



Advancing Sustainability of Process Industries through Digital and Circular Water Use Innovations

Design and Development of innovative digital services for Water- Related Industrial Settings

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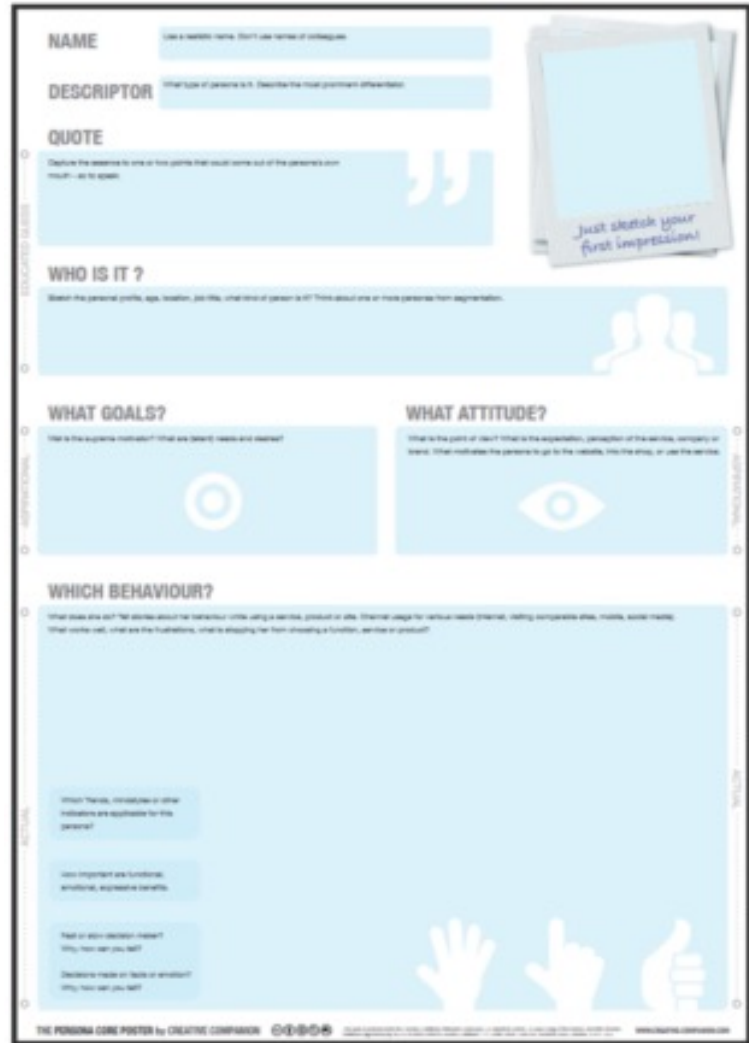
The Process



1. *[Empathise - Define]* Identify a Problem or Opportunity
2. *[Empathise]* Understand the Users
3. *[Empathise - Define]* Define the Value Proposition
4. *[Ideate]* Ideation / Concept Development
5. *[Ideate]* Validation and Refinement
6. *[Prototype]* Service Design
7. *[Prototype]* Technical Feasibility and Development
8. *[Test]* Test and Iteration
9. Launch and Change Management *[Empathise]*
10. Measurement and Improving *[Design Thinking]*
11. *If its good -> Sell it [THAT's Business]*



User Persona

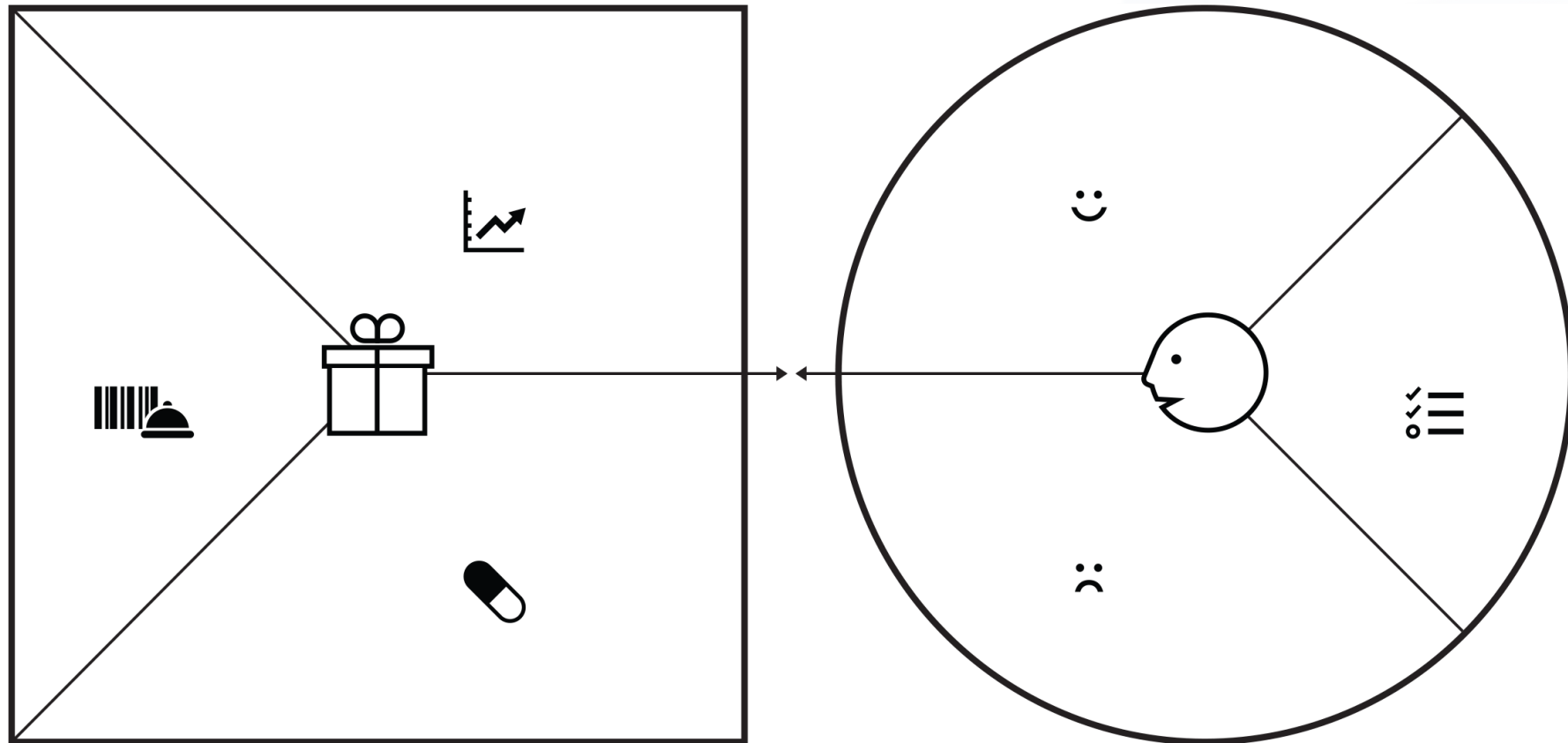


- A persona is a fictional, yet realistic, description of a typical or target user of the product. A persona is an archetype instead of an actual living human, but personas should be described as if they were real people.
 - How many archetypes in the factory ?
 - Who will use our system ?
- Name / Description / Role / Goals / Attitudes / Behavioural characteristics / Role in Organization / Match with Process / Performance evaluation / In-Factory KPI participation – relation
- Extra material for Persona Generation ([Link](#))
- Online Persona Generation ([Miro - Link](#))

