

A dark blue-grey background with white snowflakes falling. In the center, there is a black silhouette of a bare tree with many branches. Behind the tree, several green, rounded shapes representing hills or mountains are visible. The foreground is a light grey surface with small, dark, jagged shapes scattered across it.

Developing innovative banking mobile app

Using IBM Garage Approach

Say Hello To Our Team.

Work Smart, Play Hard



Victor Tan



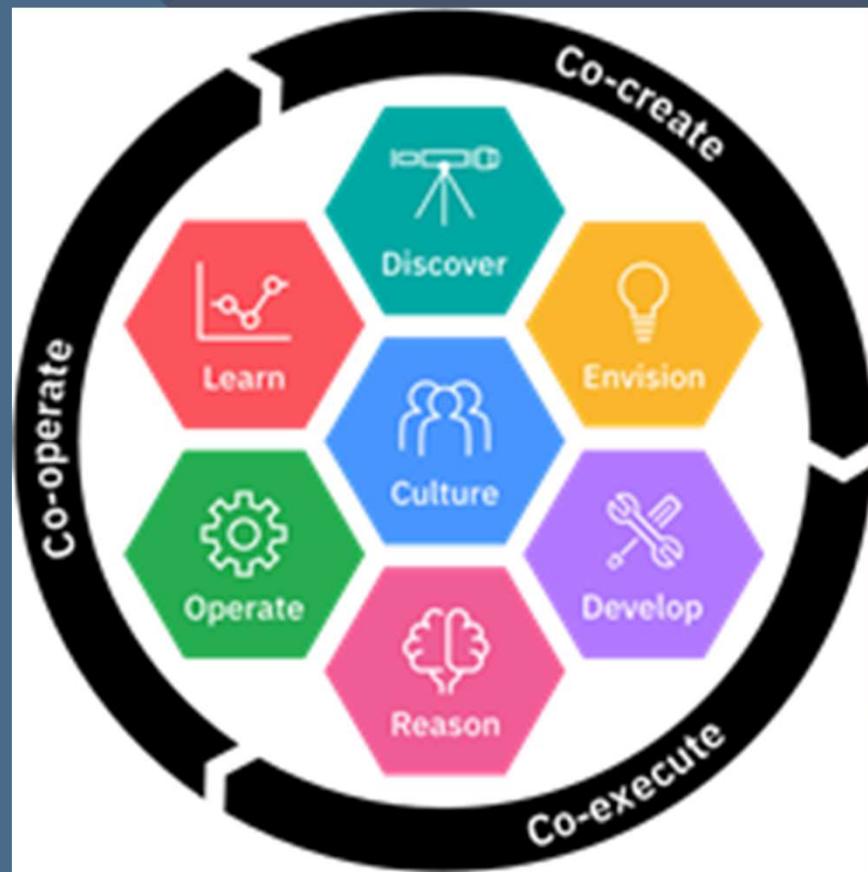
Gary Yeo



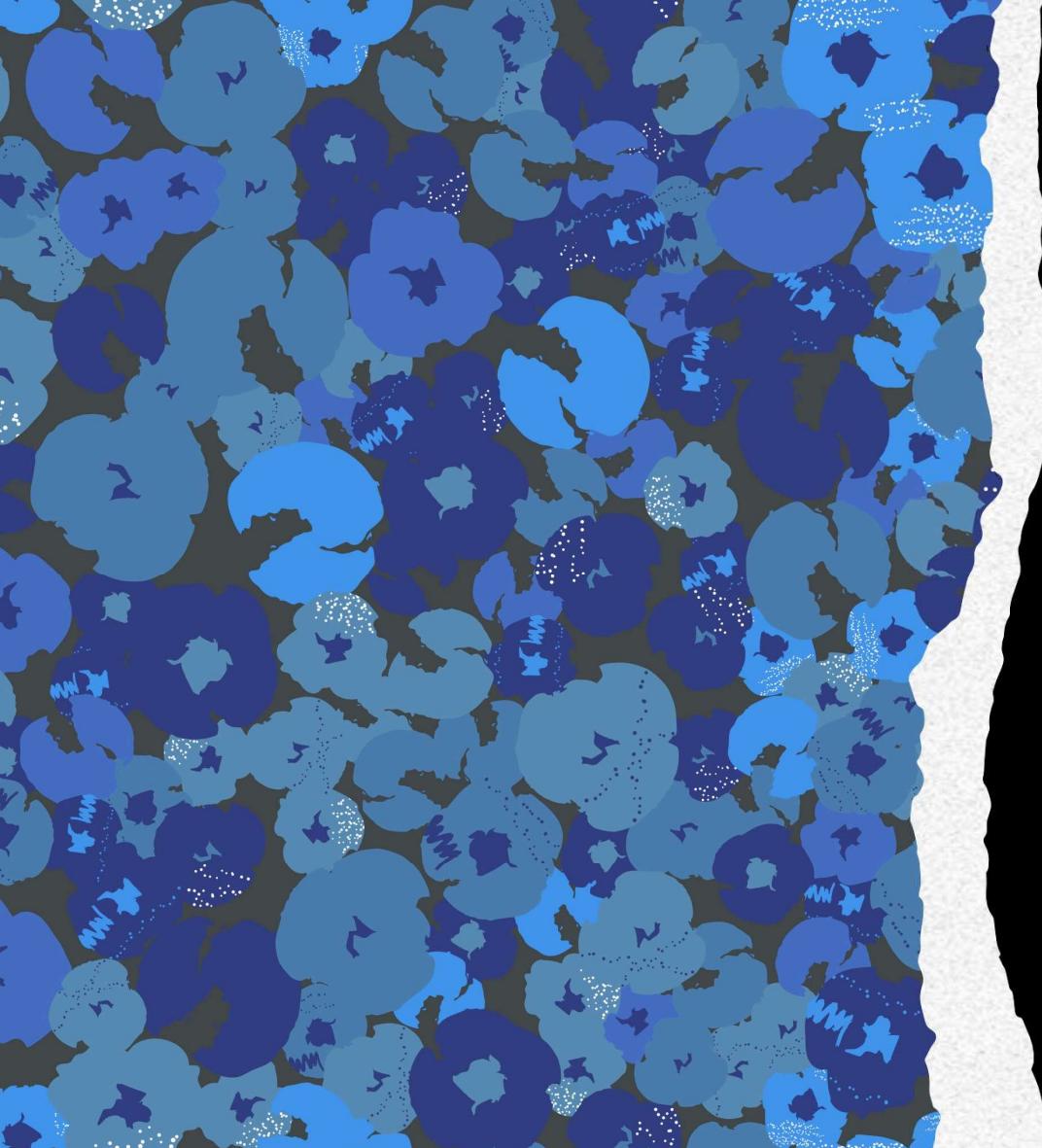
Po Po



Jane Wong



IBM Garage Methodology



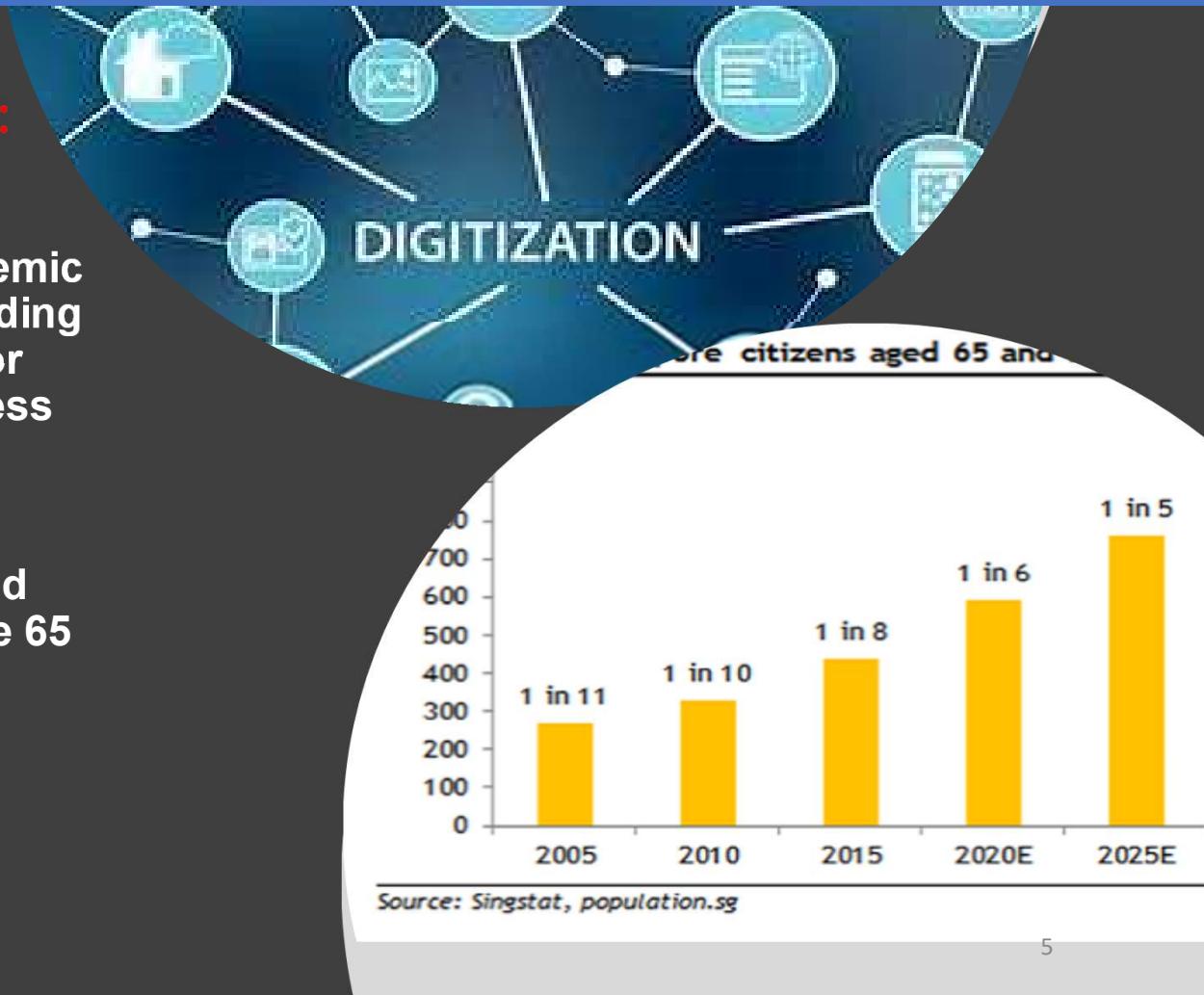
Discover

Dig deep into your problem domain, align everyone on common goals, and identify potential problems and bottlenecks.

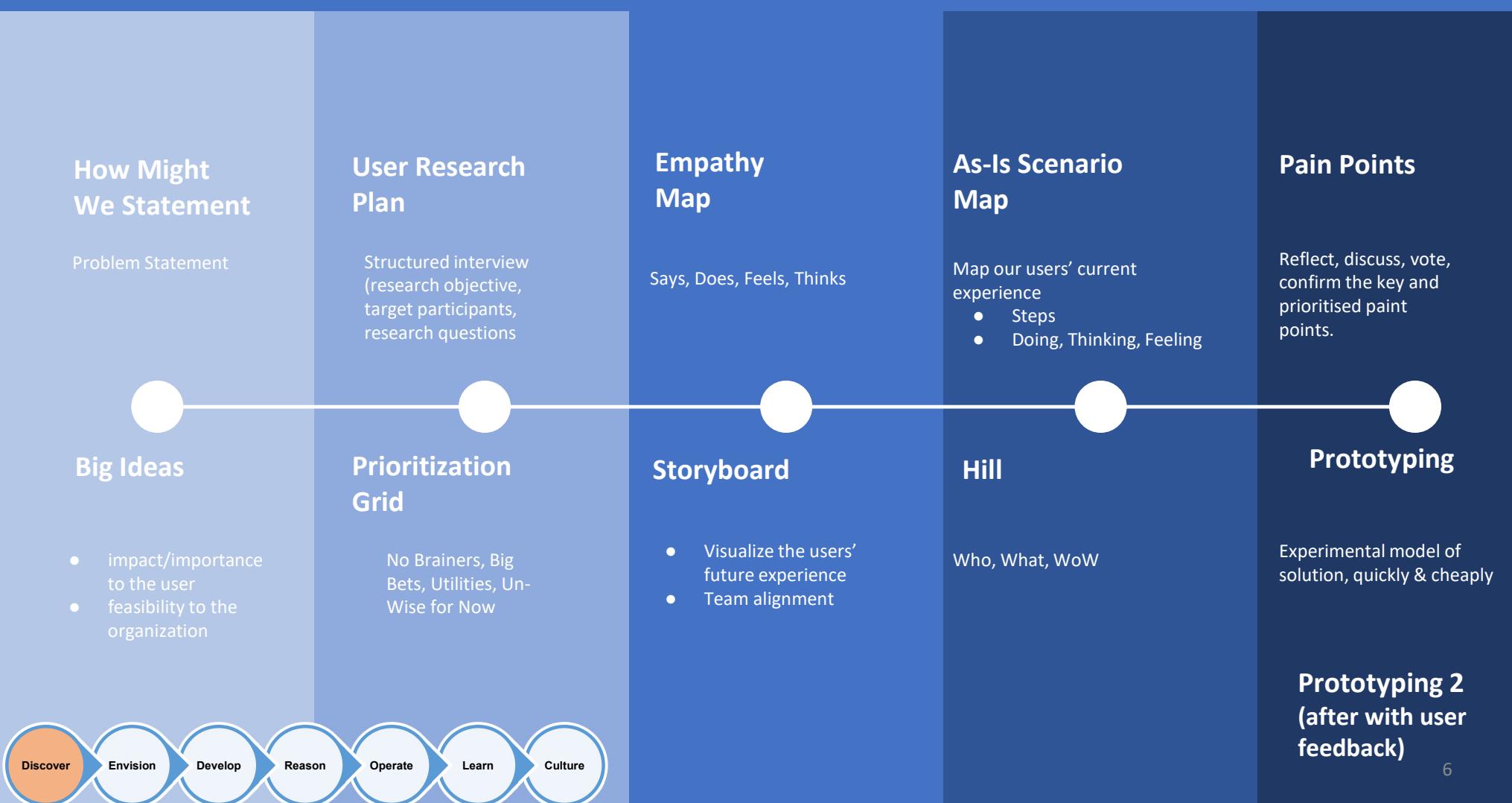
Singapore's Challenge And Why Should Businesses Care?

