

DESIGN RESEARCH IN THE CONTEXT OF FEDERAL LAW ENFORCEMENT

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INTRODUCTION

DESIGN RESEARCH

Facilitates the conceptual development, planning and making of **products that meet the needs of human beings**.

Integrates **specialized knowledge** into meaningful solutions.

Creates **structured and productive conversations** among team members and the client.

Builds **credibility** of the team and their process.

Creates **value** for the client.

DESIGN RESEARCH METHODS

Exploratory

Help us understand people and their behaviors, perceptions, experiences, needs and desires.

Generative

Provide for effective development of new ideas and concepts, leading to innovation.

Evaluative

Help systematically test products for their usability, usefulness and desirability.

DESIGN RESEARCH IN CONTEXT



Evidence Processing Application

PROJECT OVERVIEW

Client

Federal Law Enforcement Agency

Challenge

Create a software and hardware solution to automate and standardize the processing and collection of paper-based evidence using OCR.

Resources

18 Months | Team of 3–7 | 50–100% effort

DESIGN RESEARCH CHALLENGES

Laws and regulations affecting our access to data and target audience.

Working in the data-sensitive realm of **cybersecurity**, **digital intelligence**, and **evidence processing**.

Restricted physical access to people and places to conduct design research.

Dissemination of information stemming from the gathered data.

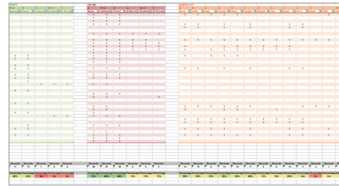
PROCESS OVERVIEW

APPLICATION



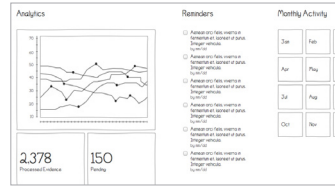
Research

Secondary Research
Contextual Inquiry
Literature Review
Hardware Assessment



Synthesis

Stakeholder Matrix
Current System Model
Task Flow Analysis
Content Analysis
Key Findings
Design Implications



Concept Development

System Components Model
Hardware Architecture
System Workflow
User Workflow
Software Architecture
Wireframes
Interactive Prototype
Concept Validation
Identity Standards
Screen Designs



Implementation

Agile Software Development
Task Completion Testing
Iterative Deployments
Usability Testing
Unit Tests



Transition

Collaborative Integration
Stakeholder Touchpoints
Expansion Proposals

DOCUMENTATION

Needs Assessment

System Requirements Specification

System Design Document

Concept Validation Report

Usability Testing Plan

Technical Documentation

User Guide

Training Materials



RESEARCH

SECONDARY RESEARCH

Collecting and synthesizing information from existing data, rather than creating original material through primary research with participants.

Data

Client and agency division information
Evidence to be processed

Purpose

Define product context
Create overall design direction

LITERATURE REVIEW & HARDWARE ASSESSMENT

Distilling information from published sources on previous research or projects as they might inform the current project.

Data

Agency documentation, training, directives, etc.

OCR technology solutions

Purpose

Define product context

Understand the market and competition

CONTEXTUAL INQUIRY

Immersive observation and interviewing of people that reveals underlying (and invisible) work structure.

Data

Visits to 5 field offices

Six 2-hour sessions

Purpose

Understand our future users, their environment and current processes.

Uncover tacit knowledge.

SYNTHESIS

STAKEHOLDER RESPONSIBILITY MATRIX

Mapping the key participants and their responsibilities within the defined investigative and processing workflow.

Purpose

Understand the varying roles and needs for the new solution.

Identify the primary user to keep in mind when making design decisions.

TASK ANALYSIS

Breaks down the constituent elements of a user's work flow, including actions and interactions, system response, and environmental context.

Data

Observed steps

Discrepancies

Pain points

Purpose

Understand the primary user's current sequence of tasks so that the future solution could enable their completion.

SYSTEM MODEL

Visualizing the interactions, connections and breakdowns among the actors, artifacts and technology.

Data

Observed steps

Discrepancies

Pain points

Purpose

Analyze the communication and data flows among the various elements of the observed system

CURRENT SYSTEM MODEL

Visualizing the interactions, connections and breakdowns among the actors, artifacts and technology.

Data

Observed steps

Discrepancies

Pain points

Purpose

Analyze the communication and data flows among the various elements of the observed system

KEY FINDINGS

Lack of automation causing significant delays and breakdowns within the entire process.

Manual processing and entry of information was very tedious and allowed for human error.

Purposeful **omission of information** occurred to speed up the process.

Overwhelming amounts of evidence and related information.

Untimely intelligence gathering.

DESIGN IMPLICATIONS

Integrate with existing systems and databases to **close the information gap**.

Use high-speed scanners to **automate the intake** of evidence and related information.

Use OCR technology to provide efficient, complete and **accurate records**.

Provide **contextual information** to aid in intelligence gathering and pattern identification.

Create a **unified methodology** to help standardize processing.