Interviewing towards the Persona

- Time with users is valuable
- Spontaneous, blissful user-guided conversation = Preparation
- Will we get an answer to everything ??
- The next user's answer is the previous user's validation
- Preparation
 - Brainstorm questions: Register all questions that will be asked
 - Identify and order themes: Interview Pillars
 - Refine questions: “Why” , “Tell me about the last time you _____ “
- Have in mind the Value Map for each Persona (end user)

Value Proposition Canvas

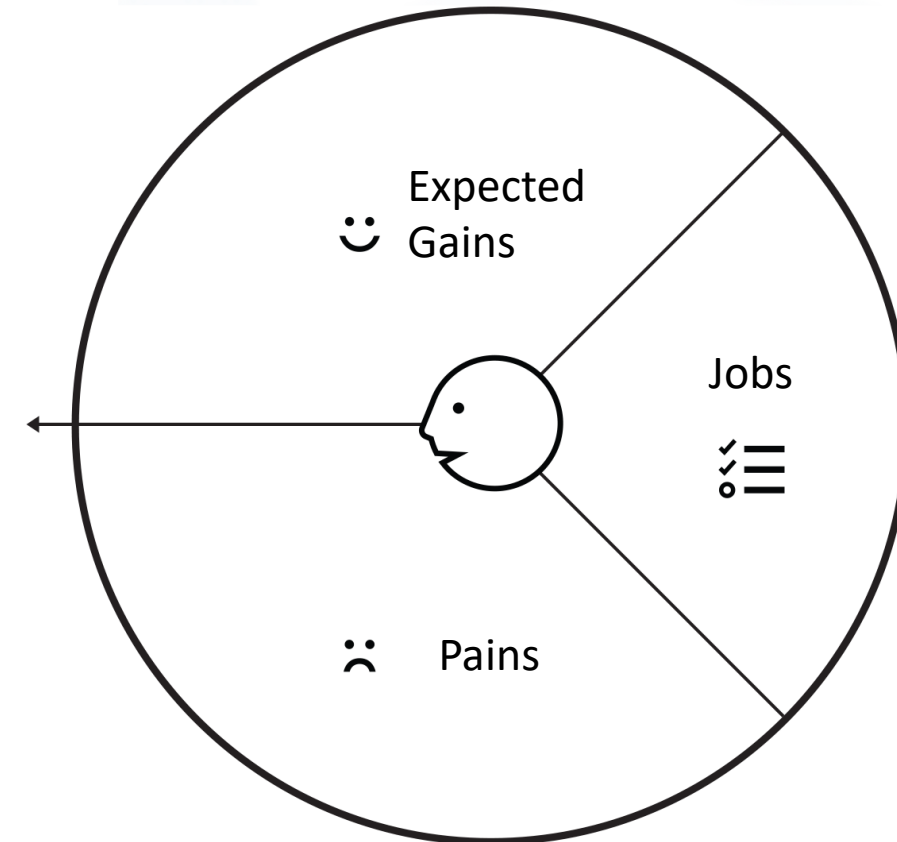


Value (Proposition) Map

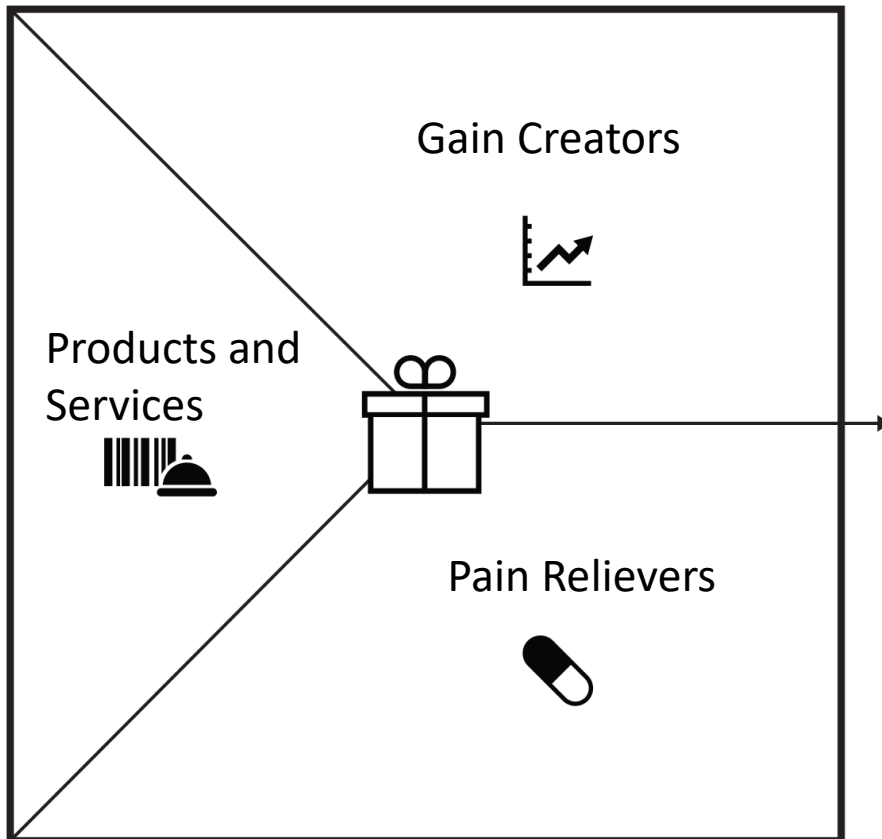
Customer (Segment) Profile

Customer Profile

- **Customer Jobs** describe what your user-types are trying to get done in their work.
- **Pains** are the bad outcomes , the risks and obstacles that come into play when executing the job.
- **Expected gains** are the outcomes the users want to achieve through an offering

