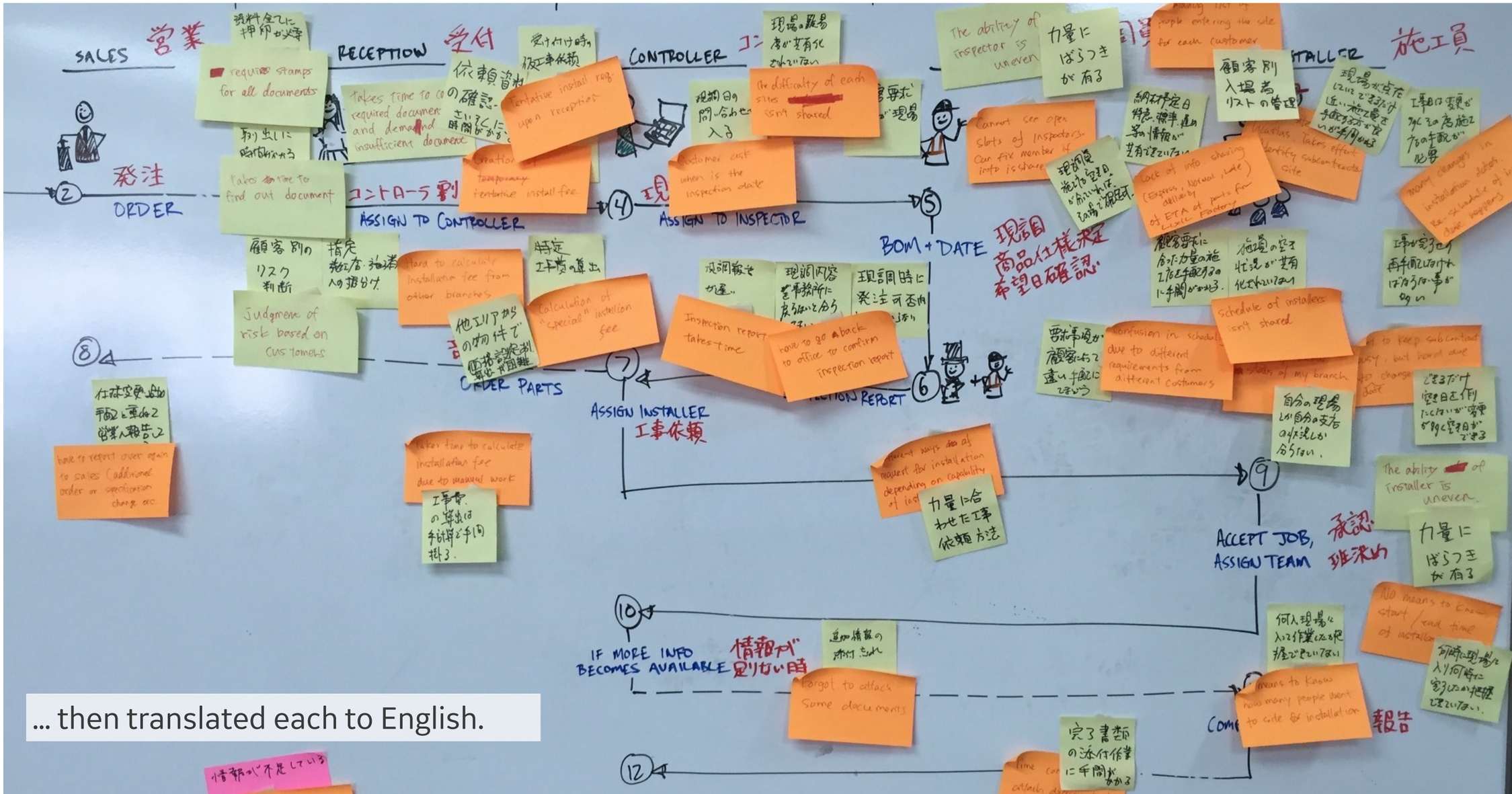
Current Workflow



The specific problems were define and associated by the LIXIL team...

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Current Workflow



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Current Workflow

Reviewing the created process map, the team next looked for types of problems. The 3 main types are:

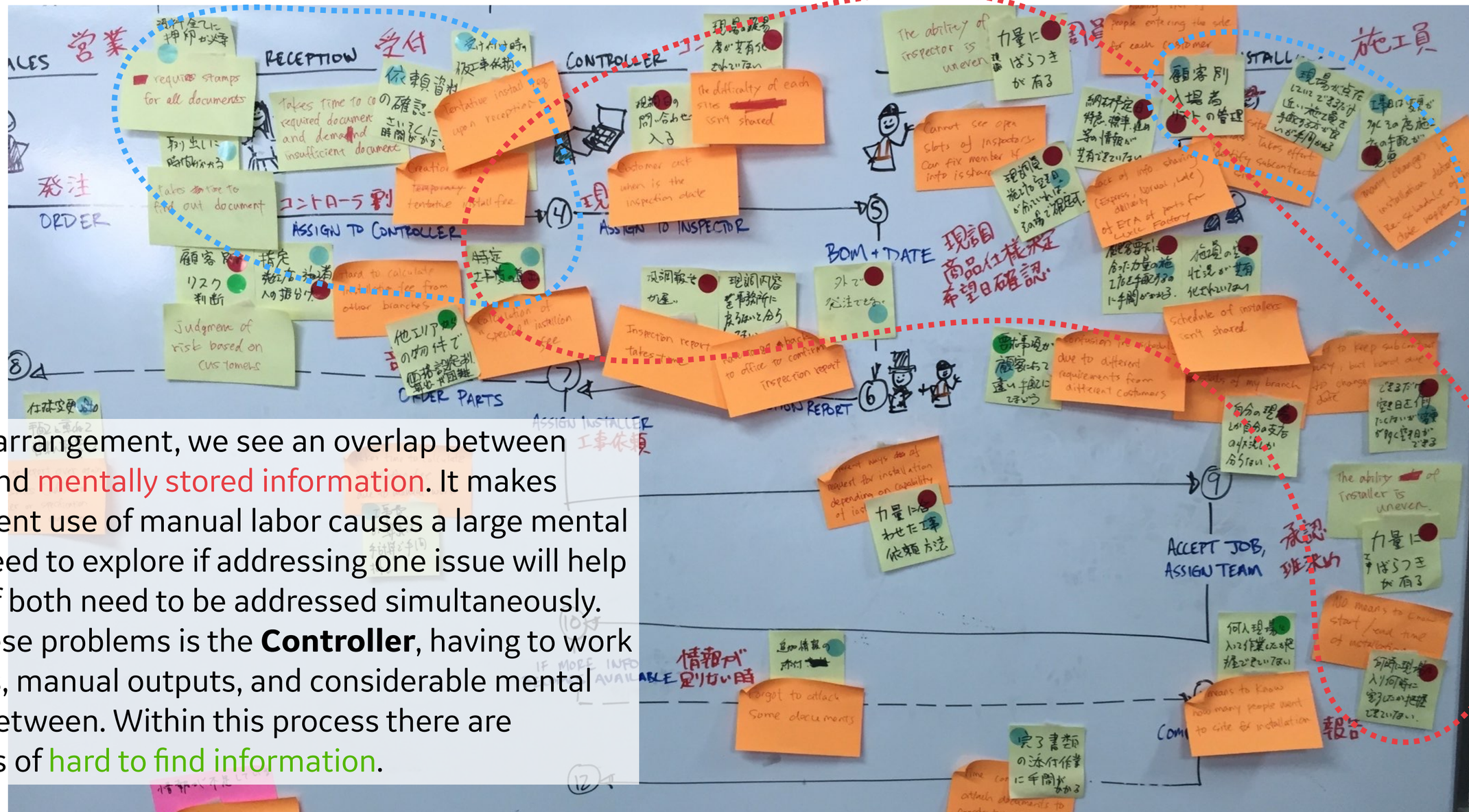
- **Mentally stored information.**
- **Manual time & effort.**
- **Hard to find information.**

Once the team agreed on problem types, each post-it was associated using a colored dot. Sometimes two dots were used for primary & secondary types. This helped depict locations across the workflow in which these problem types arise.



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Current Workflow

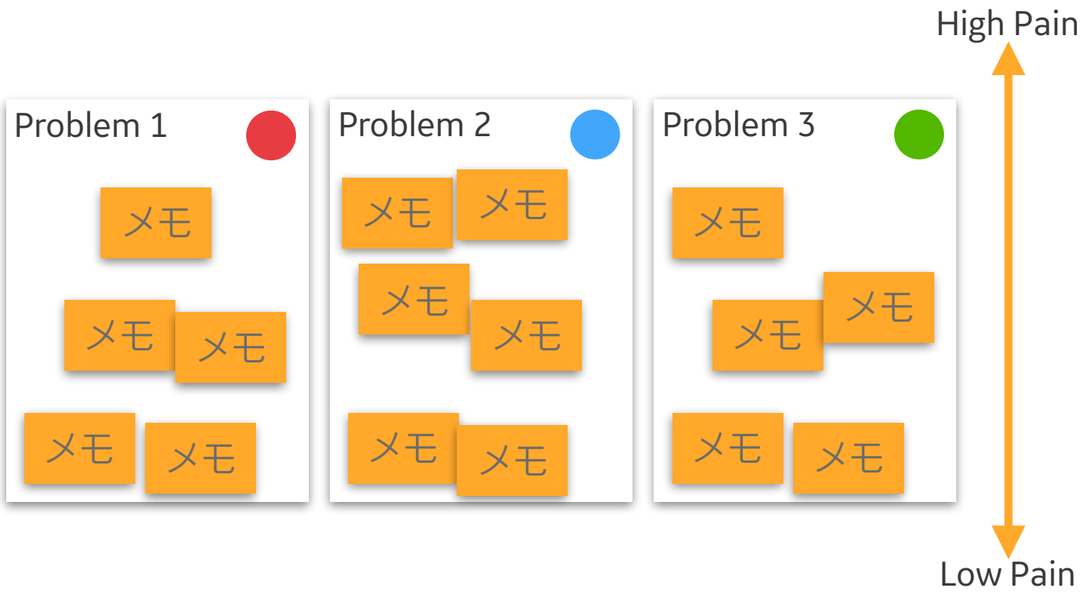


Looking at the dot arrangement, we see an overlap between manual activities and mentally stored information. It makes sense that the current use of manual labor causes a large mental dependency. We need to explore if addressing one issue will help solve the other or if both need to be addressed simultaneously. At the center of these problems is the **Controller**, having to work with manual inputs, manual outputs, and considerable mental processing there-between. Within this process there are scattered instances of hard to find information.