Daily Activity

Today

Jan 23

Jan 22

Jan 21

Last Week

Jan 18

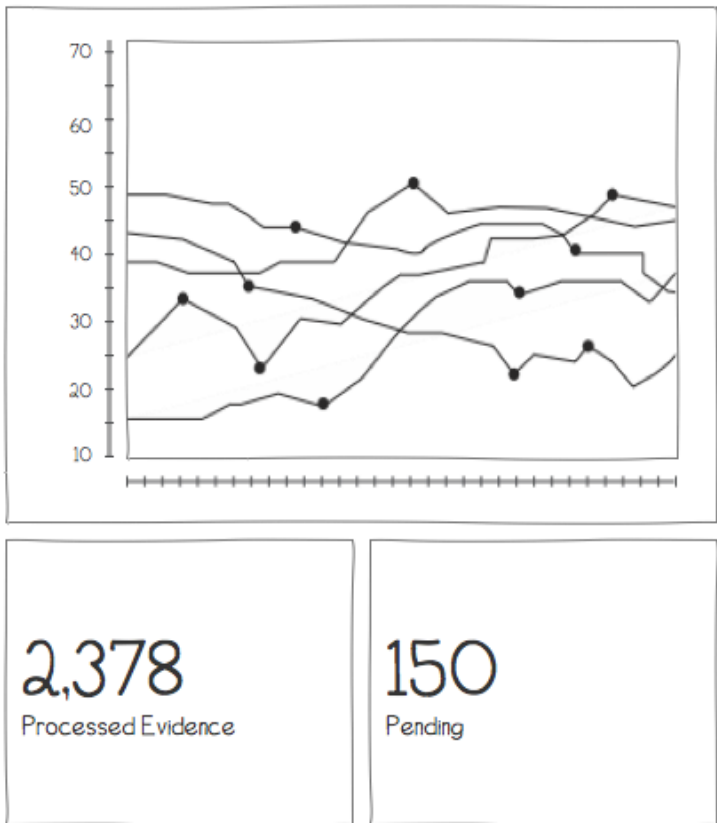
Jan 17

Jan 16

Jan 15

Jan 14

Analytics



Reminders

- ☐ Aenean orci felis, viverra in fermentum et, laoreet ut purus. Integer vehicula. by mm/dd
- ☐ Aenean orci felis, viverra in fermentum et, laoreet ut purus. Integer vehicula. by mm/dd
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Monthly