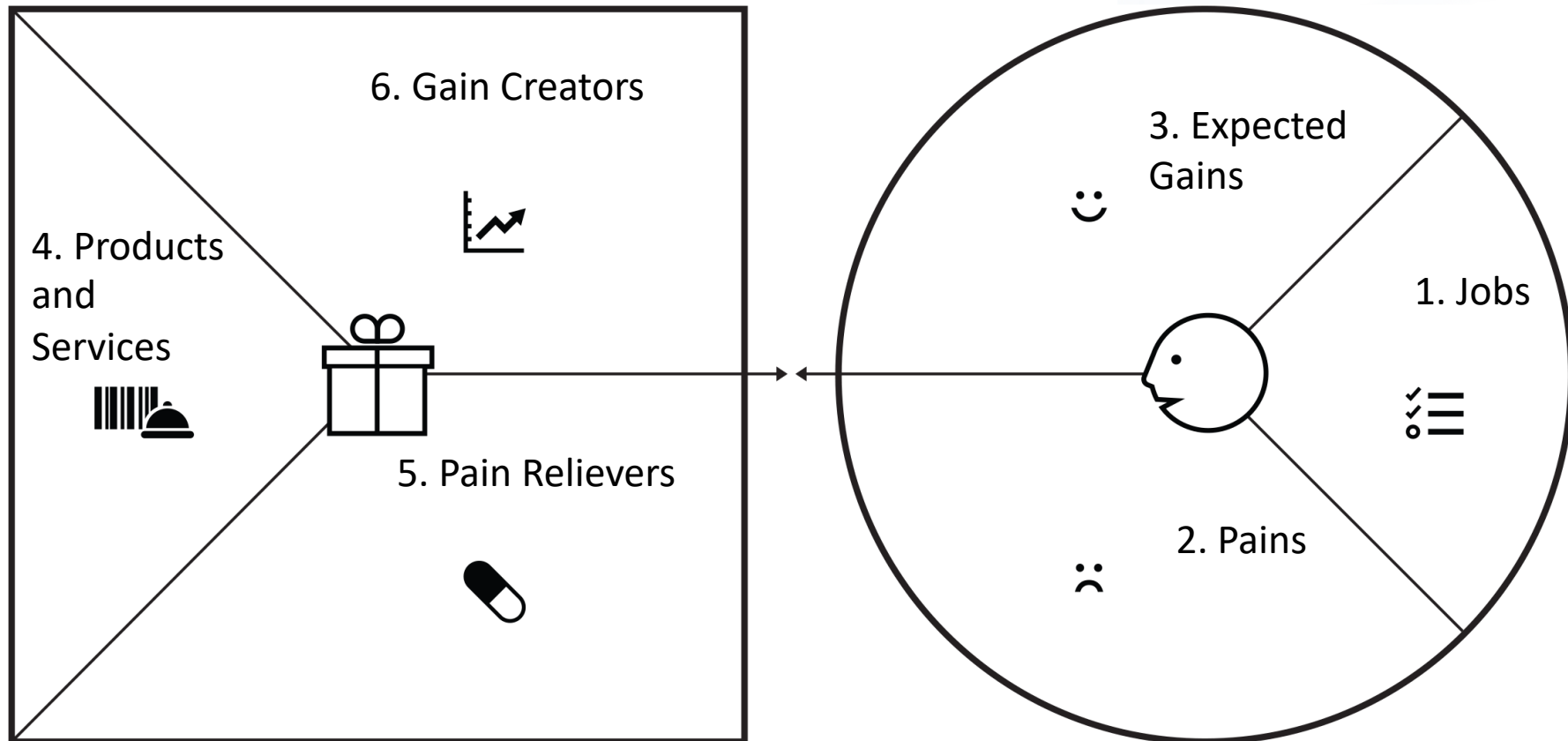


Value Map



- **Products and Services** is the solution you will design / develop / offer as a list...
- **Pain relievers** describe how the products and services alleviate pains of users
- **Gain Creators** describe how our products and services create gains for the users

The process to follow to create the match between 1-4



Value (Proposition) Map

Customer (Segment) Profile

After the match between 1-4

Minimum Viable Product

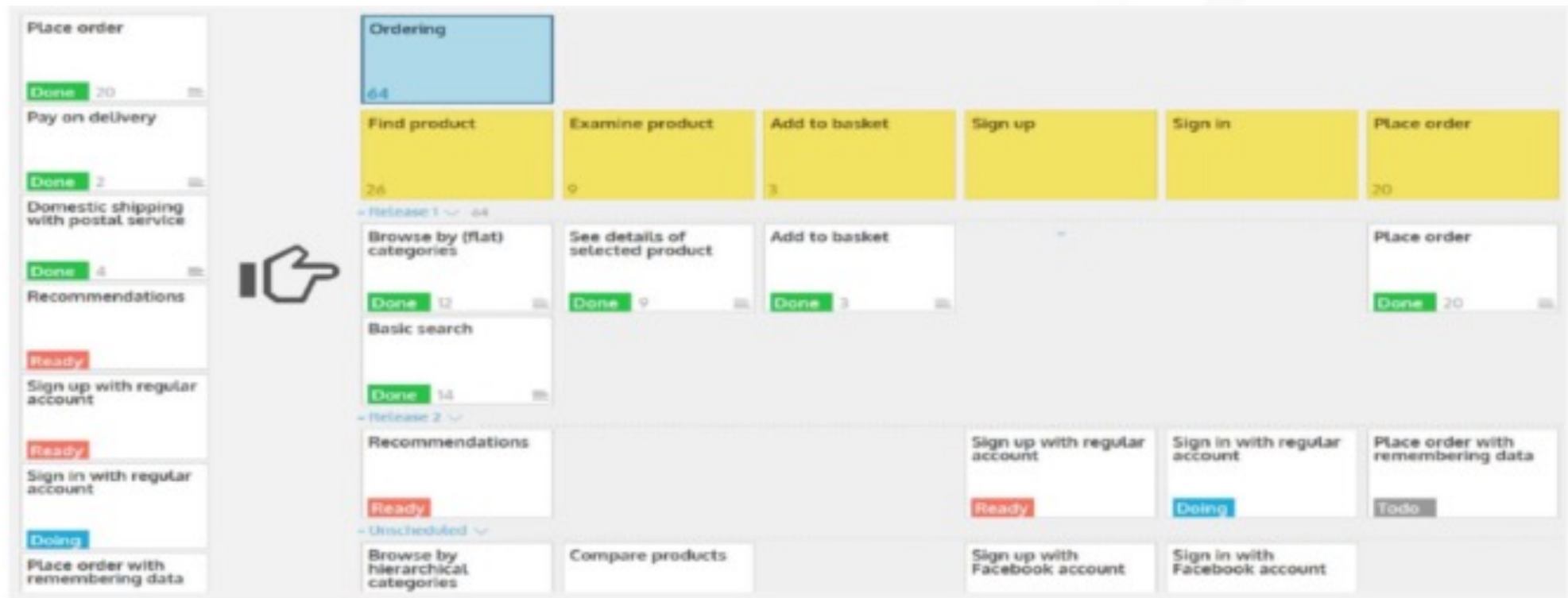
A version of a new product which allows a team to collect the maximum amount of validated learning about customers with the least effort.