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Key Problems

Next we prioritized the individual problems within each of the defined problem types. We moved the problems from the workflow onto 3 pages, organized roughly from top to bottom by level of pain.





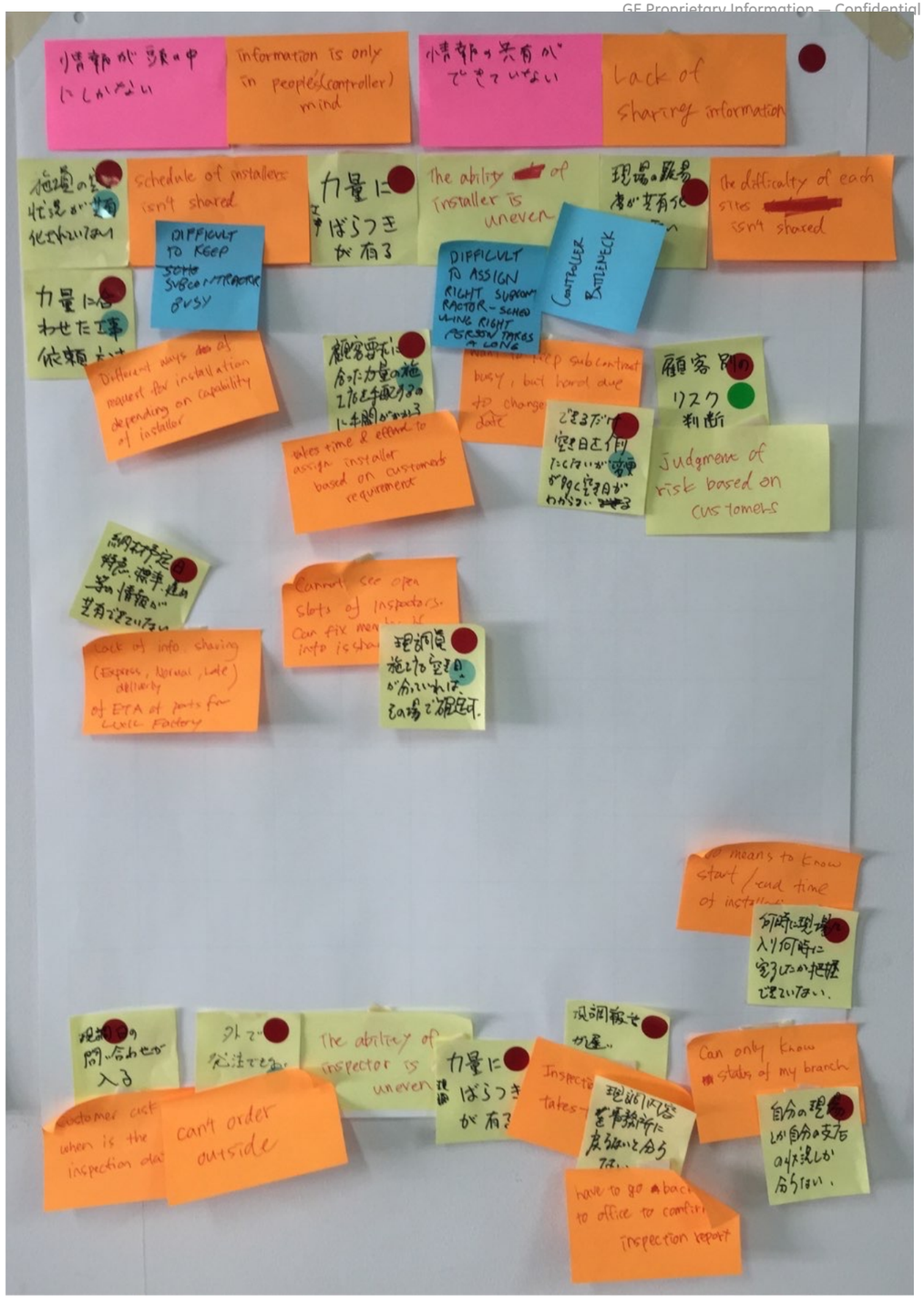
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Key Problems

- **Mentally stored information**

  This problem also relates to a lack of shared information. Mental storage is not highly portable. Specific notes:

  - Schedule availability of inspectors installers isn't shared.
  - Skills of the installers are known only to the controller.
  - Installers do not maintain a high utilization level.
  - Personal assessment of risk based on customer.
  - Requests are made differently depending on the capability of the installer.



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Key Problems

- **Manual time & effort.**

  LTS spends a great deal of time on manual activities. Some notes:

  - Calculation of installation fee.
  - Maintaining list of people entering the site for each customer.
  - Reporting back to sales (or other personas in the workflow)
  - Manual stamping of all documents.
  - Changes to installation date.
  - Tentative install date upon reception.



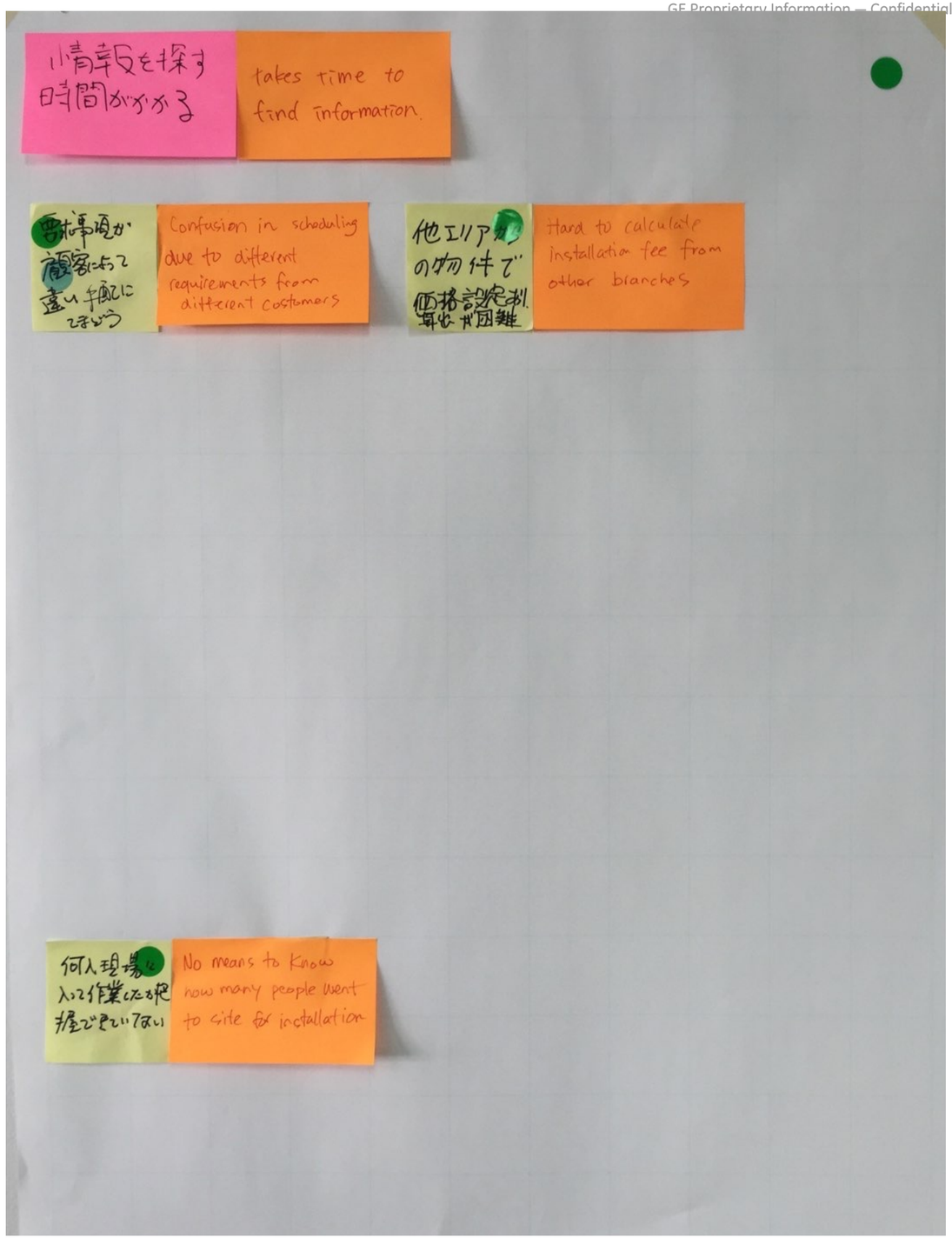
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Key Problems

- **Hard to find information.**

  The last key problem is tightly related to the earlier two. While there were less specific notes, the details are meaningful:

  - Confusion in scheduling due to different requirements from different customers.
  - Hard to calculate installation fee from other branches.
  - No means to know how many people went to site for installation.