Jan

Apr

Jul

Oct

CONCEPT DEVELOPMENT

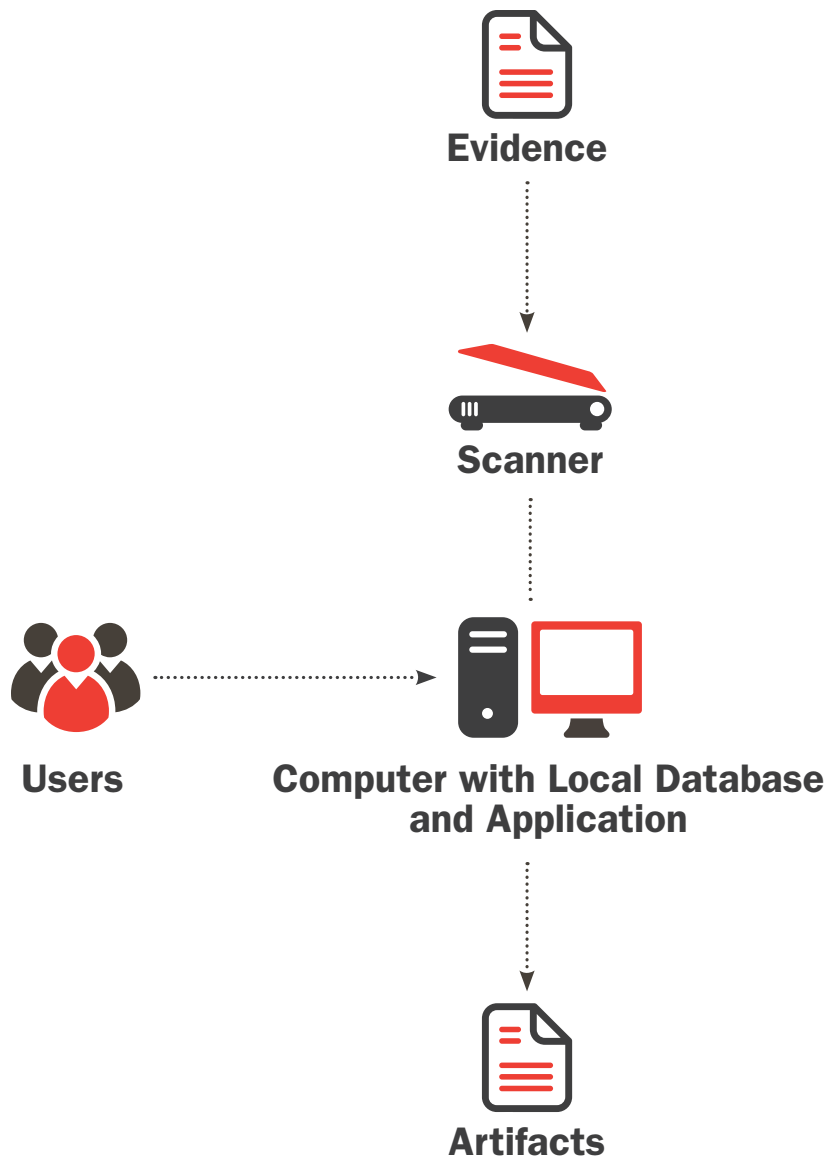
SYSTEM COMPONENTS MODEL

Visualizing the key components of the new solution.

Purpose

Begin to develop a new approach to processing paper-based evidence.

SYSTEM MODEL (SIMPLIFIED)



SYSTEM & USER WORKFLOWS

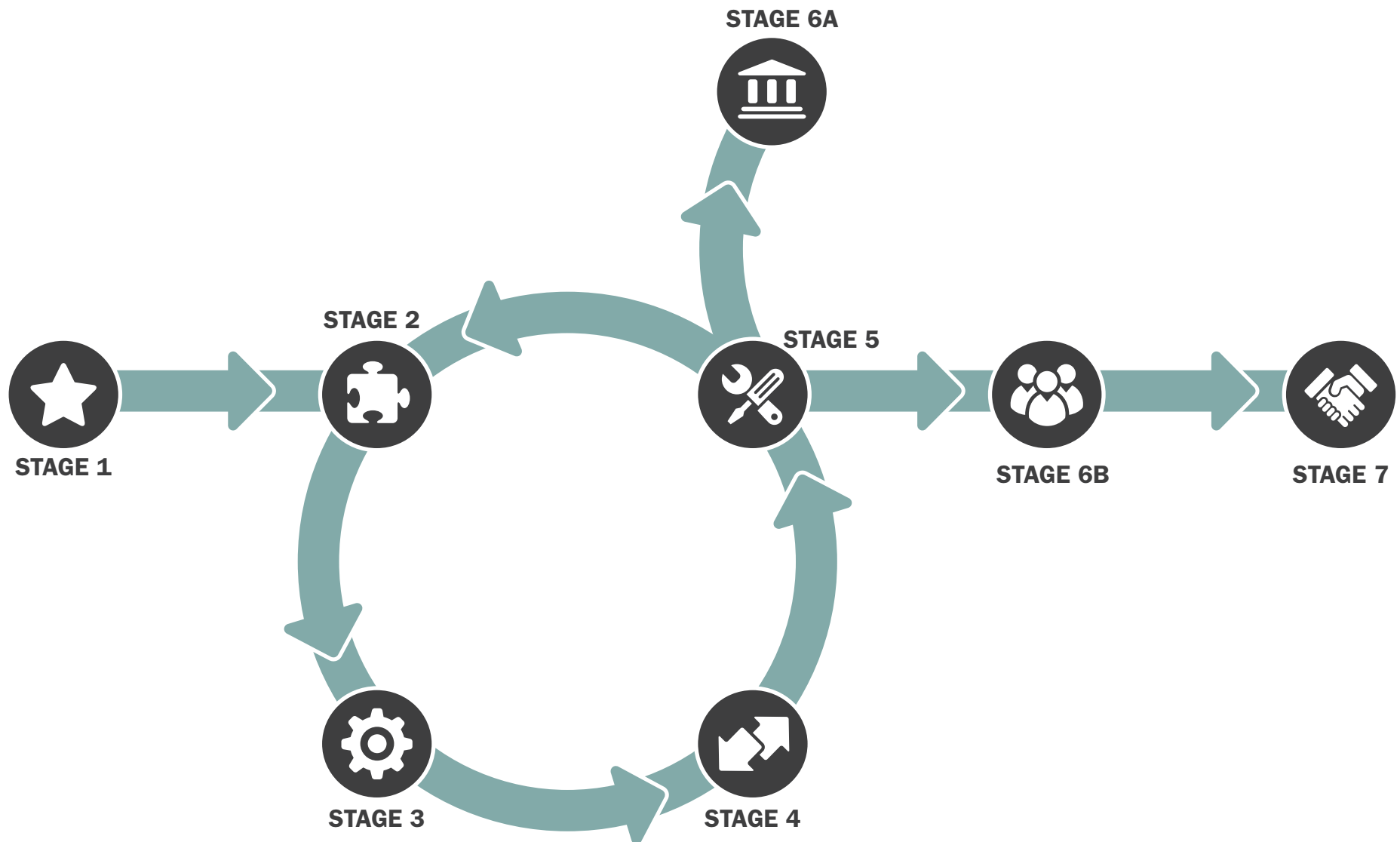
Defining the overall system stages and the individual steps a user would take to process the evidence using the new software and hardware solution.