- Examination of Competition (Services similar to yours that cover the same customer jobs)
- User stories generation
- Rapid development of potential solutions
- Selection / Storyboard generation

Study of competition and competing products solving the same or similar problems in the same or similar market

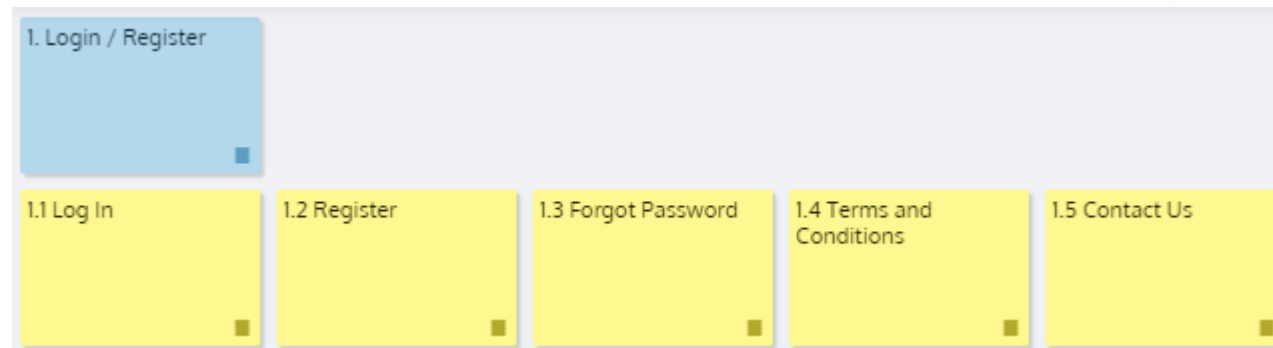
- Google is your ally
- There is always competition
- Examine all – Register to all – Demo all
- Feature compilation: We write down all features offered by competing products / services
 - *When all competitors offer a specific feature it probably is important to solving the problem and should be considered.*
 - *Cluster of features -> Main features = MVP*

- Print/Draw the most important functionalities that your service should consist of and go through the process as if you were a user
 - Map the user’s story
 - Form a user flow
 - Online platform for user stories [Stories On Board](#)

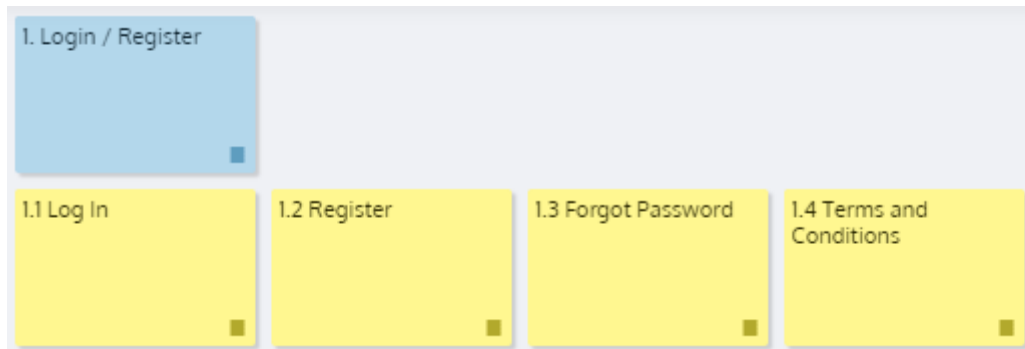


4. Ideation / Concept Development

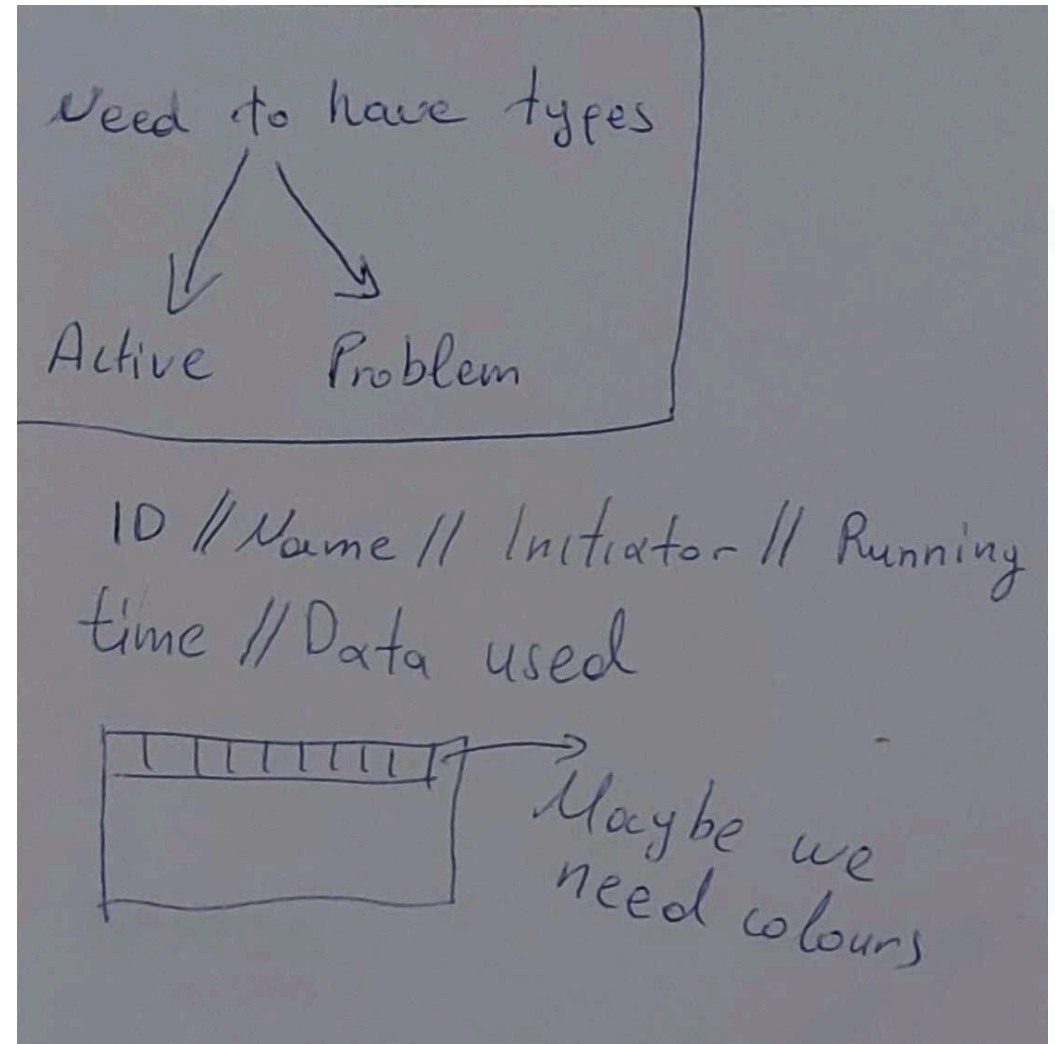
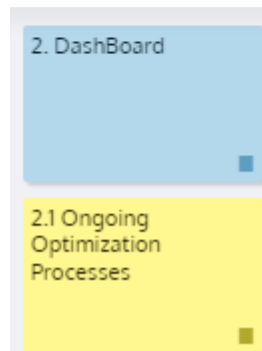
User stories generation (Example – Optimization Service – Generic)