Technology and older persons:
Ageing in the digital era.

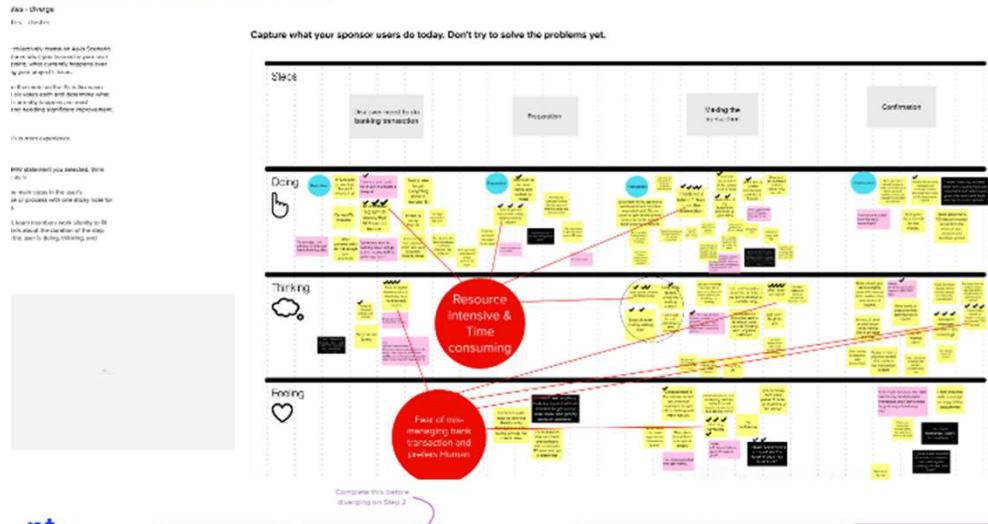
- **Economics** - The covid 19 pandemic has accelerated the world, including Singapore, in seeing the need for digital transformation for business growth and to stay competitive
- **Social** - By 2035, it was estimated that 32% of Singaporeans will be 65 years old or older.



IBM Enterprise Design Thinking



Organize User Research in an As-Is Scenario Map



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Discover

Potential Design Spaces to Consider

Think about a problem space that your team has a common understanding of the user's experience.

Tip: We encourage you to be creative, looking for a design space that aligns with your team's current focus. Don't be afraid to think outside the box or address the new normal. For example, how about something like the National Day Parade in the midst of a pandemic?

Here are some examples to consider/pivot off:



Whom does it concern?

Your user should be someone whom you can easily find so that finding sponsor users for your interviews and validating your prototype is easy.

Tip: Try to think about your users whom you know has unique needs that are not met today and needs help.

Here are some examples:

Shoppers →

- Doctors →
 - Elderly from living in HDB
 - House wife/House husband

What does the user want to accomplish?

Consider a task that doesn't require knowledge. It should be something members can relate to.

Here are some examples:

Improve the online shopping experience

Improve online booking for lodging account (new normal after traveling is allowed)

ona

love

Add the participant details that will be used throughout the 'Introducing' interview as needed.

If the participant details are not in the sample of the user, then they are to other people's details. Add them to the 'Profile of the interviewee' and save them to local file.



Name: Meenakshi

Profile

Age: 42

Gender: Female

Role: Primary Caregiver

Family: Living with husband

Hobbies: Travel, Photography

Workplace: MNC, London based, customer service, manager

Participants

Criteria for screening participants that target user:

If you interview?

Will have to interview at least one user.

At 5

layout the situation you're working with and the problem you're trying to solve. Interviewees can be stakeholders. Even a small sample of interviews can generate a wealth of data.

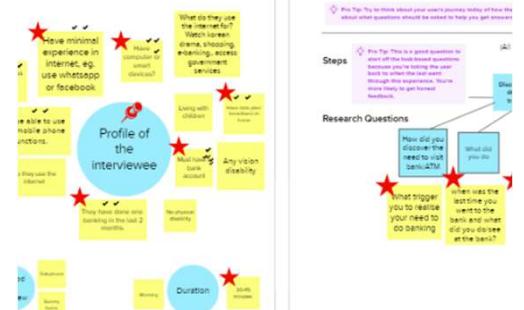
New Participants

Criteria for screening participants that target user:

If you interview?

Will have to interview at least one user.

At 5



1. Selected an interviewee from the list of eligible candidates. Consider how the user is currently using what he is doing in his/her daily life.

2. The user selected the 5th user in the list because she had more time available.

3. The user selected the 5th user in the list because she had more time available.

4. When the user selected the 5th user in the list because she had more time available.

5. Because if I select the 5th user in the list because she had more time available.

6. Consider to a user who is not too anxious.

7. Feedback of AKA and her family



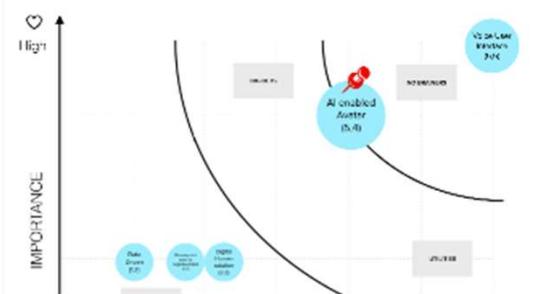
Resource intensive & Time consuming

Fear of mis-managing bank transaction and prefers Human

Summarize Votes in a Prioritization Grid

6-12 minutes

- After voting, summarize the overall user needs prioritization grid. The most voted ideas have priority to the top right of the grid, meaning they're the most important user needs that should be focused on first.
- Accurately prioritize the remaining user needs.
- Tell about the User In the Gap Deck: "What are the ways to make them more happy? How affect the idea in the User In? Can we make the idea more valuable if it includes the user needs?"