Purpose

Define a unified methodology and approach for evidence processing.

Define specific software and hardware requirements.

SYSTEM WORKFLOW 1 (ABSTRACTED)



USER WORKFLOW 1 (ABSTRACTED)

★ Stage 1	🧩 Stage 2	⚙️ Stage 3		
1 Step Description				
2 Step Description Further instructions or notes about Step 2.	5	9 Step Description Further instructions or notes about Step 6.		
		10	Step Description Further instructions about Step 6.	
3 Step Description Further instructions or notes about Step 3.			6	11
4 Step Description Further instructions or notes about Step 4. Another note about Step 4. Instructions on how to handle a special use case during Step 4.	Step Description Further instructions or notes about Step 5.			
	7 Step Description	Further instructions about Step 5. Another note		
	8 Step Description	Instructions on how to handle a special use case during Step 5.		

SYSTEM & USER WORKFLOWS

Defining the overall system stages and the individual steps a user would take to process the evidence using the new software and hardware solution.

Purpose

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WIREFRAMES

Visualize the identified requirements and establish content and functionality in the form of a simplified graphical user interface.

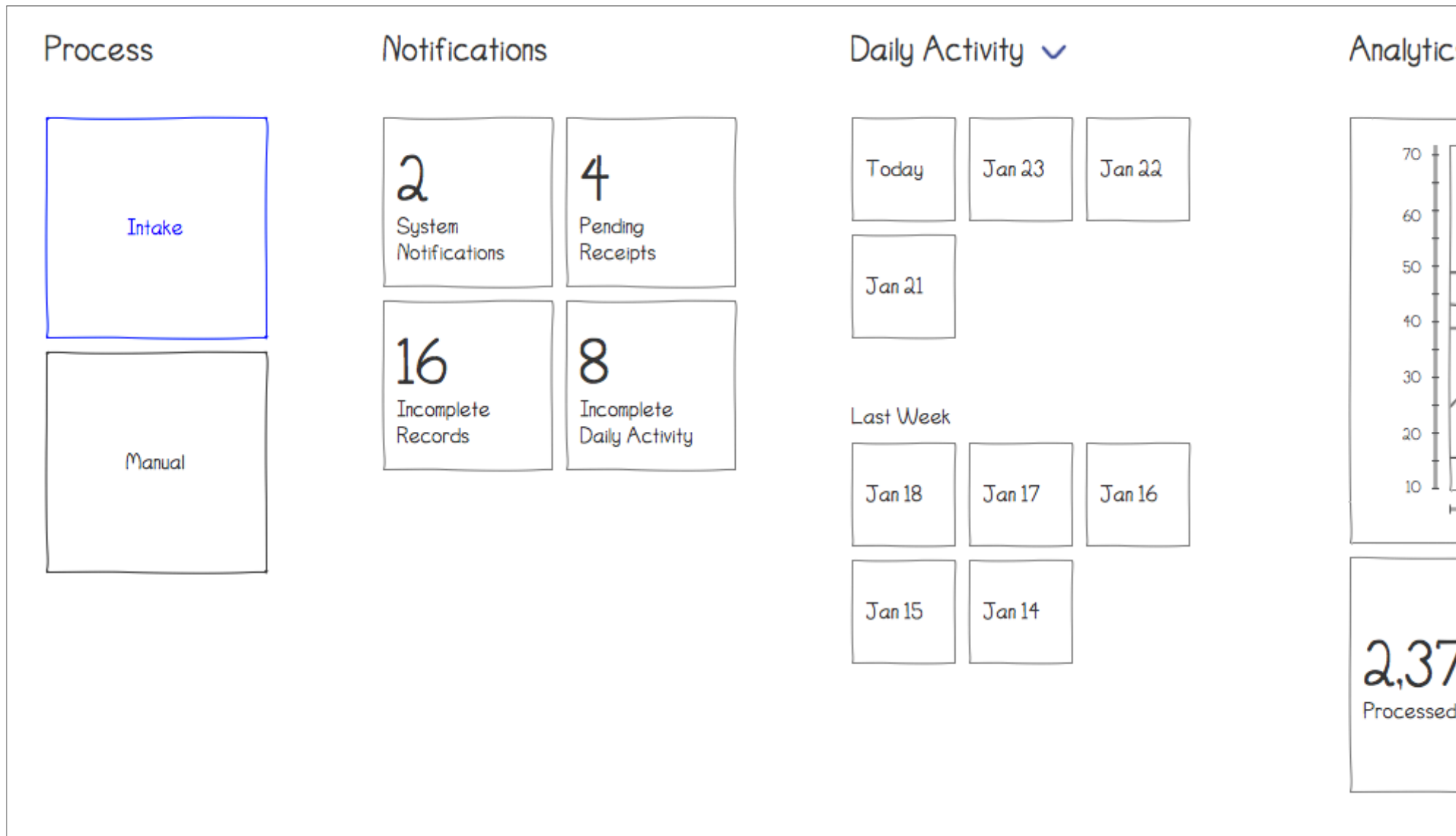
Purpose

Establish core functionality.