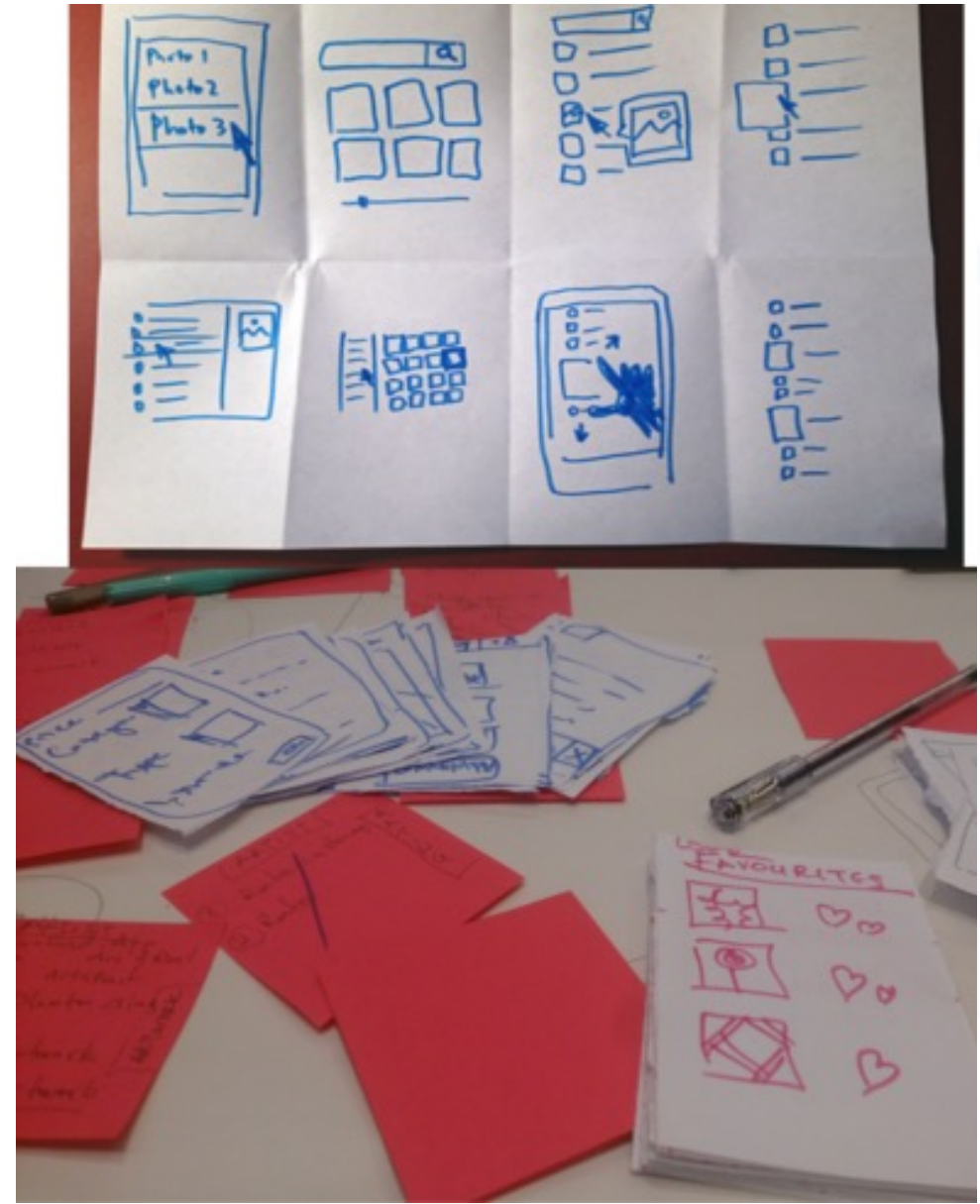
- User story
- Separate the story into parts
- We have the distinct UX -> UI that we need to address
- In PostIt© note words / phrases / designs that come to mind
 - What does a user do here?
 - How can we measure success?
 - What happens next?
 - What are main hypothesis ?



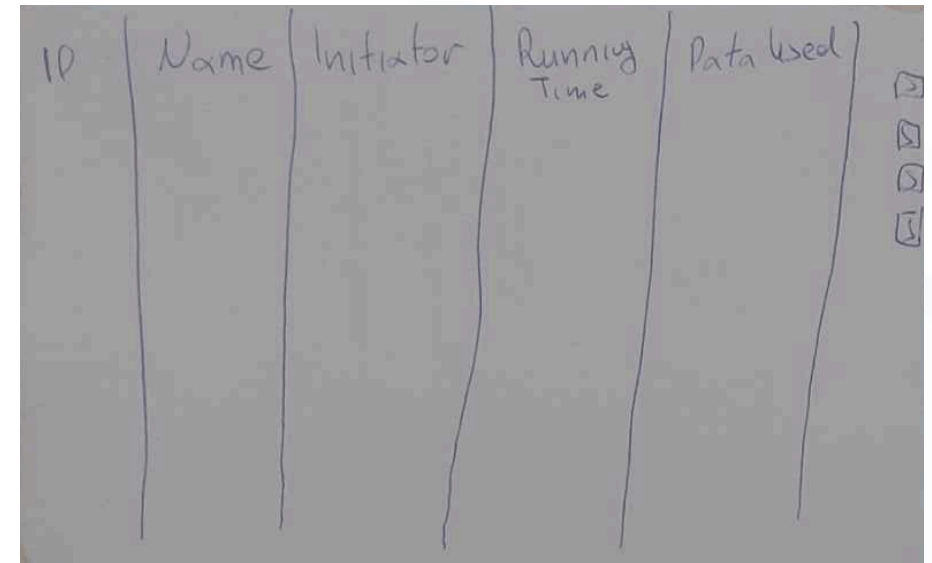
- E.g. Dashboard notes for 2.1 *Ongoing optimization processes* notes
- In Post-It© note words / phrases / designs that come to mind
 - What does a user do here?
 - How can we measure success?
 - What happens next?
 - What are main hypothesis ?



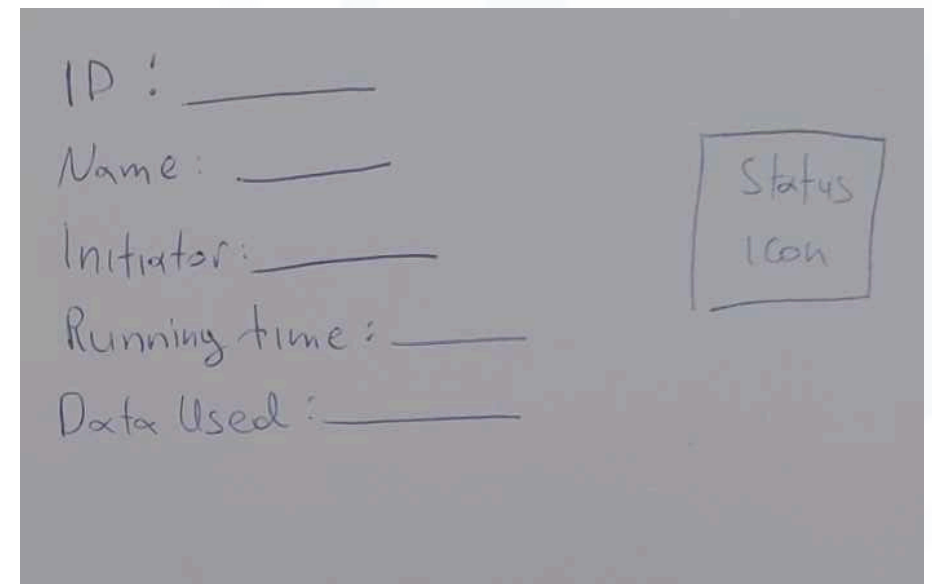
- For every step of the user story
- With all notes taken
- All members collaborate and perform the exercise of developing many “equal features” possible versions of the same functionality