User Ideas

1. Create user storyboard
2. Storyboard
3. User persona
4. User persona
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100. User persona



Original HMW Statement:



Reframed HMW Statement:

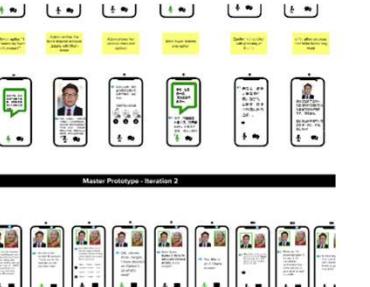
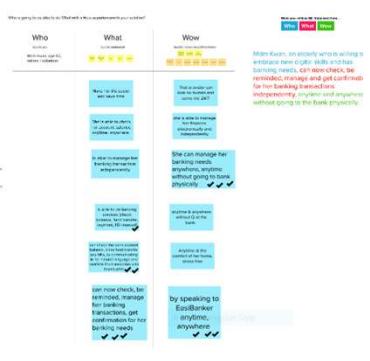


Given user's experience and achieve the user's goal of your project. Then 10 screens that depicts your application.

Remember to consider all angles and work in a complete idea that has led up to this point.



Master Prototype - Iteration 2



How might we make it easier for elderlyies to use internet banking?



AI enabled Avatar bank app

Make every detail simple & interactive and accessible at anytime & everywhere.



Business Opportunity Statement:

Improve the experience of interactive and engaging online banking services for the elderly.

Users of our target group of elderly struggle today because **they prefer human interaction. They do not see the need to use internet banking. There is also the fear for the security of their funds.**

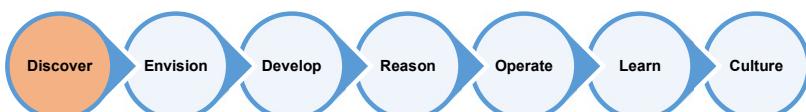
Solving this will be good for our businesses because there will be a **20% reduction in operation cost**, we will achieve and improve customer satisfaction through the new digital experiences and thus generate revenue from other channels for the rapidly increasing number of elderly in the population while Singapore continues to evolve digitally.



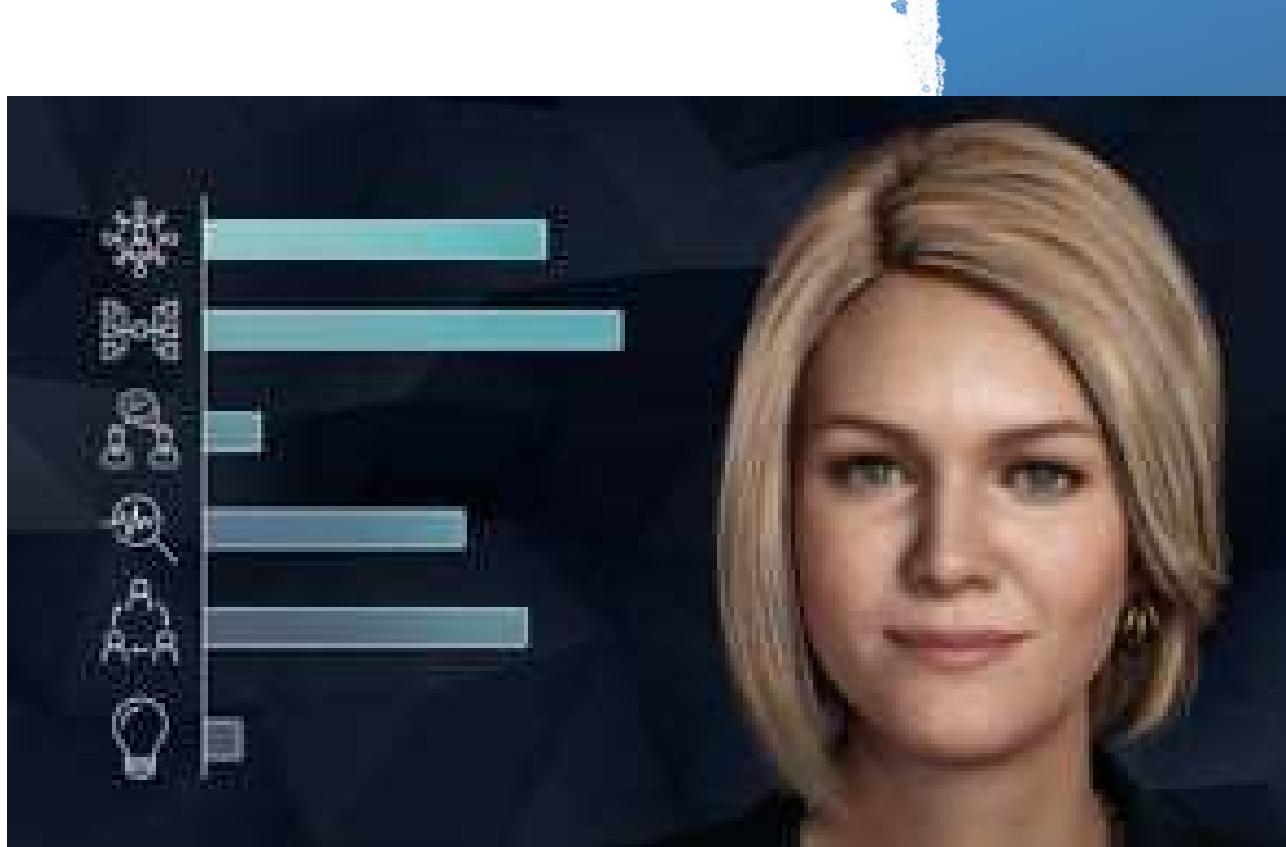
U.S. bank leverages AI to simplify customer service