Validate high level requirements with the client.

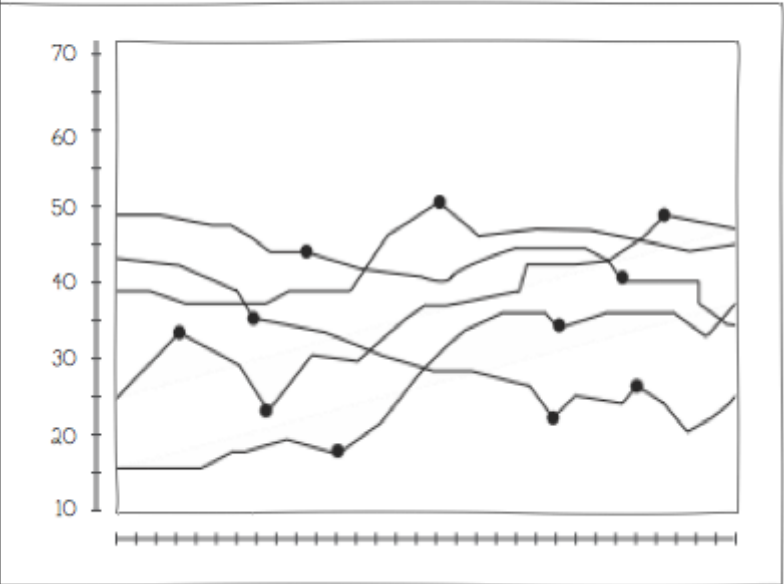
Validate concept and overall workflow.

WIREFRAME 1 (ABSTRACTED)



WIREFRAME 1 (ABSTRACTED)

Analytics



2,378
Processed Evidence

150
Pending

Reminders

- ☐ Aenean orci felis, viverra in fermentum et, laoreet ut purus. Integer vehicula. by mm/dd
- ☐ Aenean orci felis, viverra in fermentum et, laoreet ut purus. Integer vehicula. by mm/dd
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Monthly Activity

Jan	Feb	Mar
Apr	May	Jun
Jul	Aug	Sep
Oct	Nov	Dec

CONCEPT VALIDATION / TESTING

Combining wireframes, task completion analysis, usability testing and a survey, we created an interactive PDF to test the concept.

Data

4-hour teleconference call with 27 participants from 24 field offices.

Purpose

Validate concept with future users.
Get feedback for future iterations.

CONCEPT VALIDATION / TESTING

Structure

WORKFLOW: Identifying workflow breakdowns.

USER INTERFACE: Stepping through a scenario to evaluate task completion.

CONCEPT: Rating the overall system concept.

EXPERIENCE: Giving feedback on overall experience with the system and its potential.

CONCEPT VALIDATION / TESTING

Usability Metrics

Task completion

Critical errors

Non-critical errors

Subjective evaluations



IMPLEMENTATION

PAPER-BASED DATA CAPTURE FORMS

Recording session feedback in the absence of remote testing technology and direct observation.

Purpose

Gather feedback from participants to further improve the solution and user experience.

Gather metrics on process improvement.

PAPER-BASED DATA CAPTURE FORMS

	Day 1	Day 2	Day 3	Day 4	Day 5
How much evidence did you scan?					
How long did it take?	START hh:mm END hh:mm	START hh:mm END hh:mm	START hh:mm END hh:mm	START hh:mm END hh:mm	START hh:mm END hh:mm
Was any evidence unscannable?	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
If yes, • How many? • Why? (e.g., Torn? Taped? Fragile?)					