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ID	Name	Initiator	Running Time	Data Used
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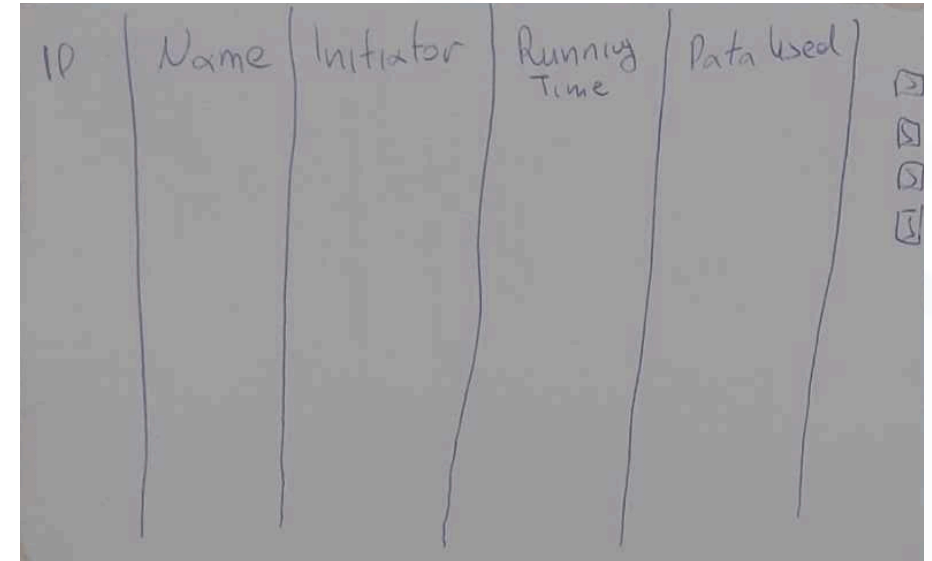


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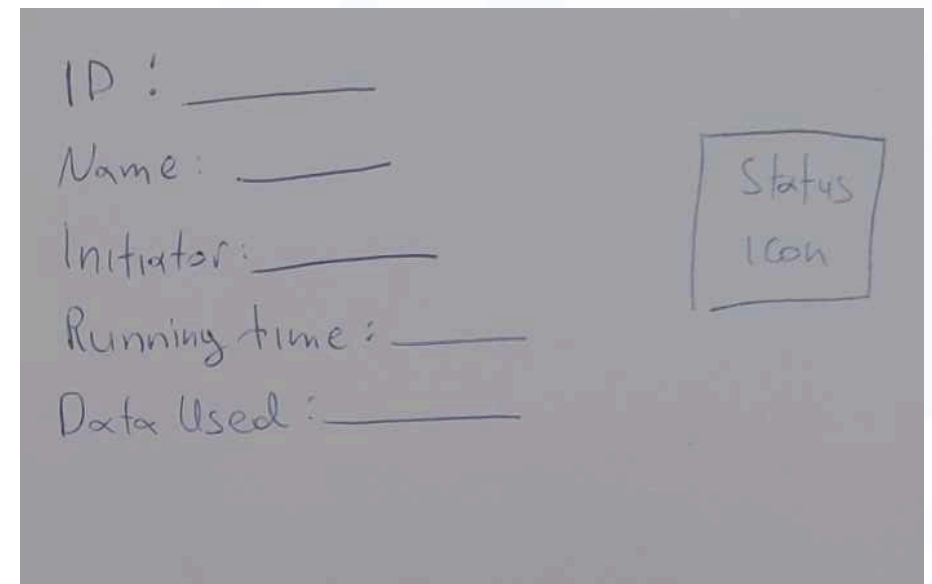
Status
Icon

Silent Positive Support / Voting

- All designs are placed on the wall relevant to each user story
- External users / Team members receive a predefined number of Dot-Stickers (=votes)
- Each member casts their vote by
 - Observing the designs
 - Selecting the version they believe that it adequately meets the requirements
 - Only positive votes
 - No judgment