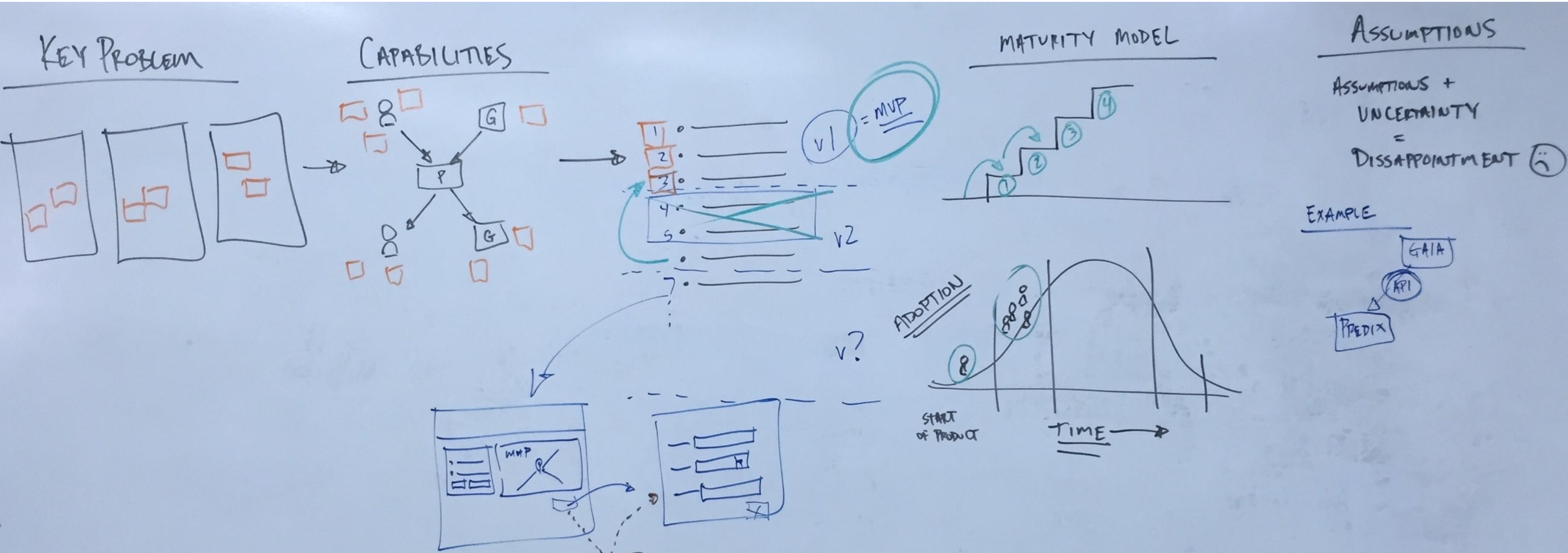


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Problems to Capabilities

This workout process diagram helped the team understand the upcoming steps. We have our key problems understood and will map to inputs and outputs of a Predix scheduling system.

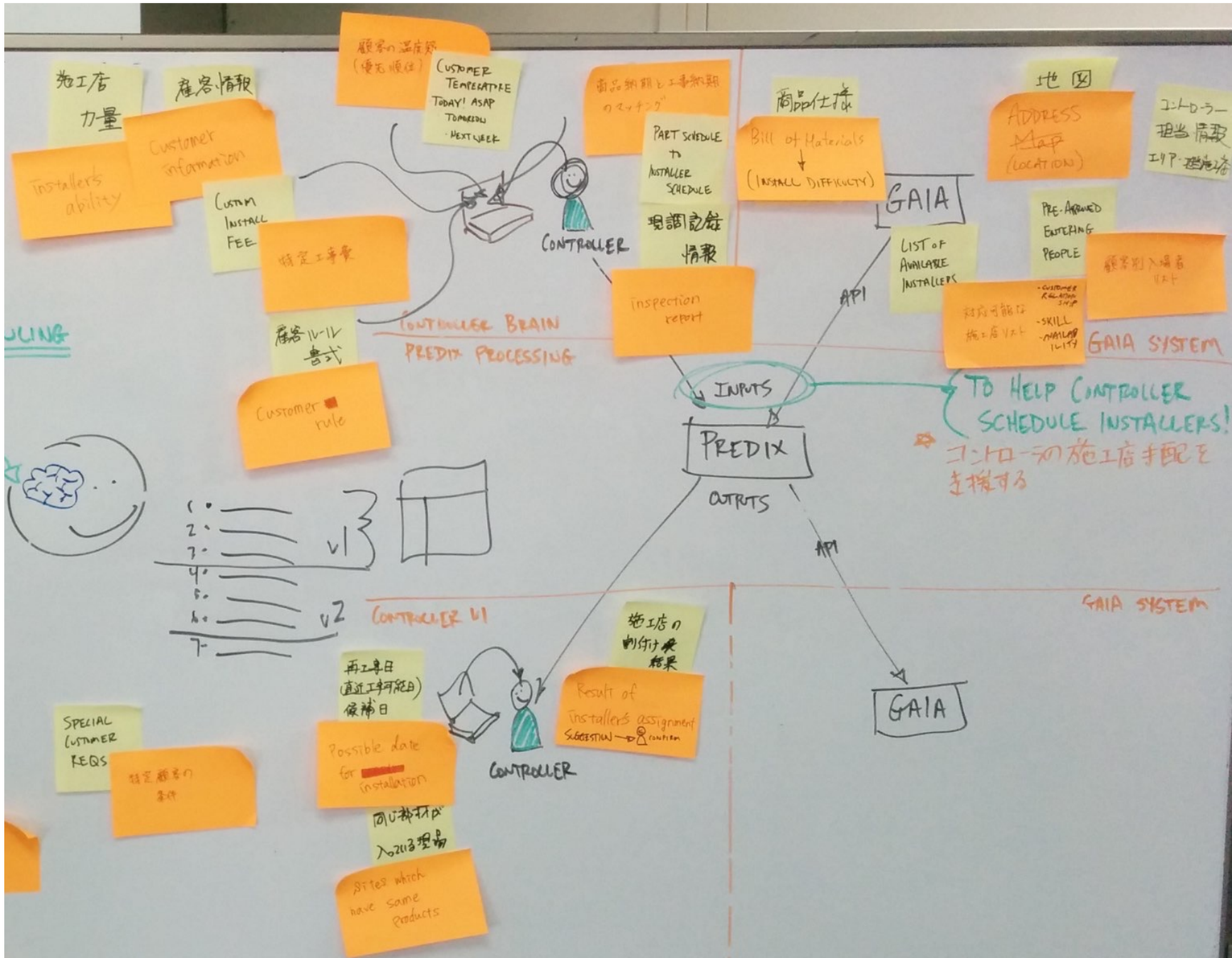
We will then prioritize those capabilities to define our MVP, which informs our rough UI concept. An MVP should mature over time with user adoption.



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Inputs & Outputs

After learning about GAIA and the current process, the team worked to structure the needed capabilities of Predix scheduling. We framed inputs from both the **Controller** and the existing GAIA system that would help inform scheduling of installers. The “Magic Box” would perform it’s calculations and output information back to the controller, into the GAIA system, or both. This helped us understand how the scheduling system would best fit within a future LTS workflow.



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MVP Capabilities

From our list of system input and output capabilities, we moved to prioritize in two groups: “MVP” and “Next” (for everything else…). Based on our MVP education, the team was challenged to make tough choices and eliminate some capabilities for the focused first release.

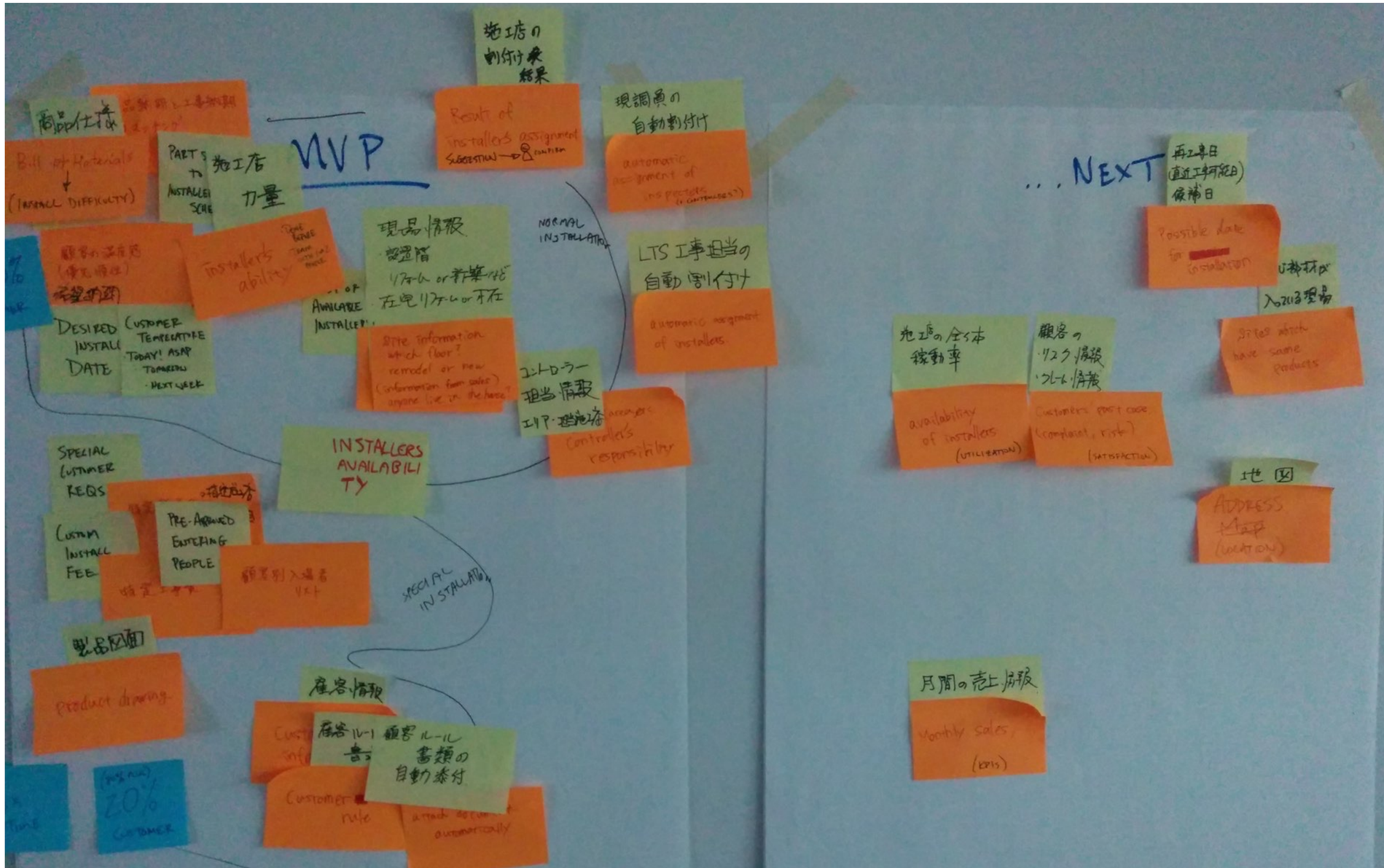


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MVP Capabilities

The MVP page filled up quickly, so we further prioritized top to bottom. The most important capabilities were:

- Desired install date (as priority of job).
- Bill of materials (as indicator of job difficulty).
- Inspection information (as indicator of job difficulty).
- Auto recommendation of assigned controllers/ inspectors/installers.