RETROSPECTIVE THINK-ALLOUD PROTOCOL

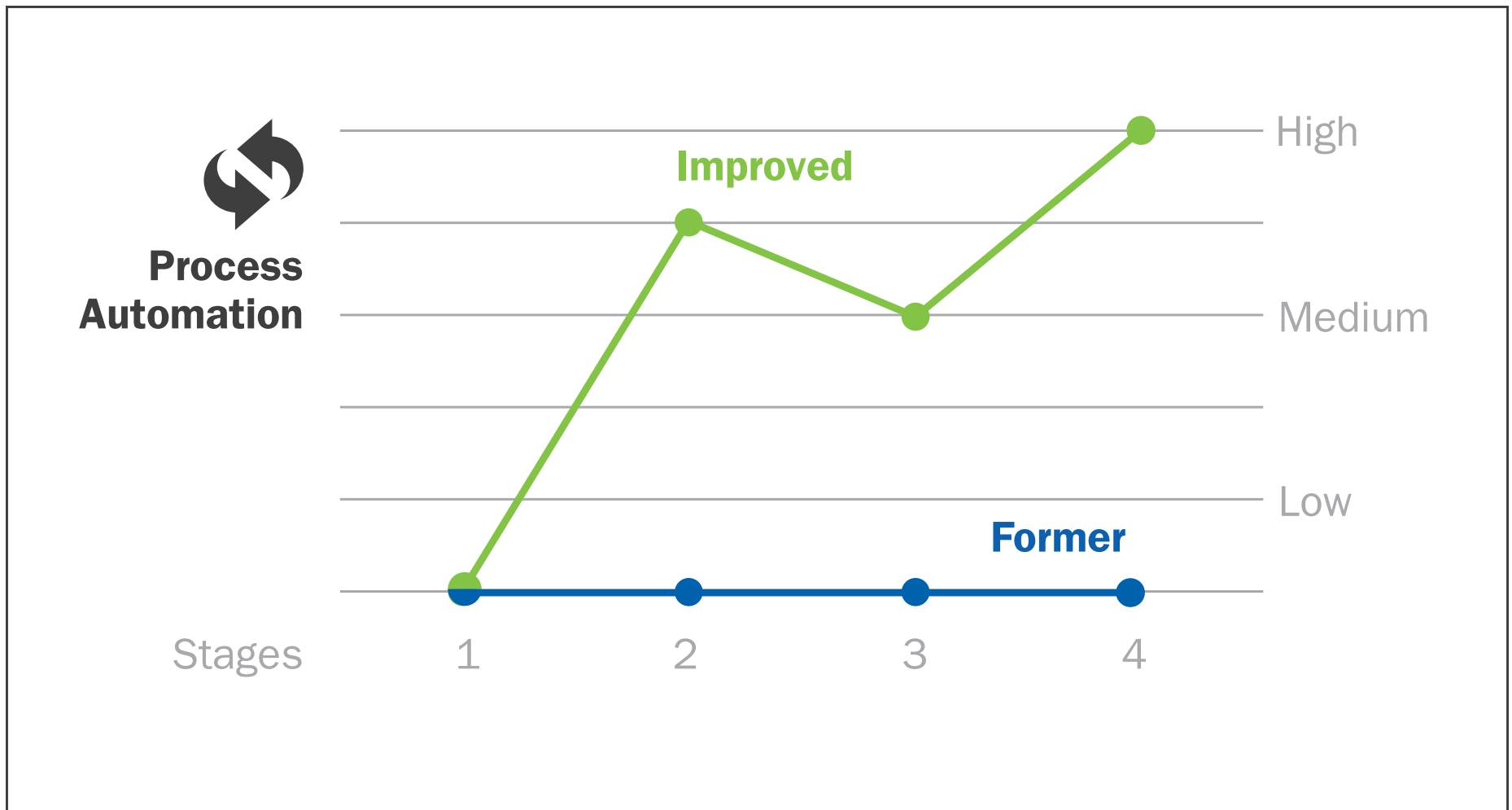
Verbalizing retroactively the feelings and thinking after task is completed, also revealing the