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Name : _____

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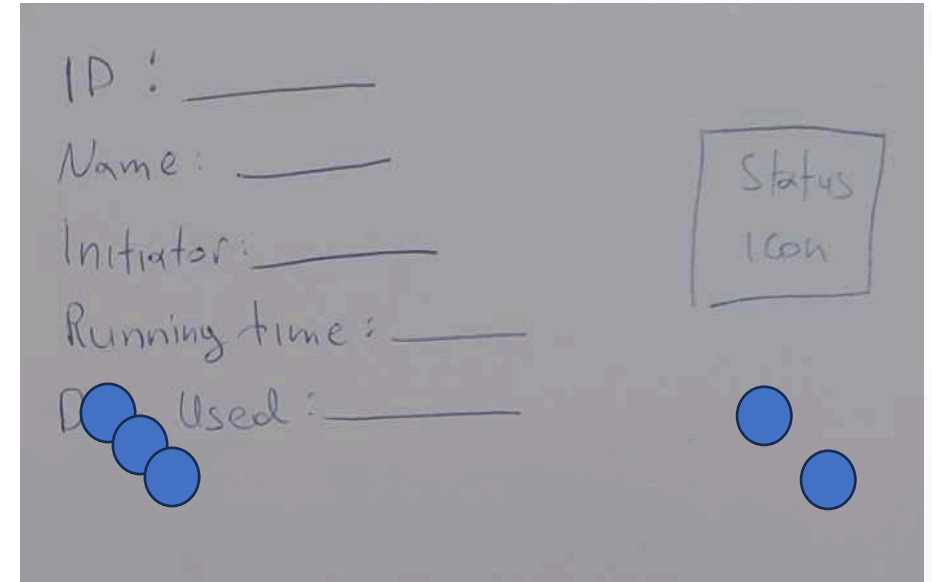
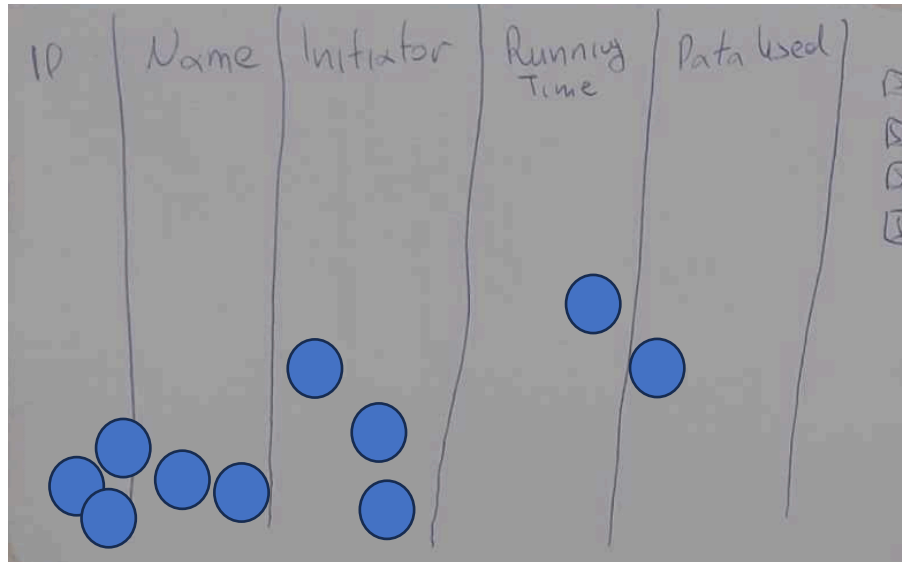
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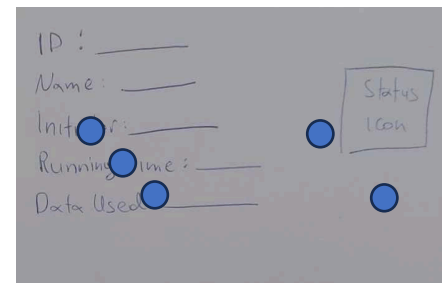
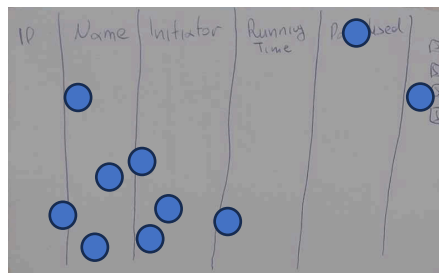
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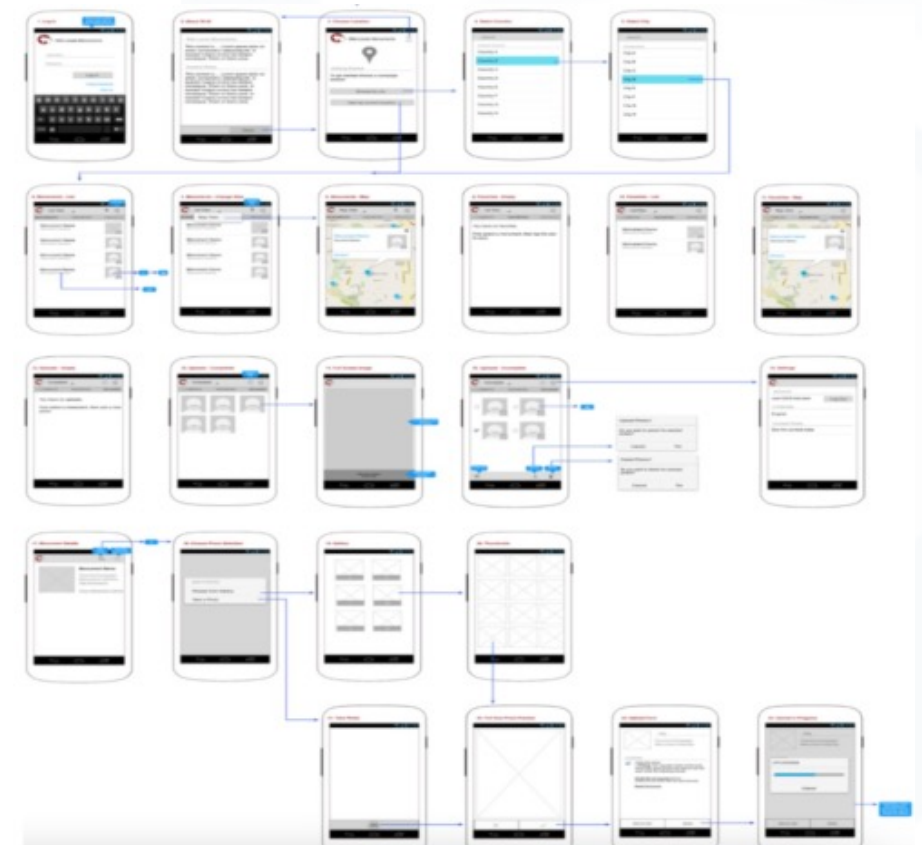
Rapid development of potential solutions





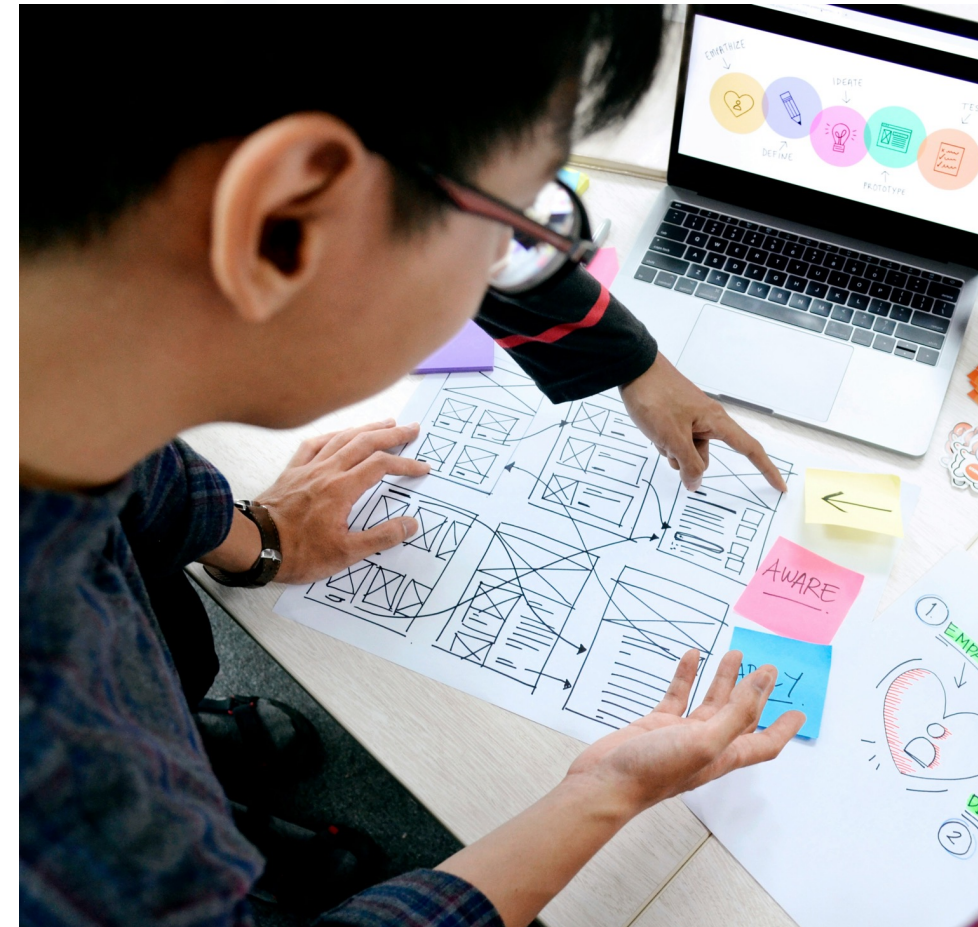
Selection / Storyboard Generation / MVP

- All designs are then compared and at least one version proceeds to Storyboarding
- Final stage before prototyping
- A storyboard that shows Click-by-Click where the user can navigate to and what (s)he can do
 - Templates relevant to the app we will develop
 - Naming conventions
 - Location in the user story
 - Functionality description and user interaction description
 - Wireframes
- Interactive Mockup Prototypes
- Fast implementation to test with actual users
- Minimally real prototypes
 - Actual text
 - Actual images
- Tools ([Proto.io](https://www.proto.io/), [Justinmind Prototyper](https://www.justinmind.com/), [FluidUI](https://fluidui.com/) etc.)