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MVP Capabilities

Once we completed organizing our MVP capabilities, we asked Ueda-san to tell a story about our future application. As he described the future MVP, he pointed to each feature and described how it helped accomplish his job. This is a gut-check way of understanding if we correctly associated a simple set of capabilities that can fulfill a goal.



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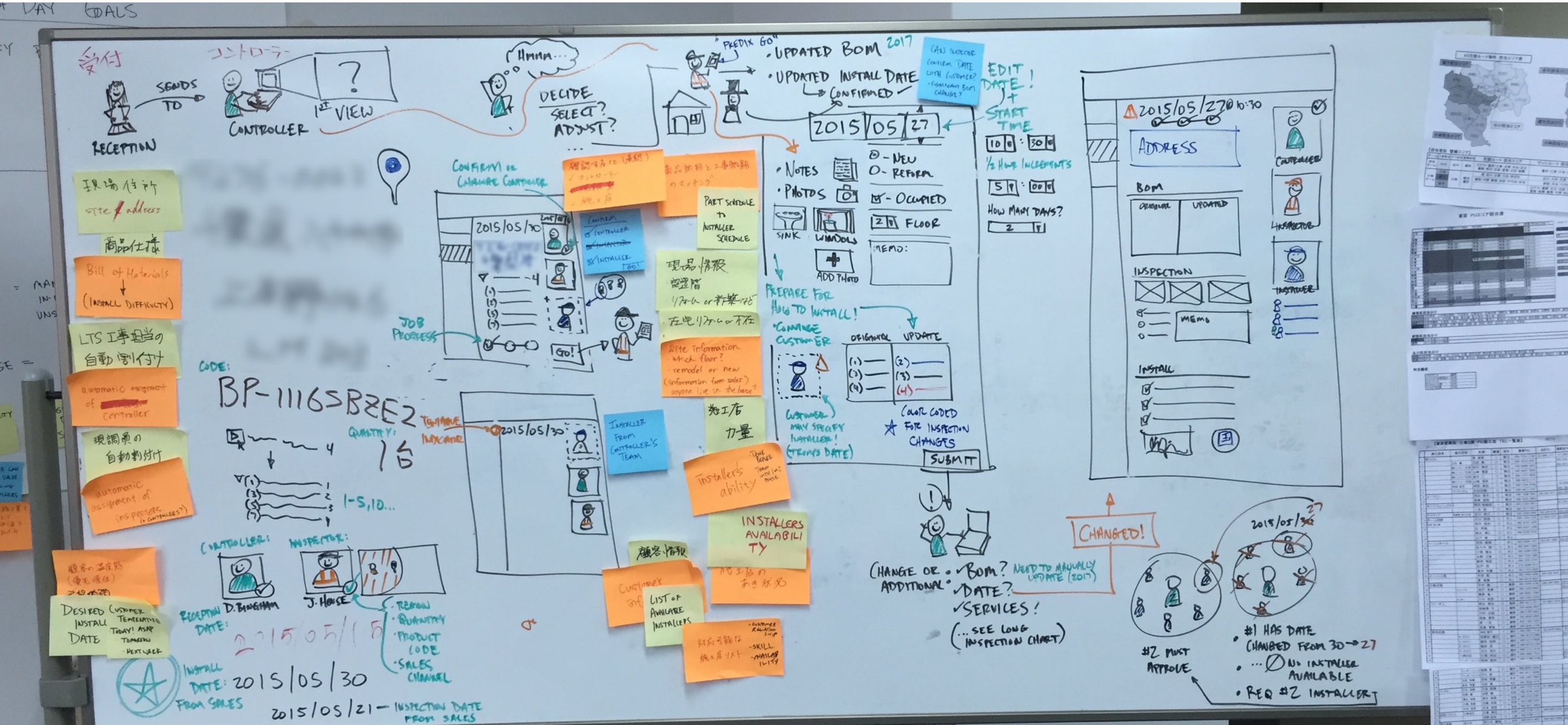
MVP Capabilities

Next we sketched what new interface might suffice these MVP capabilities. We looked at date formats, product codes, site addresses, progress indicators, and assignment confirmations to create a rough pass at an interface that fits the new workflow.



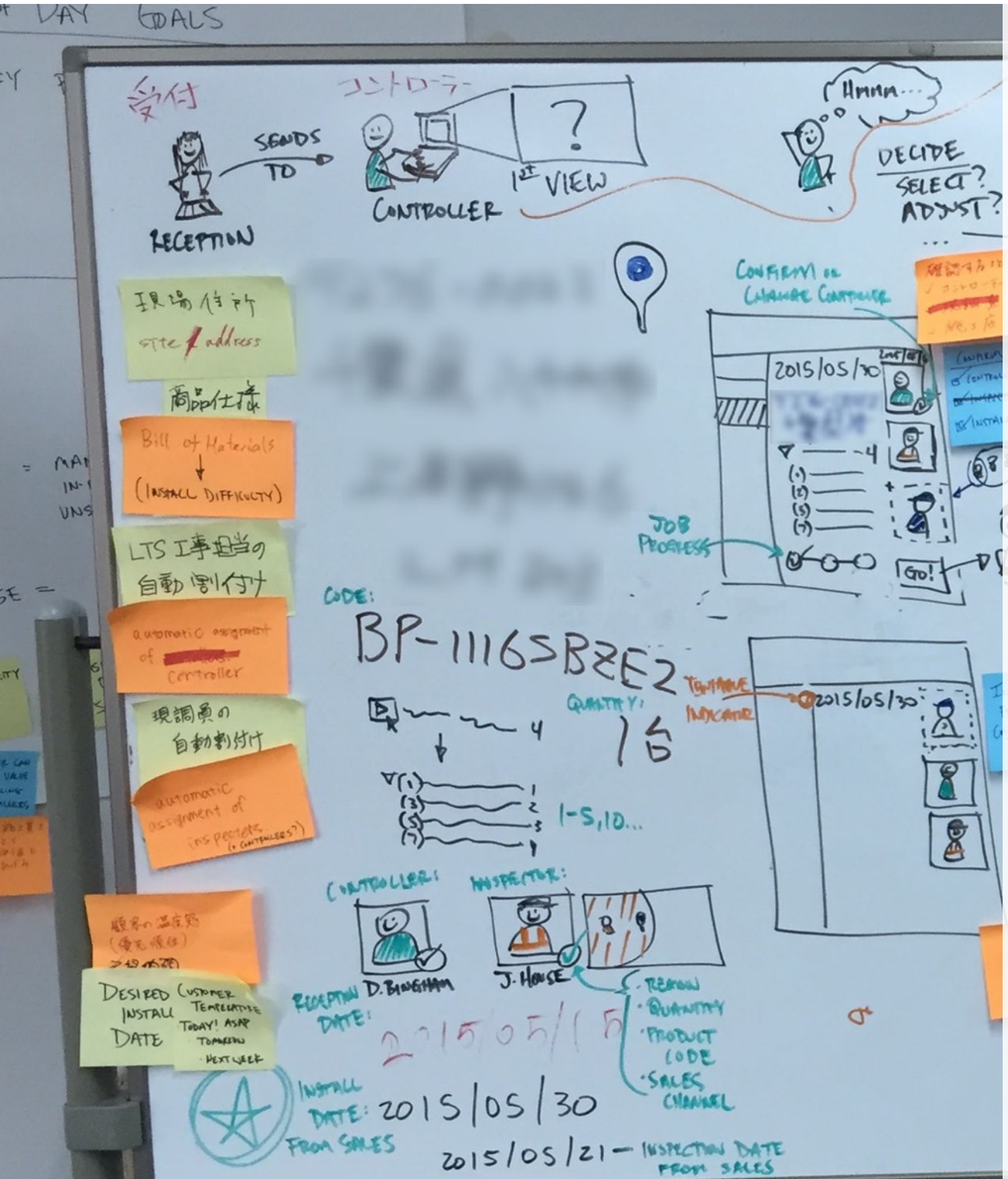
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MVP Capabilities



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MVP Capabilities



The first information the **Controller** sees should be summarized and meaningful to scheduling the job. The Controller can see these primary pieces of information within the job ticket:

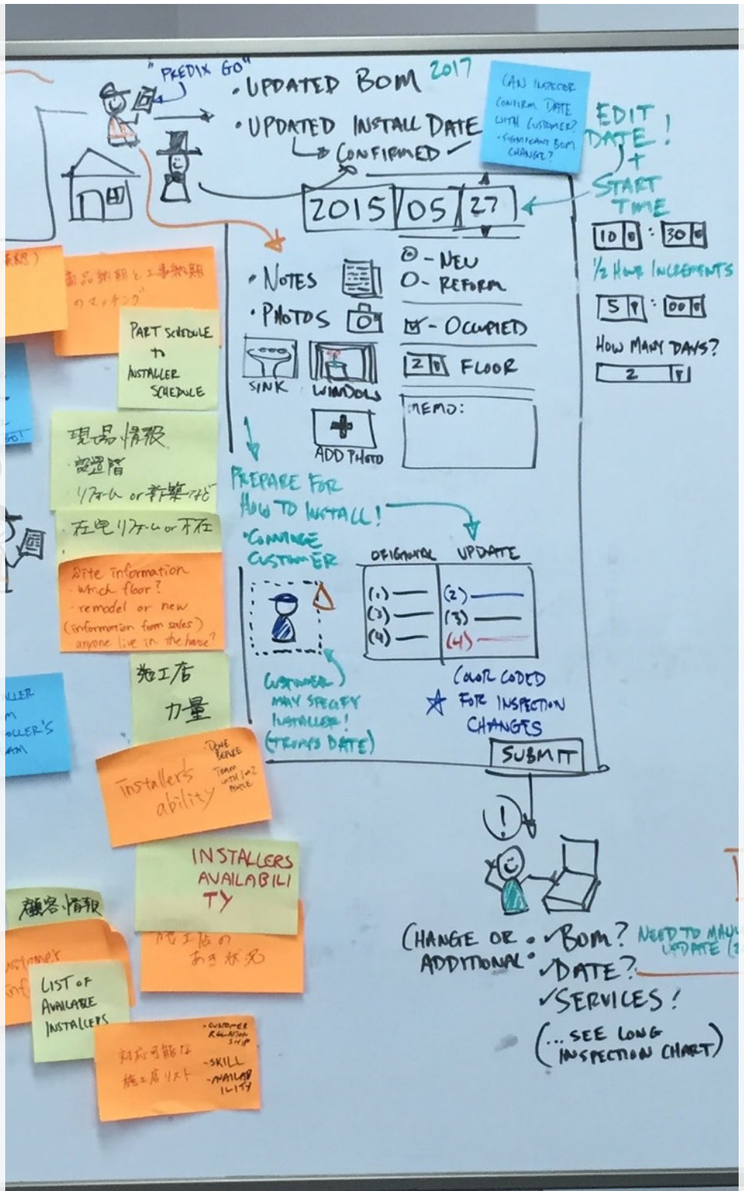
- Installation date from Sales.
- Inspection date from Sales.
- Job address
- Bill of materials with product codes and quantities.
- Assigned Controller with the ability to accept or reject assignment.
- System-suggested Inspector for inspection date.
- System-suggested Installer for install date.
- Job progress indicator.
- ...ending with a “Go” button that passes this job to the associated Inspector.