reasoning, intentions and strategy behind a task.

Purpose

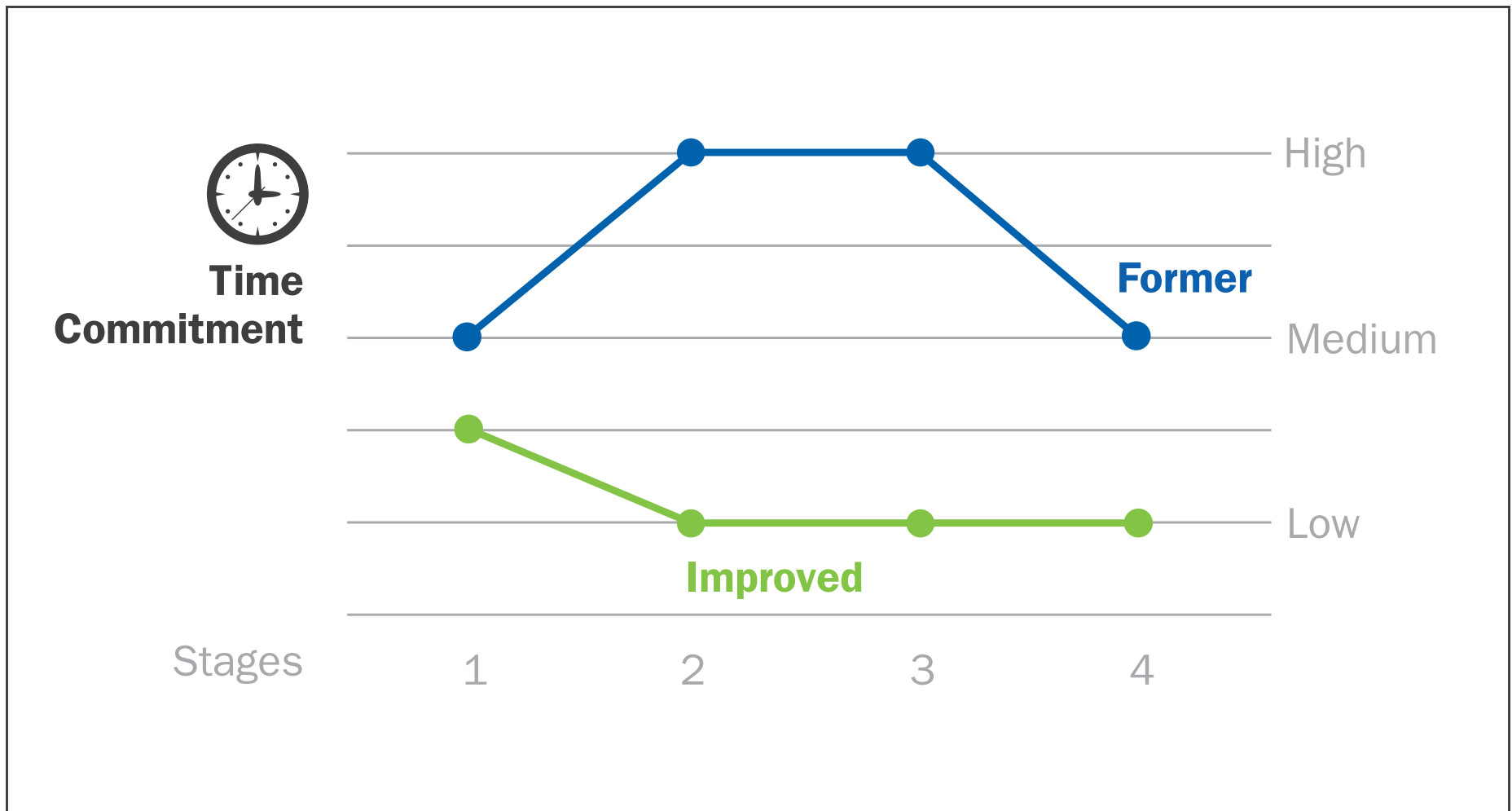
Gather feedback from participants to further improve the solution and user experience.