[Img src](#)

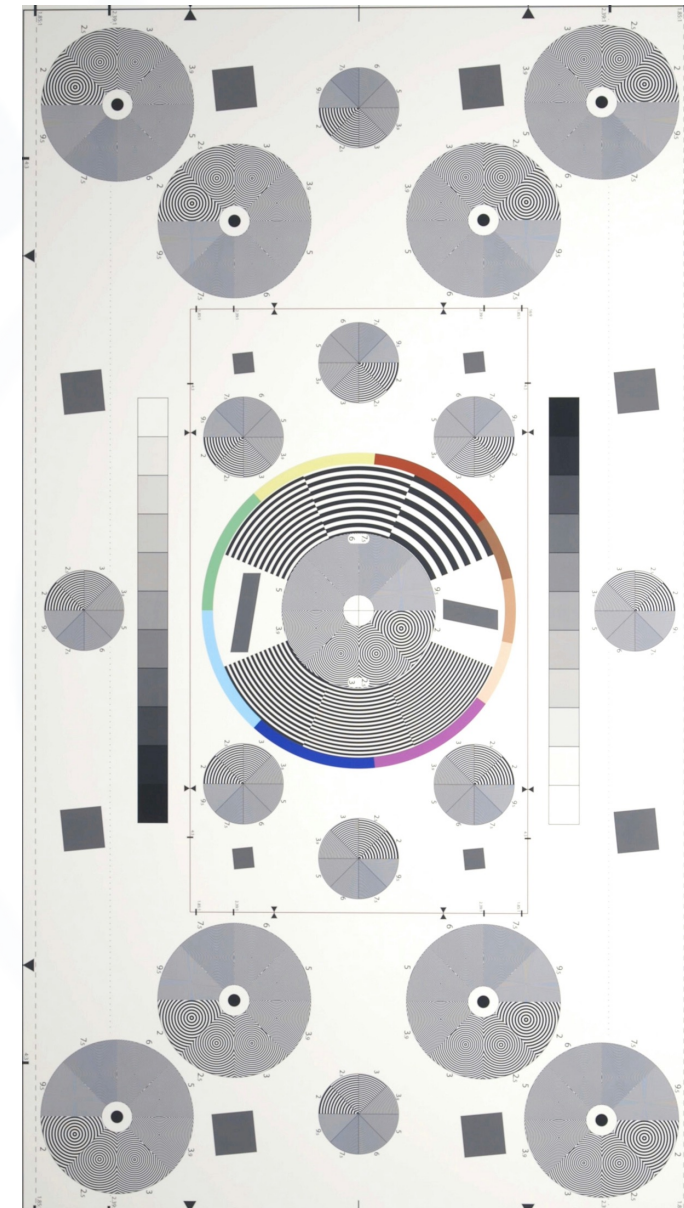
1. Define Objectives and Goals
2. Identify and recruit users from the target users
3. Define and Create the Test Scenarios and User Tasks
4. Environment Preparation
5. Facilitation of the User study (Observation / Think Aloud / Minimal Interference)
6. Data reception (Recording / Qualitative analysis / Quantitative analysis)
7. Analysis (Identification of Issues and Prioritization of Fixes or Updates)



- Having all the results from the previous tests with the users, the next step is to finalize the design of the service towards its development.
- Integration with Existing Systems
 - Compatibility: Legacy systems, Machinery, Software
 - Data Interoperability: Ensuring of real-time information flow
- Scalability and Flexibility
 - Architecture: Need to design the architecture to be able to handle varying loads and scale with the industrial operations' needs
 - Flexible configuration: Customization for varied processes and user types
- Reliability and Performance
- UX design
- Security and Compliance
 - Data security
 - Compliance
- Supportive tools
 - Real time monitoring

- **Front-End:** React, Angular, Vue, HTML5, CSS, etc.
- **Back-End:** [Java, Python, C#, Node.js][Spring Boot, Django, ASP.NET Core]
- **DBs:** [PostgreSQL, MySQL, MS SQL Server][MongoDB, Cassandra, Redis]
- **Industrial Protocols and Middleware:** [OPC UA, Modbus, MQTT][Apache Kafka, RabbitMQ]
- **Cloud:** AWS, Azure
- **DevOps:** Containerization : Docker, Kubernetes - CI/CD: Jeknins, GitLab CI/CD – Monitoring and Logging: Prometheus, ELK stack

- **Unit Testing:** Developers write and run unit tests for individual components.
- **Integration Testing:** QA team performs integration tests to ensure components work together.
- **System Testing:** QA team conducts system testing to validate the complete system.
- **Acceptance Testing:** Business stakeholders and end-users perform UAT to verify the system meets business requirements.
- **Performance Testing:** Performance engineers test the system under various loads.
- **Security Testing:** Security experts perform penetration testing and vulnerability scanning.
- **Usability Testing:** UX team conducts usability tests with real users.
- **Compatibility Testing:** Test the application on different devices, browsers, and OS configurations.
- **Regression Testing:** Automated regression tests are run after every major code change.
- **End-to-End Testing:** Conduct end-to-end tests to validate complete workflows.
- **Alpha Testing:** Internal team performs alpha testing to catch early bugs.
- **Beta Testing:** Release a beta version to a select group of users for real-world testing.
- **Configuration Testing:** Test with various hardware and software configurations.



Change management for the new digital solution involves the structured approach to transitioning individuals, teams, and even the whole organization from their current state to the future state (with the new service operational in the day-to-day activities) while minimizing resistance and maximizing engagement and adoption, to harvest the envisaged benefits.

Goal

- Minimization of Disruption
- Maximization of Adoption
- Improvement of Efficiency
- Management of Resistance to change

- Stakeholders
 - Assessment of impact
 - Engagement
- Communication plan
 - Strategy of communication
 - Omni-channel approach
- Training and support
 - User manuals / guides
 - Training programs
- Rollout plan
 - Approach in phases
 - Pilot testing rollout
 - Feedback mechanism



- Analytics: Implement analytics tools to track user behavior, engagement, and other key metrics.
- Continuous Improvement: Use the data to make informed decisions and continuously improve the service.
- KPIs... more KPIs... and even more KPIs...
- Go to slide #1... and start again...

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8. Test and Iteration
9. Launch and Change Management
10. Measurement and Improving
11. And if it's REALLY Good? -> Sell to others



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