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MVP Capabilities

Achieving our scheduling goals requires connection of accurate job details to available and capable installers. When the inspector receives the job ticket, he is presented with to-date information with additional forms and functions to record site details. His survey of the site leverages a Predix Go mobile device to perform the following tasks:

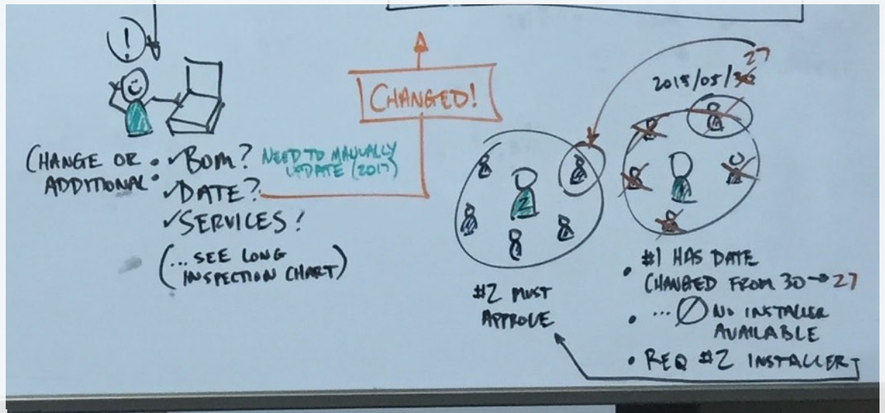
- Confirm install date, time, and overall job length with Customer.
- Record boolean, memo, multi-select, and other quick entry form fields.
- Take site photos with annotations.
- Record needed bill of material changes.
- Append additional installation services.
- View if an (anonymized) available and capable Installer can do the job.
- ...ending with a “Submit Report” button that passes the report back to the Controller.



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MVP Capabilities

The controller receives the job ticket with the additional inspection report information. The ticket should clearly communicate changes to the bill of materials, install date adjustments, and additional services. The system confirms if the installer associated with the job is still available and correctly skilled. If the date has changed and no Installers from the Controller's team are available, the system will alert the Controller of available and capable Installers from Controller2's team. Controller1 can request scheduling of those Installers and if accepted by Controller2, will be assigned the job.



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MVP Capabilities

The completed inspection allows the job ticket to be forwarded to the associated Installer. Once the installer has completed their assignment, their report is appended to the job ticket and is closed.



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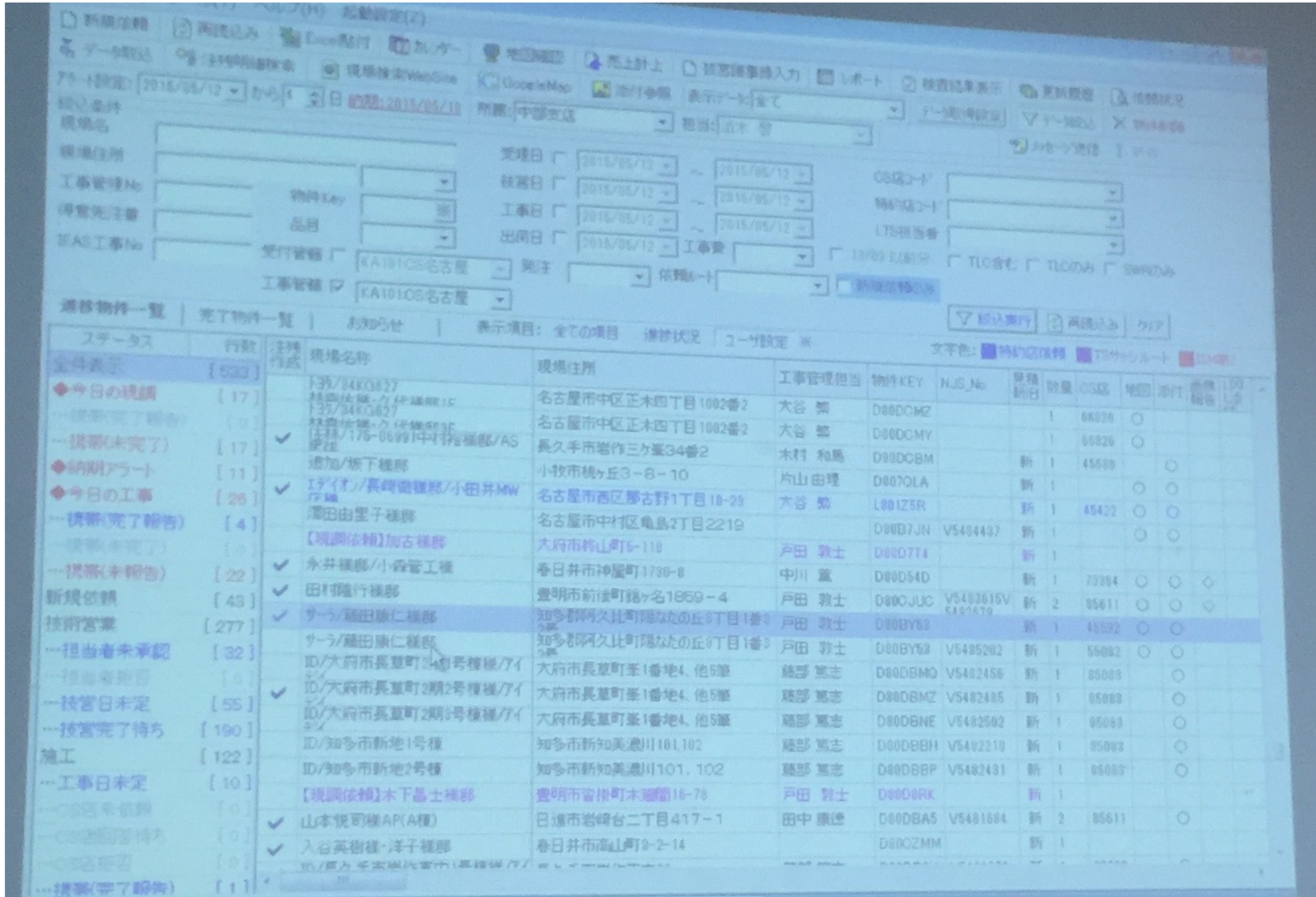
LIXIL Software

Sato-san provided a demo of LIXIL's existing GAIA software. The primary information interface is a list of data entries with numerous columns for each aspect of a job. Each row represents an installation job. The left column are groups and categories of jobs for organization and workflow. The header allows filtering, searching, and sorting of info. We learned many of the attached documents duplicate data found within GAIA. Color and shape coding are used as indicators:

O: Accepted by INSTALLER

Δ: Not yet accepted by INSTALLER

▼: Rejected by INSTALLER



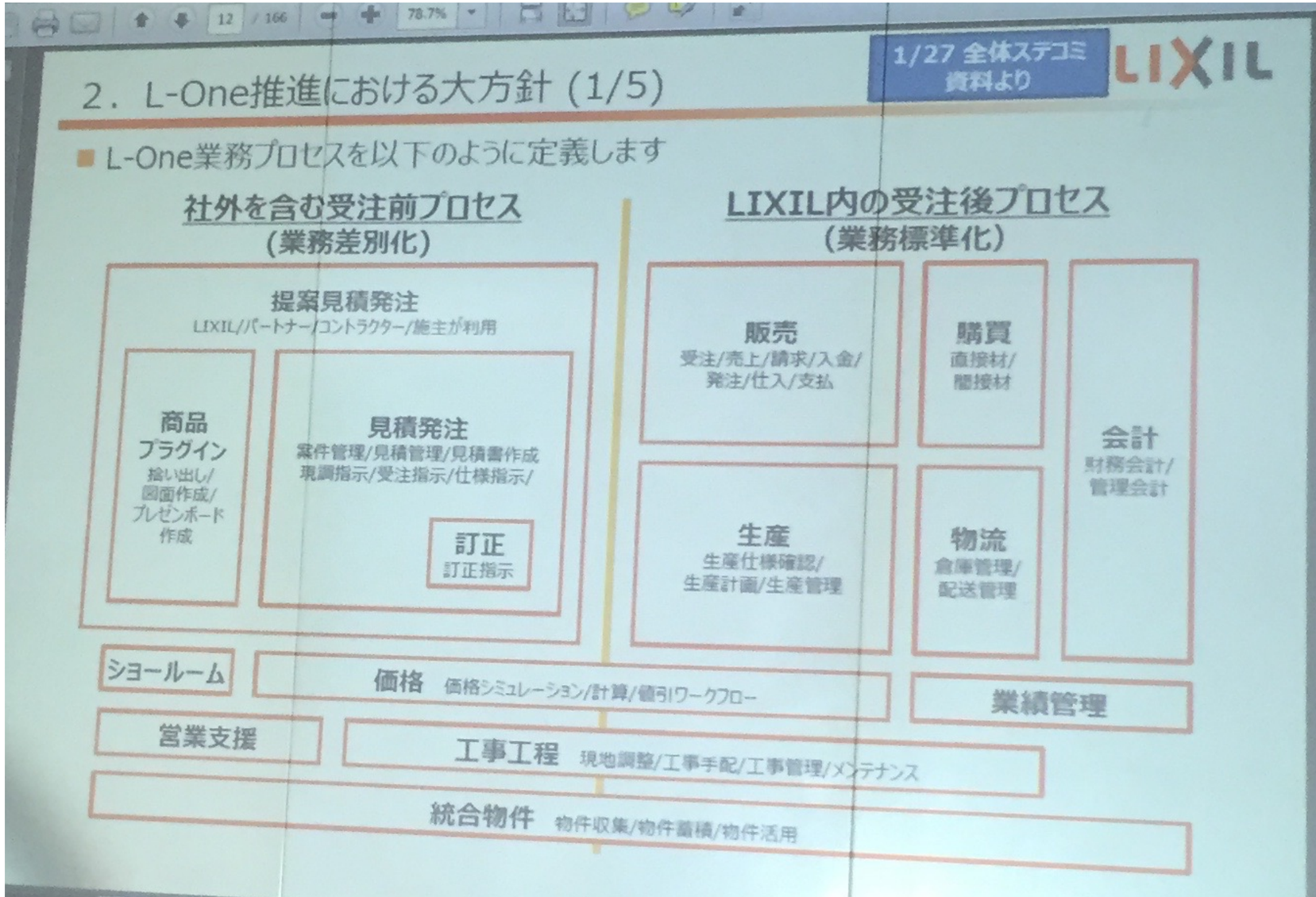
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LIXIL Software

On our third day, information technology colleagues of Sato-san provided an overview of LIXIL software systems and upcoming upgrades. “L-One” is LIXIL’s planned system upgrade with the goal of standardized workflow & post-order process, and lower maintenance costs. This should integrate LIXIL’s 5 companies and 1500 systems into 1 single global system.