CONCLUSION

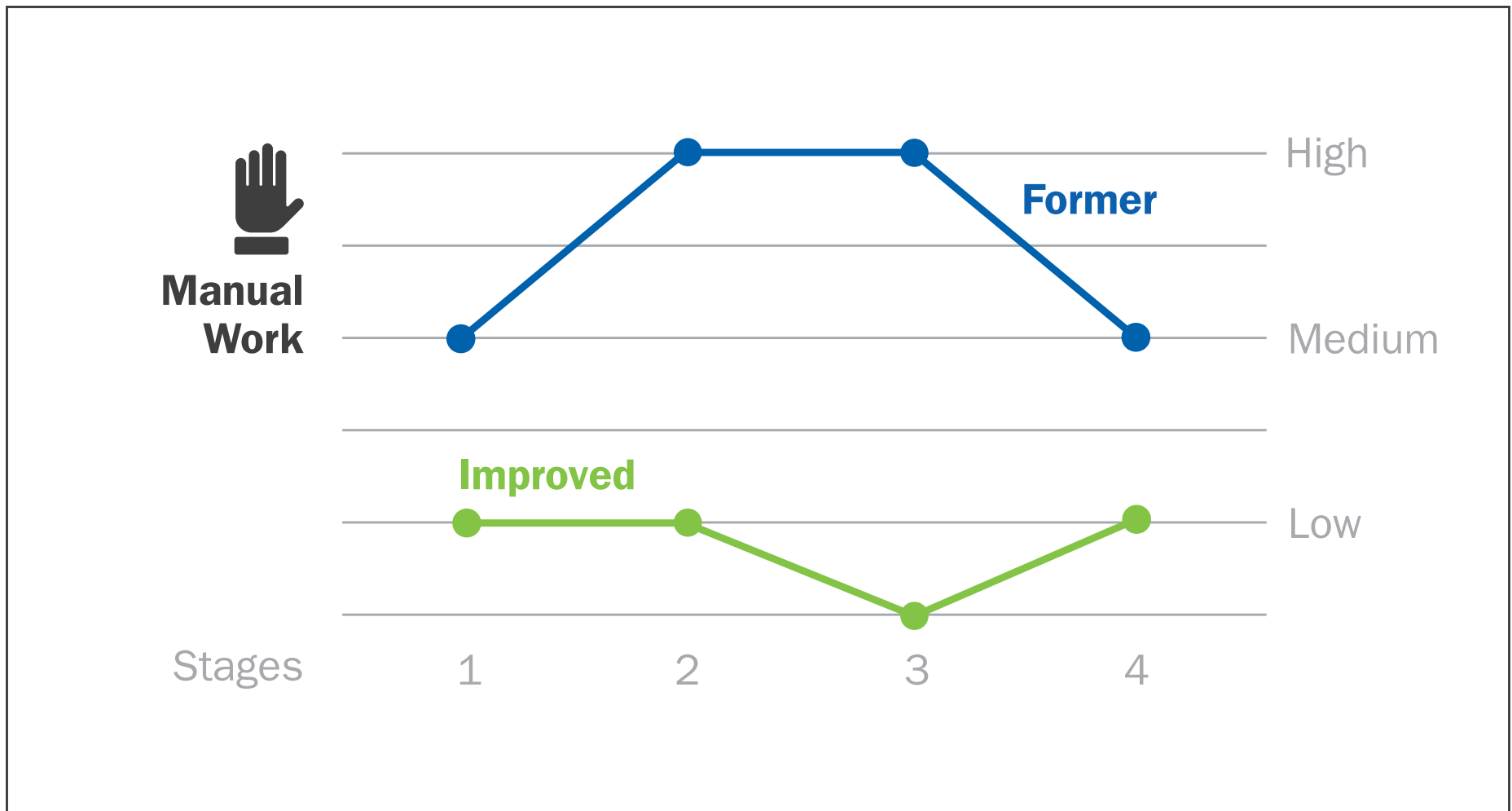
PROCESS IMPROVEMENT



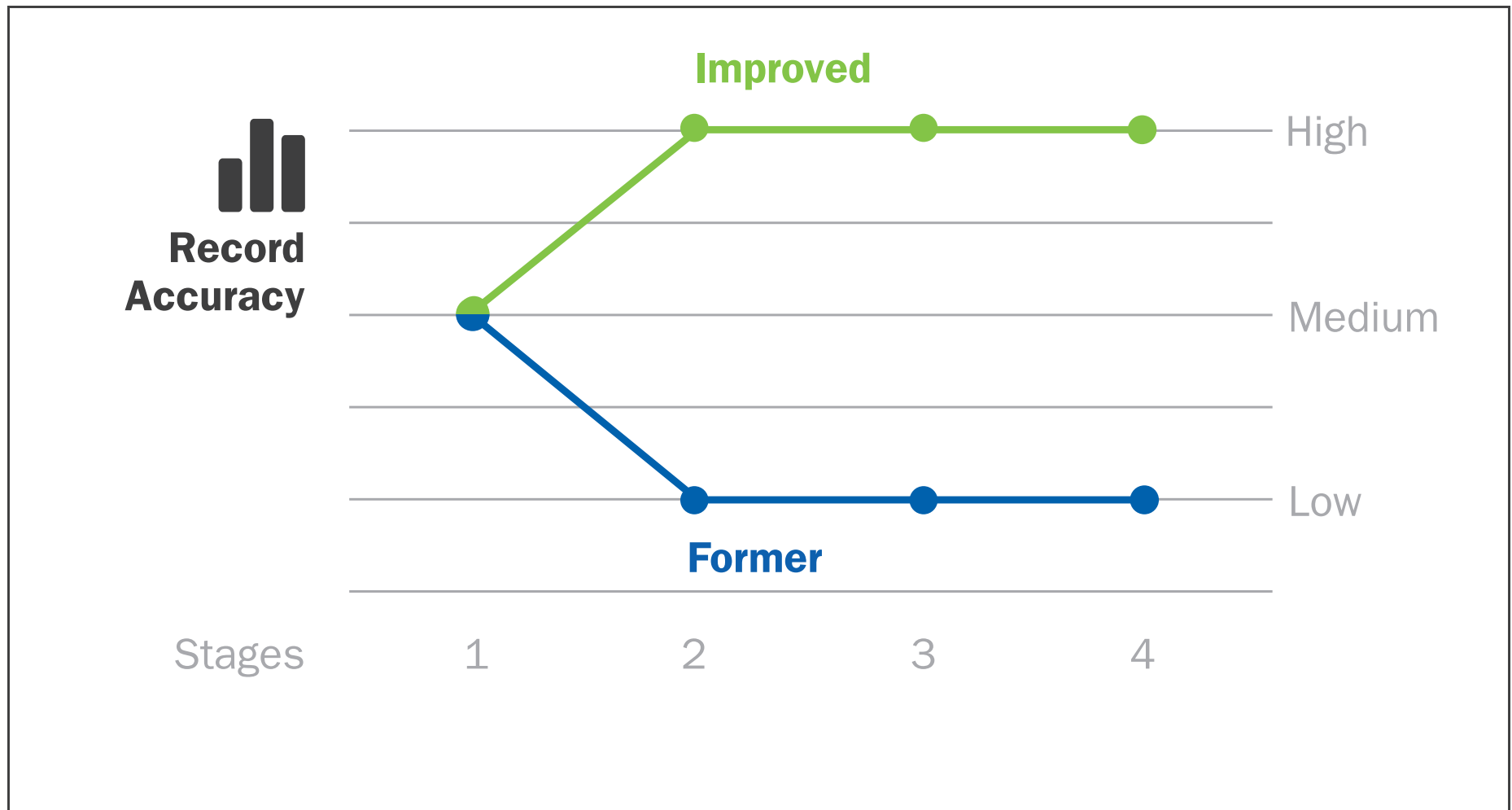
PROCESS IMPROVEMENT



PROCESS IMPROVEMENT



PROCESS IMPROVEMENT



THANK YOU!

SOURCES

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