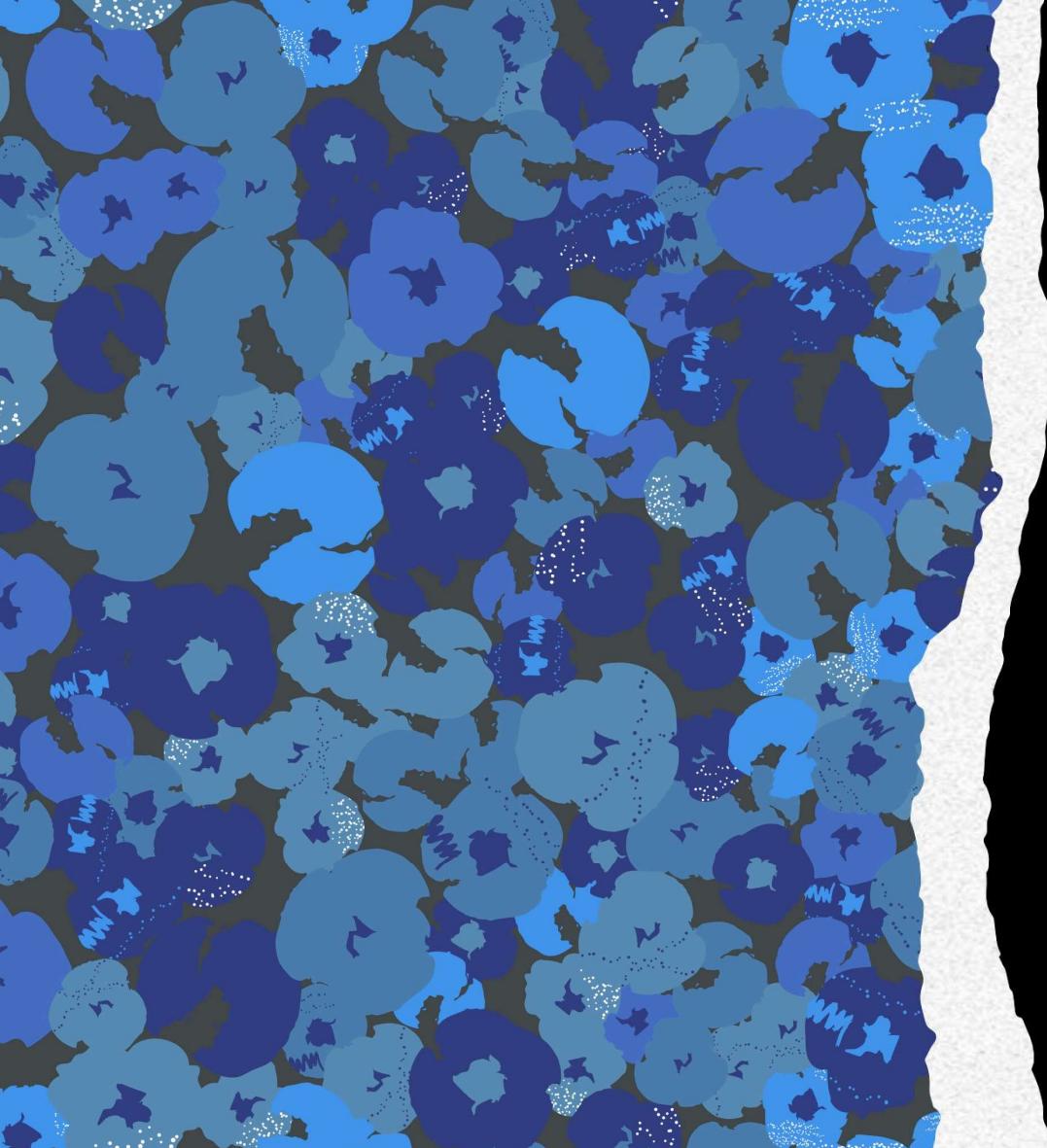
A U.S. bank deployed cognitive computing customer care capabilities for its contact center transformation, which led to cost savings through reduced call volumes, lower average handle times, increased customer satisfaction and improved customer experience. The bank's self-service virtual banker solution drives and services customer calls from start to finish and has serviced 700,000 calls already— equivalent to the amount of work done by 55 contact center reps. The AI-enabled solution also empowers contact center representatives to respond much faster to customer queries. The company is expecting USD 6.2 million in annualized benefits over five years with more than a 50 percent completion rate and 85 percent accuracy rate.

Source: IBM Institute for Business Value



Hello to Amelia – Conversational AI





Envision

Incrementally deliver awesome apps by using Enterprise Design Thinking and related design practices to establish a repeatable approach to rapidly deliver innovative user experiences.

Persona



Name Mdm Kwan

Profile

Age	62
Location	Bishan
Education	Primary
Job	Retiree / Volunteer
Family	Living with husband
Work experience	Personal Assistant
Technical literacy	YouTube- Korean drama; FaceBook; Whatsapp

Motivations

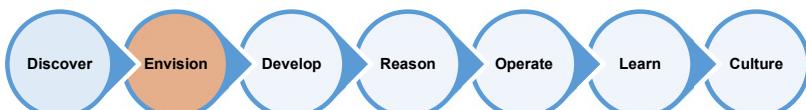
- Keep track of FD maturity
- Higher passive income
- Manage her retirement funds

Goals

- Place FD at the best rates
- Complete the banking transaction within 15-minutes
- User-friendly process, complete within 5 steps,

Needs

- financial stability- manage her finances independently
- Social engagement - connected lives
- Active lifestyle - be informed and constantly upgrading herself and learn more things



Slide 14

pp1 I suggest to give a few more assumptions, hypotheses and have specific outcomes and relate them back to the first iteration and user feedback which we did under EDT. on 2nd thought, the one we have a little overgeneralized and simplified. We can have a few MPV statement based on the 2nd iteration...
popo poh, 3/5/2021

pp2 I am reminded that this is a business proposal, if i am the boss, i will want to know more about the risks involved, outcomes for different assumptions and hypotheses that we can think of...
popo poh, 3/5/2021

pp3 suggest that we elaborate and expand a little more on some of the points on separate slides, especially those parts under envision...