L-One Block Diagram.

**translate?*

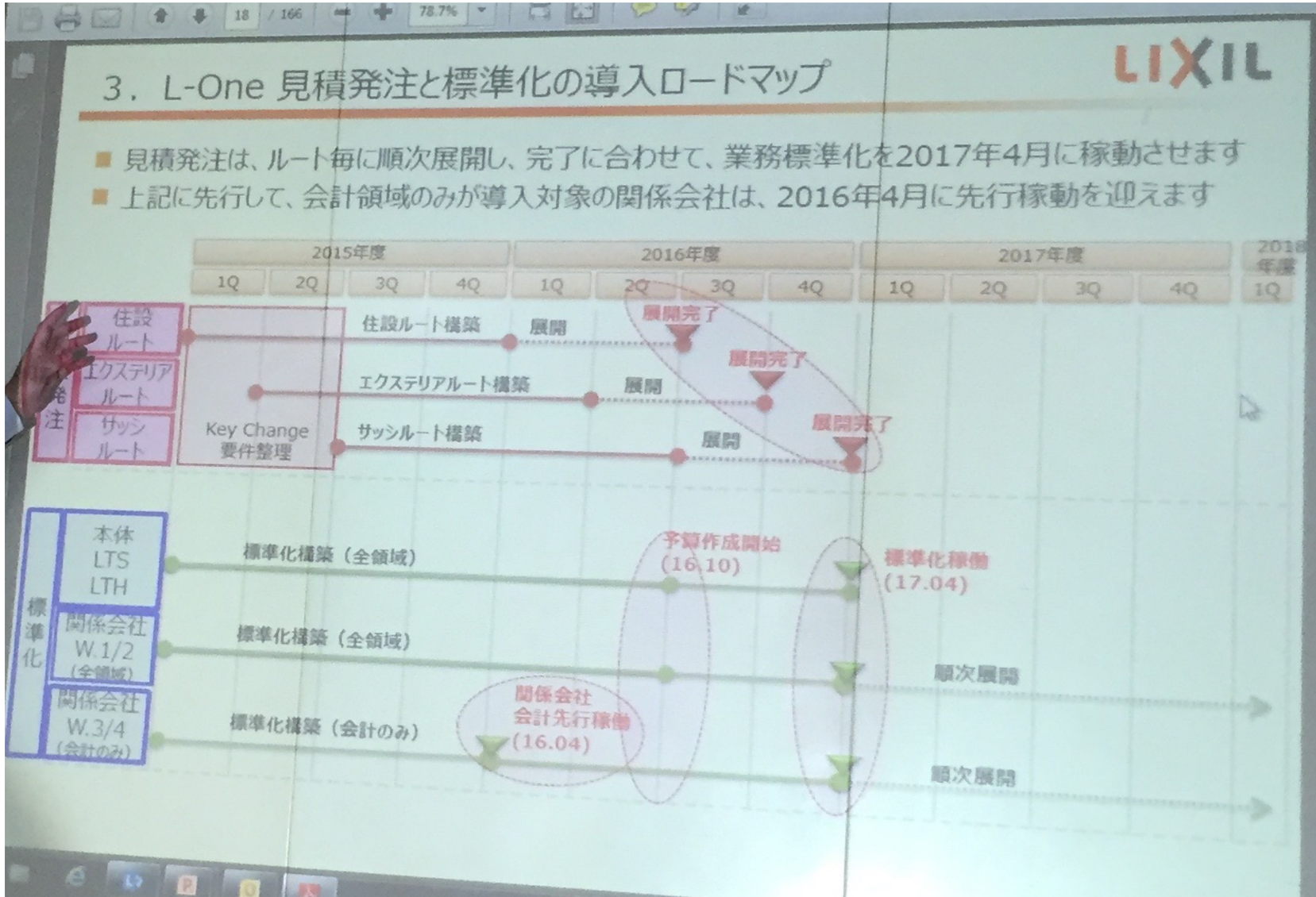


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LIXIL Software

L-One roadmap. 2017 is a key date for upgrading the construction (installation) portion of the system.

**translate?*

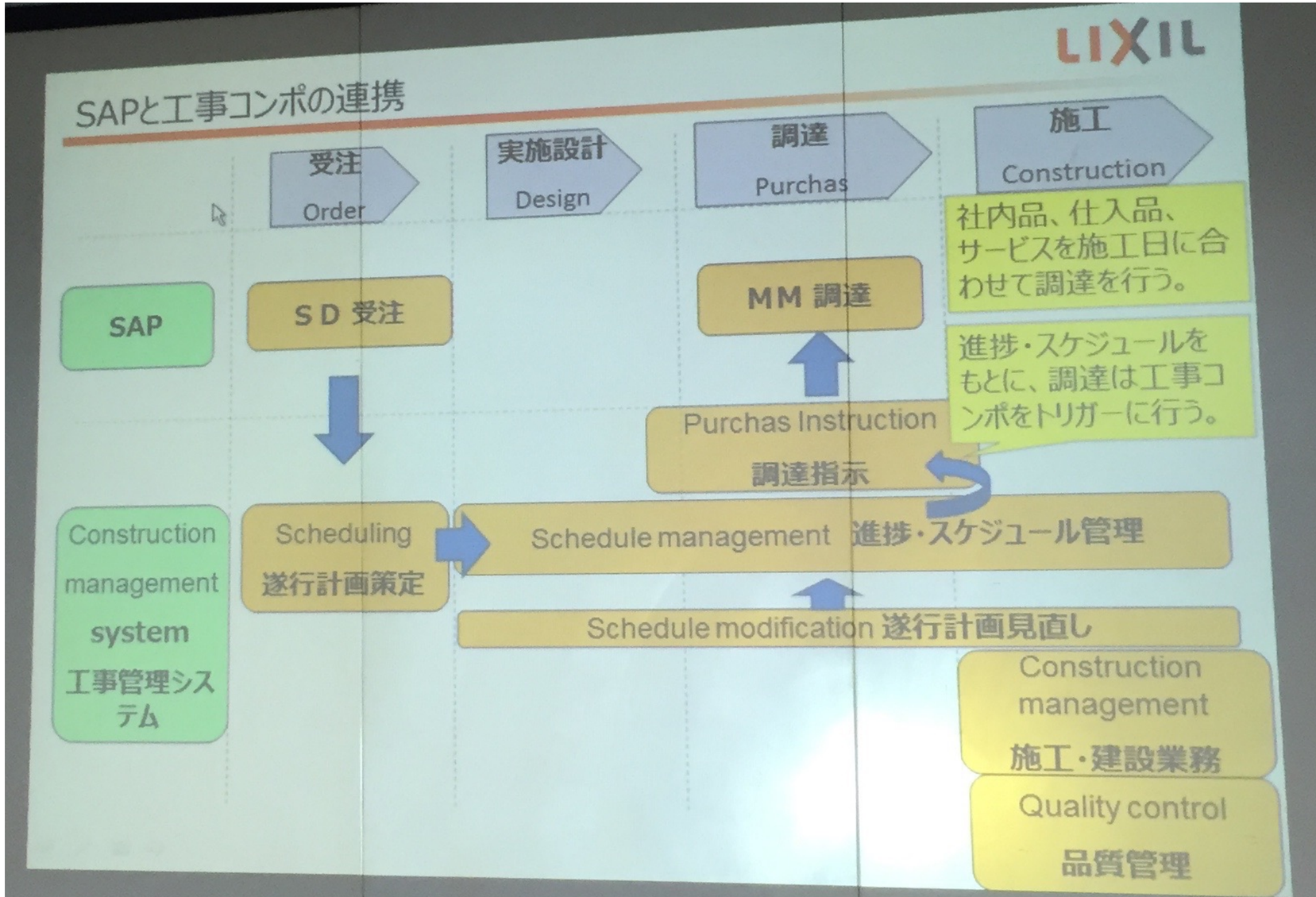


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LIXIL Software

LIXIL uses SAP for their order fulfillment process. The upgrade plans to affect most parts of the system except scheduling.