Assumptions that we can think of include -

User will feel safe to use the apps

User will have no issues texting messages

User will not need the service after office hours

User is able to understand simple English/Mandarin

User is able to navigate the app to have their needs met

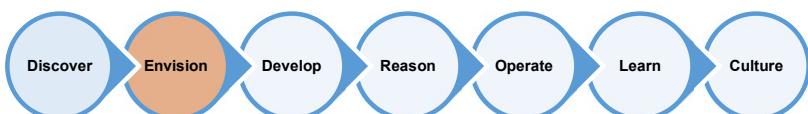
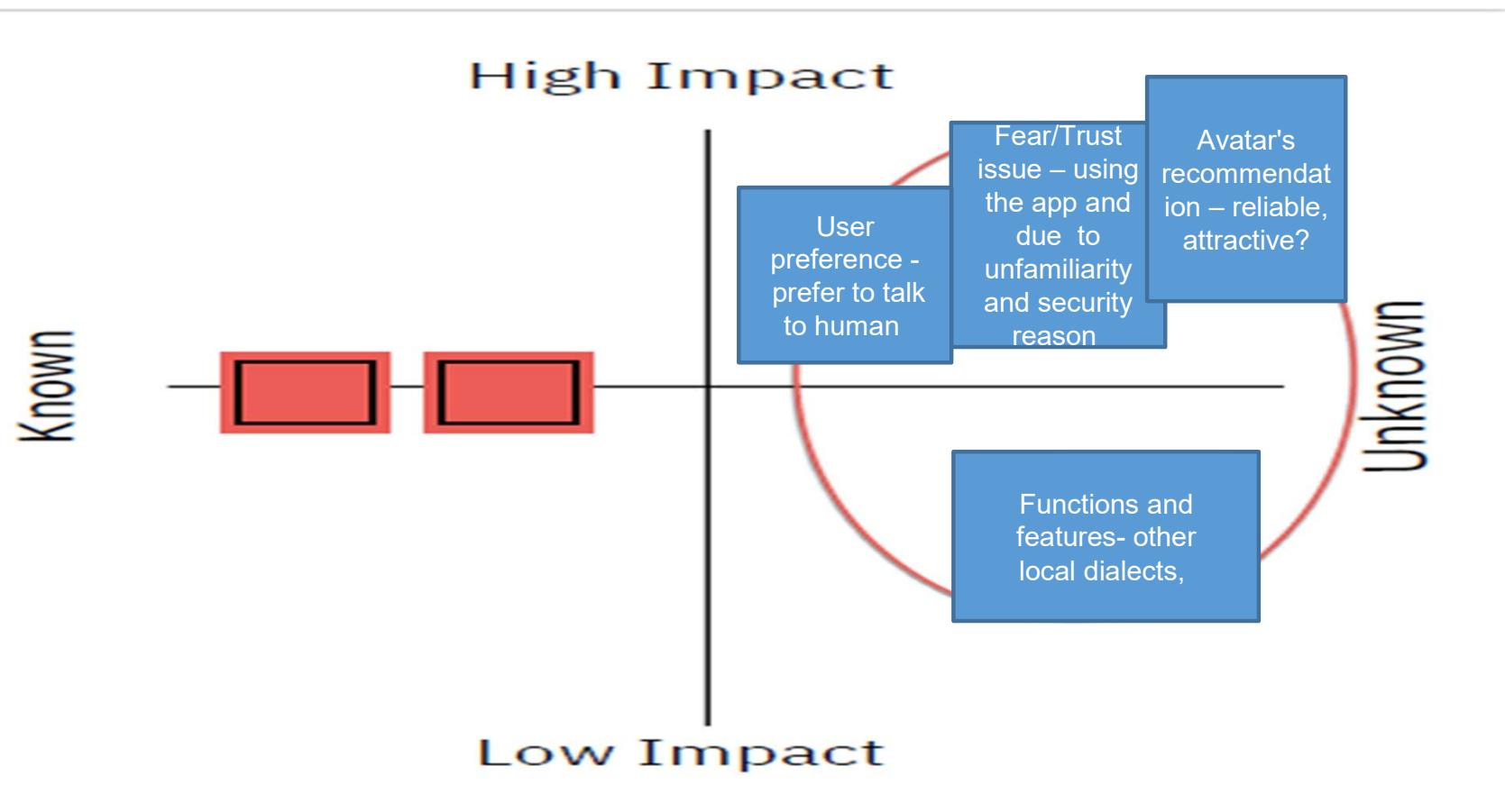
popo poh, 3/5/2021

MVP Identification of Assumptions & Risks

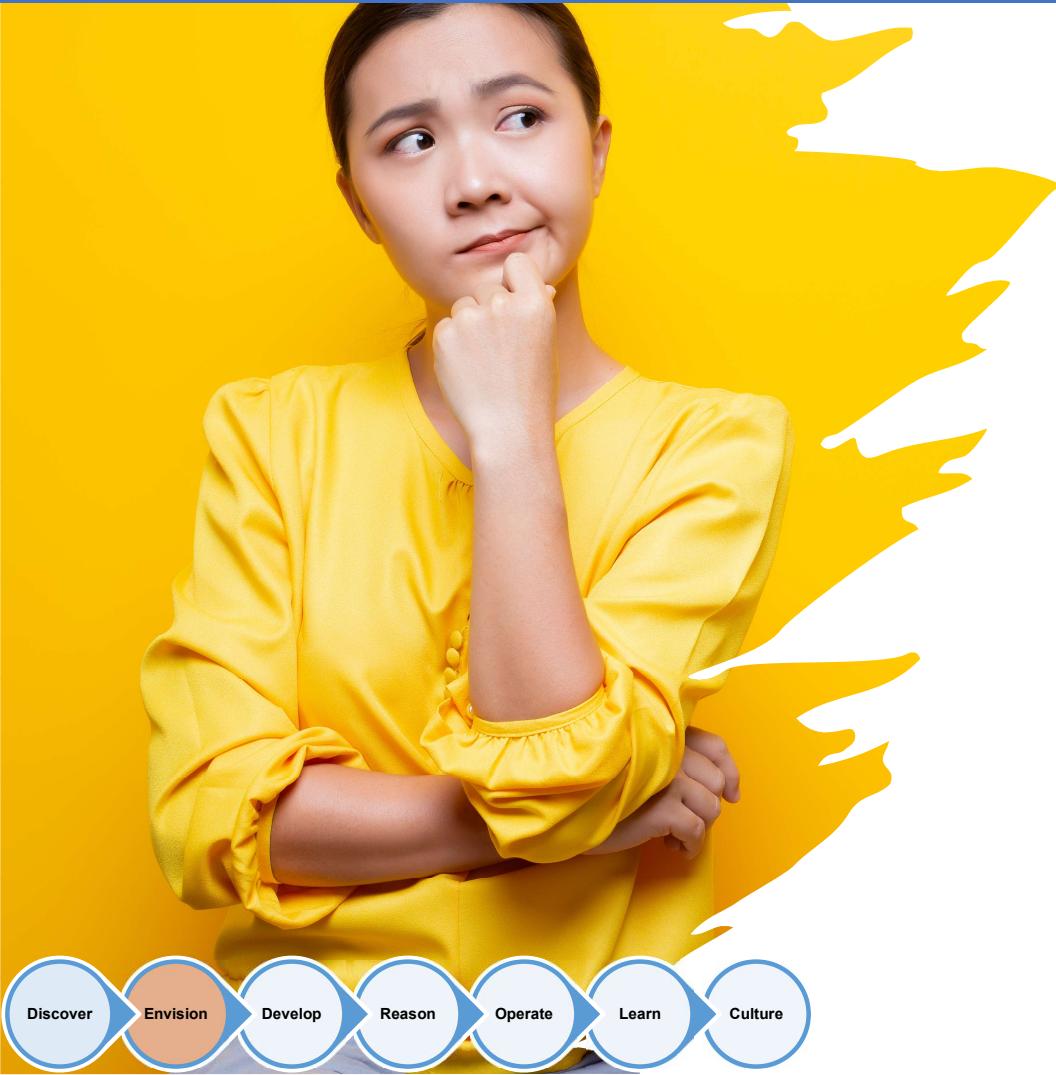
Assumption	Risk
User will feel safe to use the app	User will not feel secure and safe to use the app
User will not need the service after office hours	User will need the service after office hours
User is able to navigate the app to have their needs met	User finds it challenging to navigate the app to meet their banking needs
User will trust the recommendation provided by the app	User will not trust the recommendation and will turn to other banks for banking needs
User is able to speak and understand simple English/Mandarin/Malay/Tamil language	User will not be able to speak and understand simple English/Mandarin/Malay/Tamil language.