**translate?*

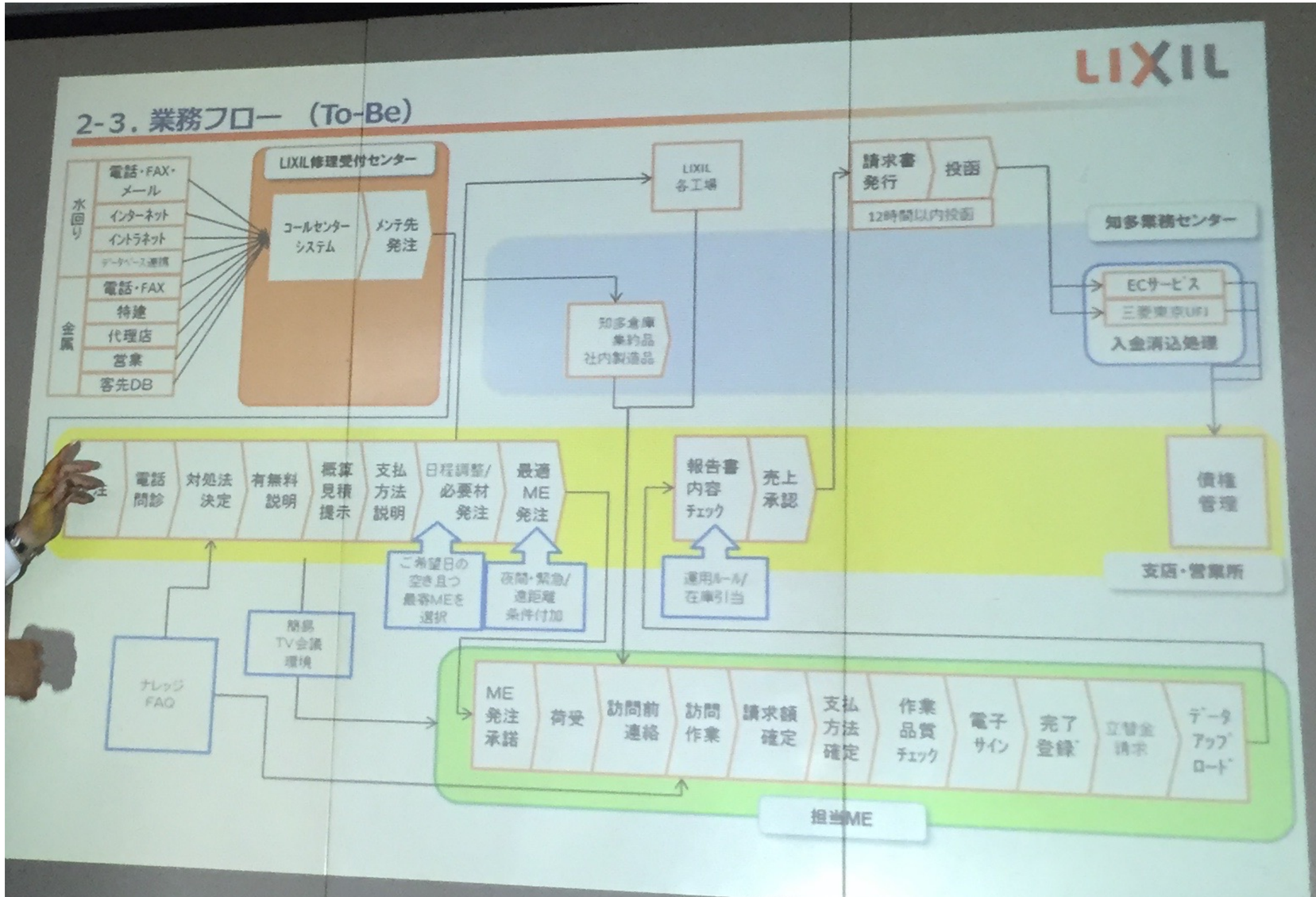


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LIXIL Software

LIXIL's maintenance process runs similar to their install process, but without a **Controller** helping to guide and schedule requests.

**translate?*



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LIXIL Showroom

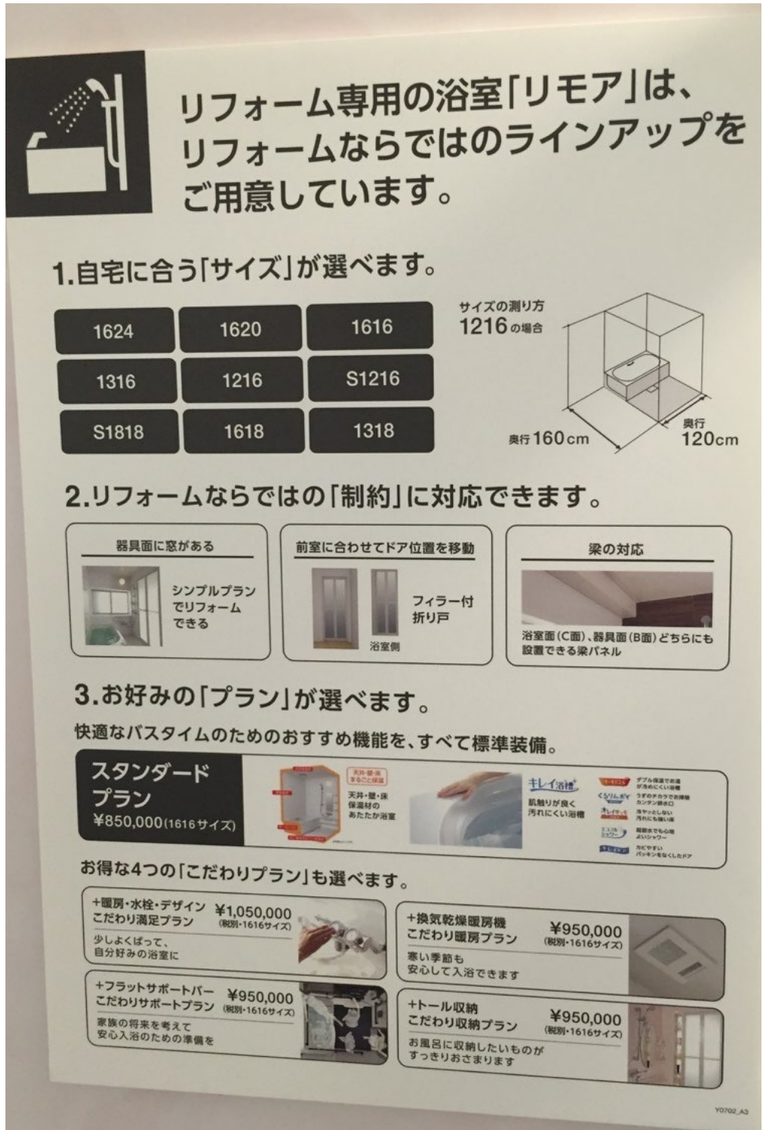


Understood the breadth of product categories and the front end of the LIXIL Total Service workflow.

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LIXIL Showroom



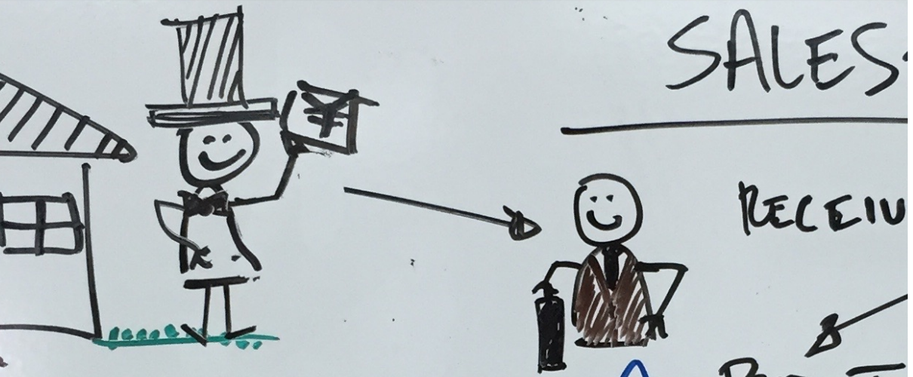


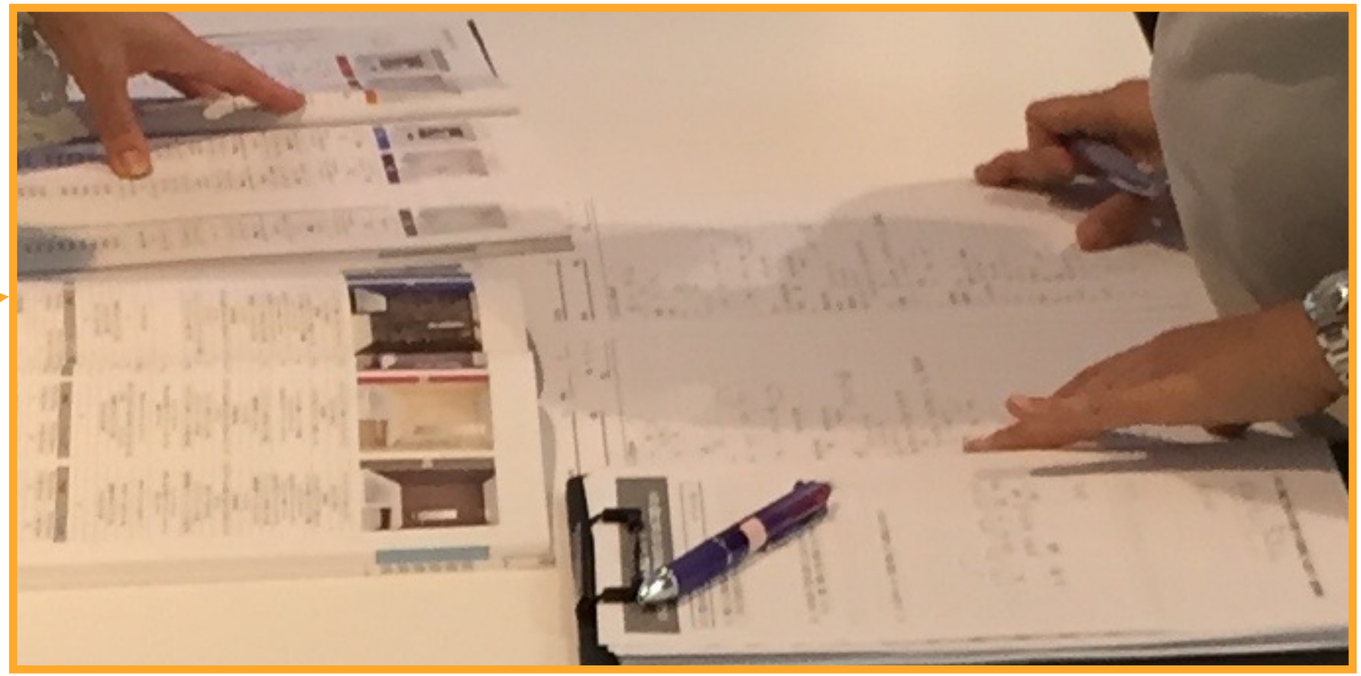
The showroom's fully installed (and sometimes working) bathrooms give customers an understanding of the products in context. Adjacent placards help communicate room size constraints and recommended dimensions for each product set. Ensuring this information relates to installation standards could smooth the overall scheduling process and customer experience.