MVP Assumptions & Risks by impact



MVP Hypothesis statement



If we provide Mdm Kwan with her fixed deposit renewal via online service, we will observe:

- 100% secure personalized information platform
- Interactive digital human available at anytime (24/7) and anywhere (via internet connection)
- Decision support and augmentation in user experiences (*last best experience becomes the minimum expectation)



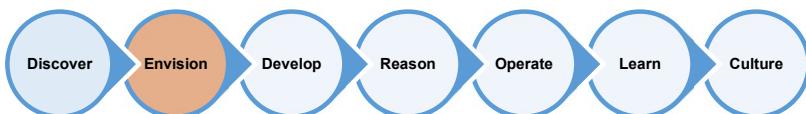
MVP Goals and Future Goals

Goals:

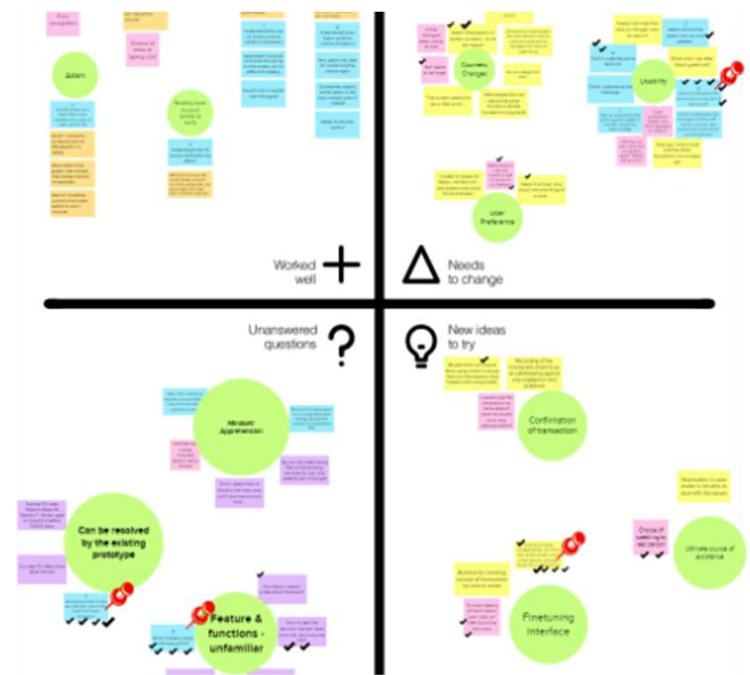
- Integrated with existing back-end systems
- Lively updates (e.g. timely and reliable) on customer profile and product information
- Secured platform
- Digital human
- Multi language capabilities

Future Goals:

- Business model - ecosystem innovation
- New population segment – youth group
- Multi local dialect capabilities



MVP Feedback grid, validation, playback



MVP Statement

MVP Statement

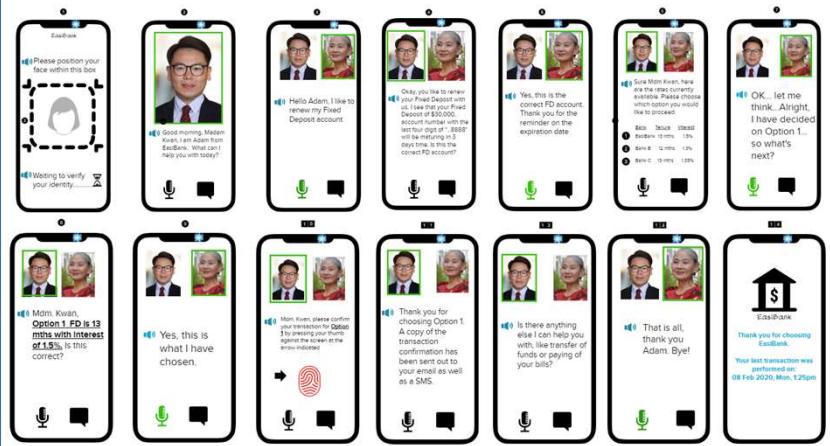
If we provide: The Elderlies

With: timely and reliable source of information with the help of Avatar (a Conventional AI, or "digital voice assistant"),

We will address the risk of: Mdm Kwan not trusting the recommendation provided by Avatar.

By measuring: the number of times recommendation by Avatar are accepted.

We'll know we've arrived when we observe: high frequency of usage of Avatar for fixed deposit recommendation.