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LIXIL Showroom







During our visit, we observed a customer going over the details of their order with a LIXIL sales person. While we didn't intrude on their conversation, we noticed the input of product and customer information starts with a physical catalog and written form.

LIXIL Showroom

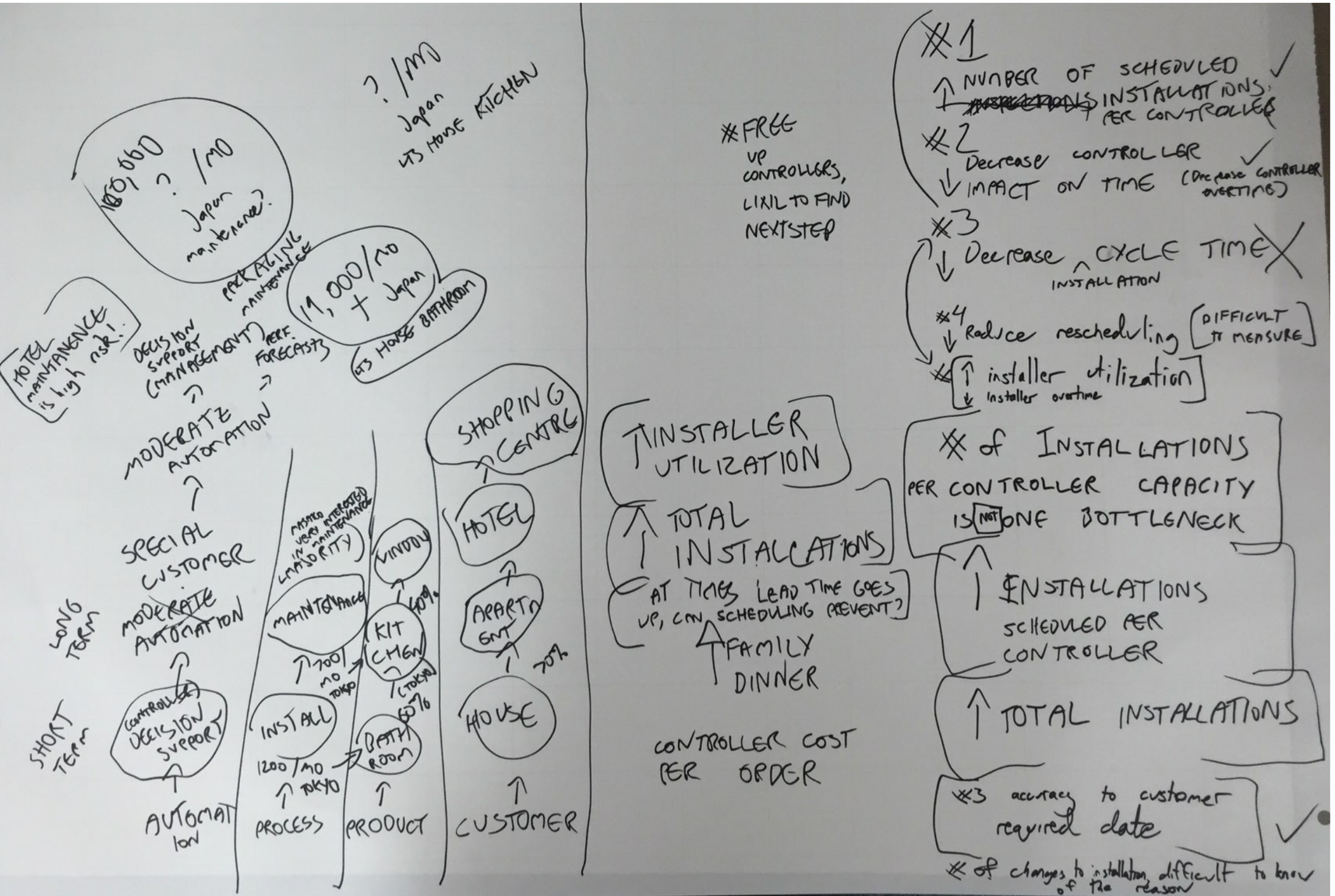


In addition to bathrooms, LIXIL's showroom demonstrates the breadth of products with potential downstream installation and scheduling needs:

- Kitchens
- Doors & Windows
- Solar Panels
- Tile & Flooring

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KPIs



While one team helped sketch the possible interface, another team looked at the LTS business numbers and opportunity. We found the process of installation generally overlaps with maintenance. These apply to home, apartment, and hotel customers wanting bathrooms, kitchens, and doors/windows. The following pages structure how LTS could progress their business within these categories.

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KPIs

From our workout and understanding of LIXIL's business problems, we think there are 3 primary metrics to measure project success:

KPI measurement methods could include*:

- Compare the quantity of jobs per day in the legacy system versus the new Predix system.
- Throughput of 2 separate teams simultaneously every other incoming job between legacy and new systems.
- Customer satisfaction before and after.

**These are only examples— Any KPI measurement design needs to use a large enough sample pool and timeframe to be statistically significant. Learning time, preference bias, and other factors also need to be considered.*

Increase controller throughput.

Improve installer utilization.

Reduce deviation from initial install date.

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Roadmap

	Installation	Maintenance
Hotel		
Apartment		
Home		
	Bathroom	Kitchen	Windows & more...

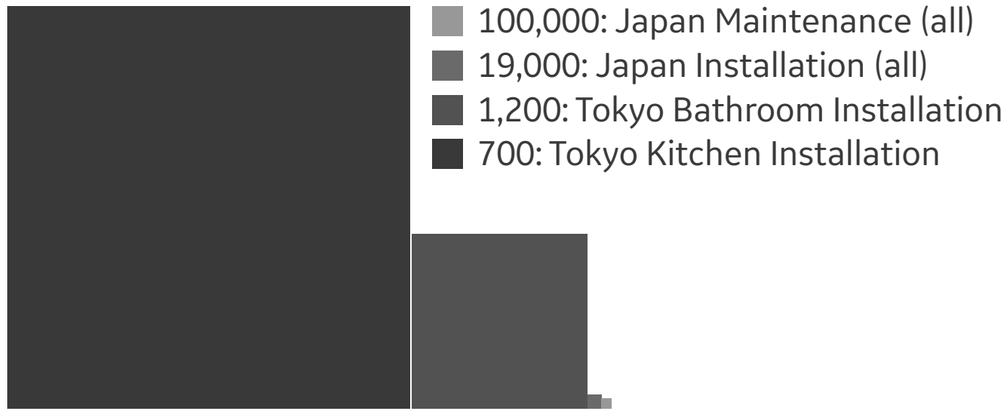
This map outlines how a Predix software application focusing on decision support will start at one point and strategically evolve through the business. The map considers the following axes in combinations:

Services: Installation, Maintenance

Customer Types: Home, Apartment, Hotel

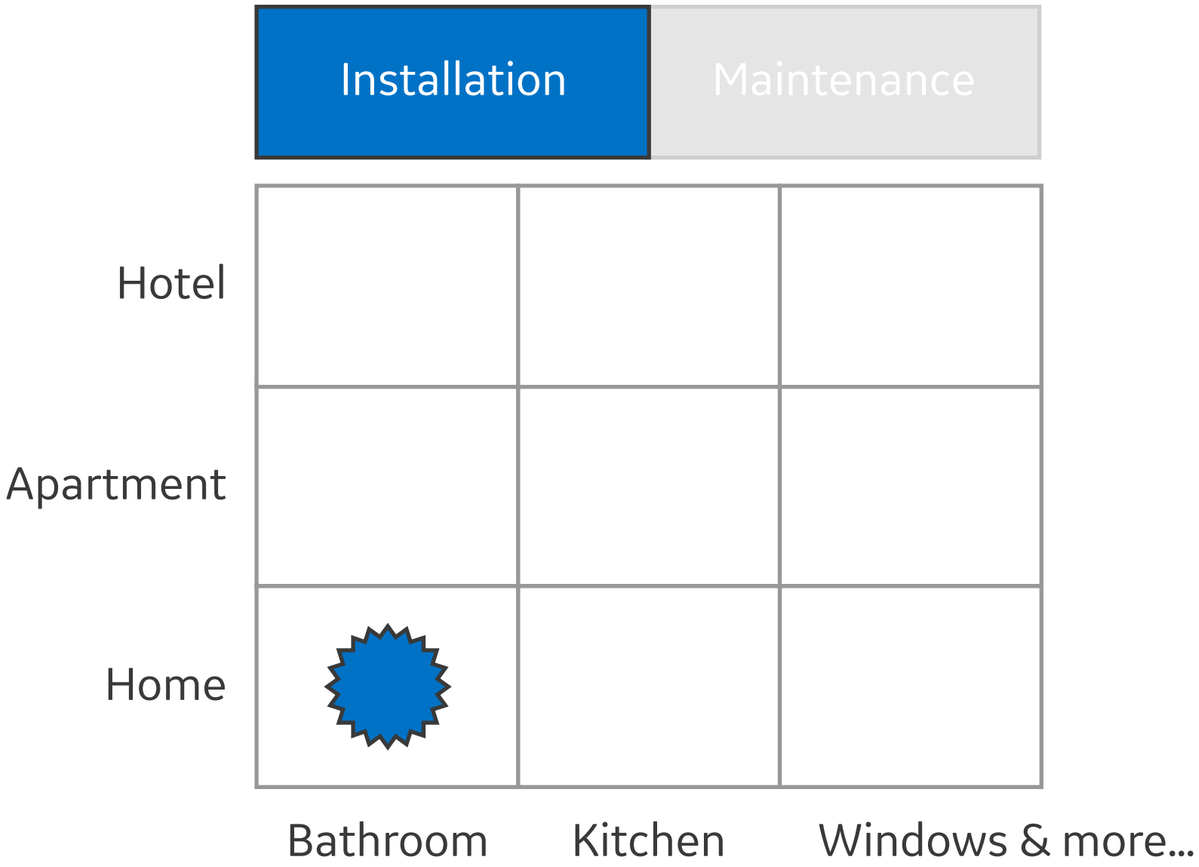
Products: Bathroom, Kitchen, Windows

Scheduled Services per Month:



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Roadmap



1. Home Bathroom Install

- Initial offering as defined by project team
- 1,200 installations per month in Tokyo
- 19,000 installations per month in Japan

Thanks!