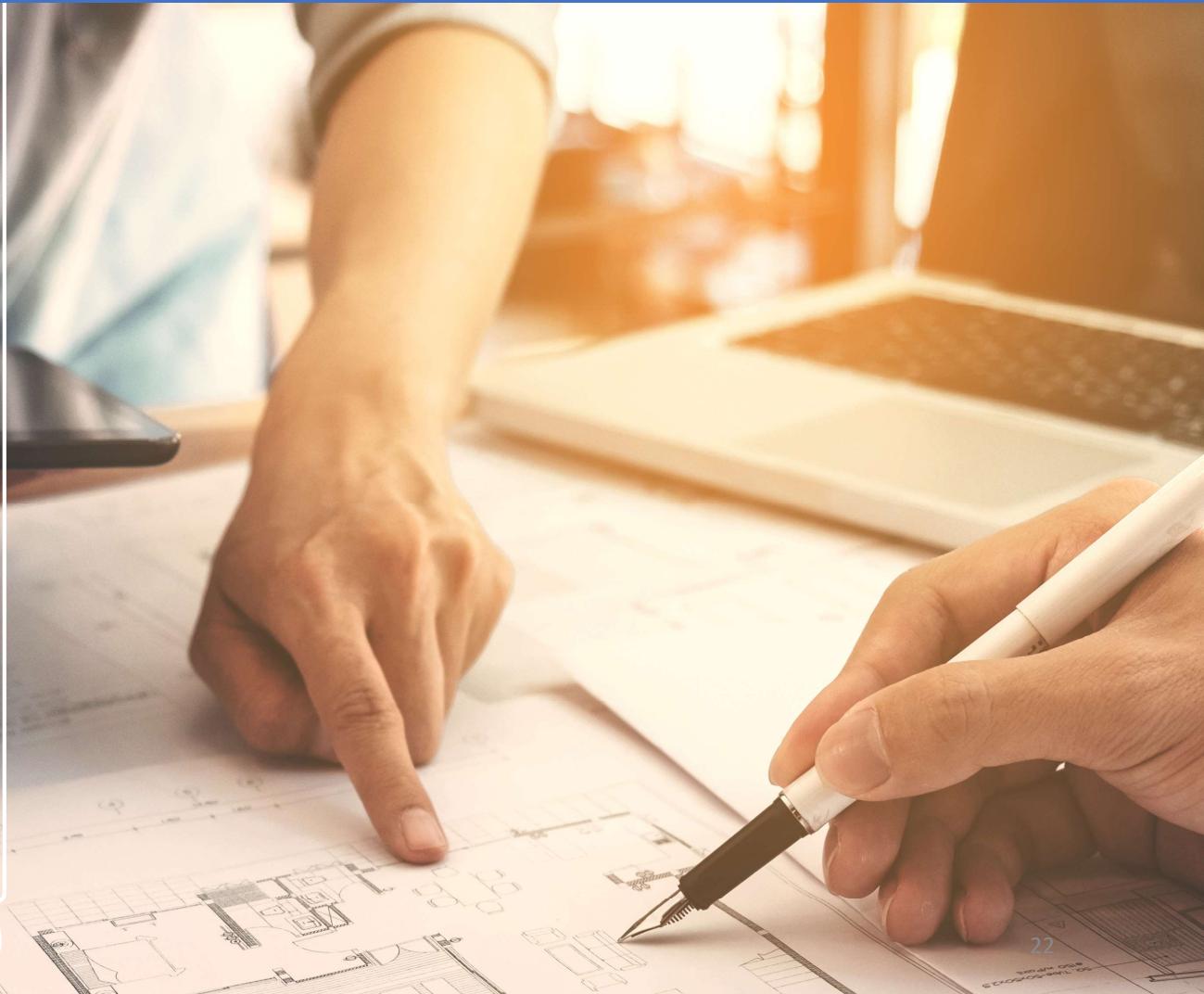
Parking Lots – future MVPs

- If we provide the user with app that is easy to use and that facial recognition and thumbprints as authorization and authentication, we will address the risk of the user not feeling safe, comfortable and secure using the app by measuring the number of times the user uses the app. We'll know we've arrived when we observe high and constant usage of app to meet her banking needs and increased in percentage of transactions done digitally
- If we provide the user with UI whereby the user can interact with a virtual human with questions, we will address the risk of the user not feeling not being attended to or served by measuring the length of time used for different services and the comments made by the user. We'll know we've arrived when we observe longer interaction time and enquiries about other services provided by the bank and positive comments from the user.



Parking Lots – future hypothesis

- If we provide two way authentication and authorization in a simple form, the user would feel that it is easy and safe to use.
- If we provide multi-language capabilities, the user would feel it is easy to use and understand
- If we provide a user interface whereby the user can interact with a digital human with questions, the user would feel that it is interactive and feel being served and attended to.
- If we provide 24 hours service for the user, the user will be happy to have the service at anytime and anywhere.
- If we provide real time and reliable source of information for the user, the user will trust the app and will accept recommendation provided by the app.



MVP Exploration -> Development

Next Steps in MVP Exploration and Development

1

Architecture



Determine how to build your MVP with tools from the IBM Cloud Platform.

2

UX Sketching



Visualise your users' MVP experience with medium fidelity wireframe designs.



Test them with your sponsor user and get early feedback to improve the experience.

3

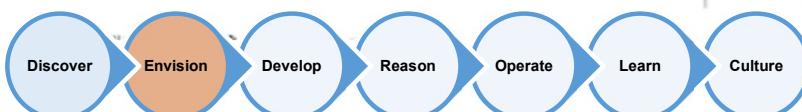
MVP Build-up

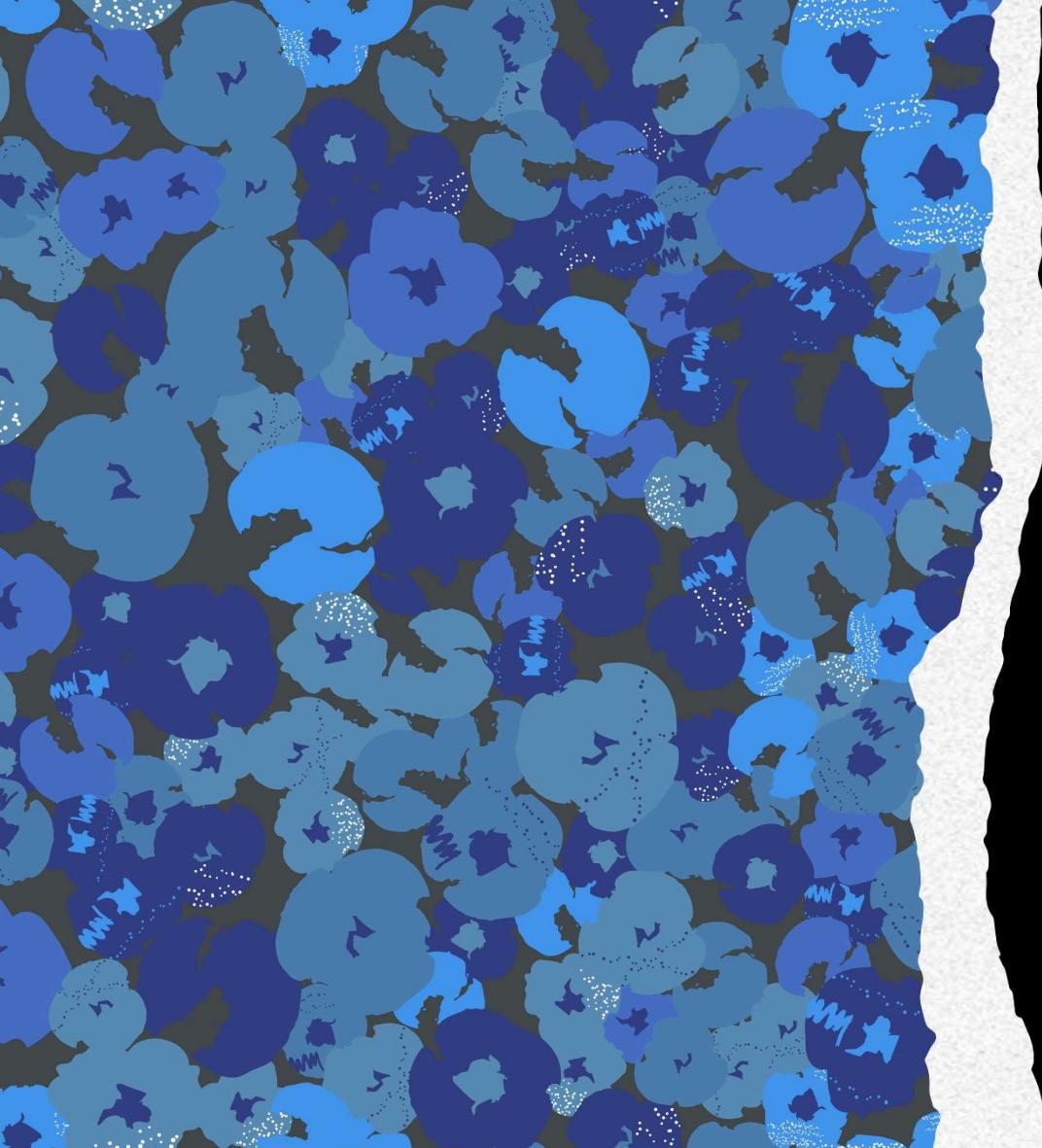


Bring your MVP to life. Developers pair program in weekly iterations to build the MVP on the IBM Cloud.



Keep improving your user experience based on user feedback.

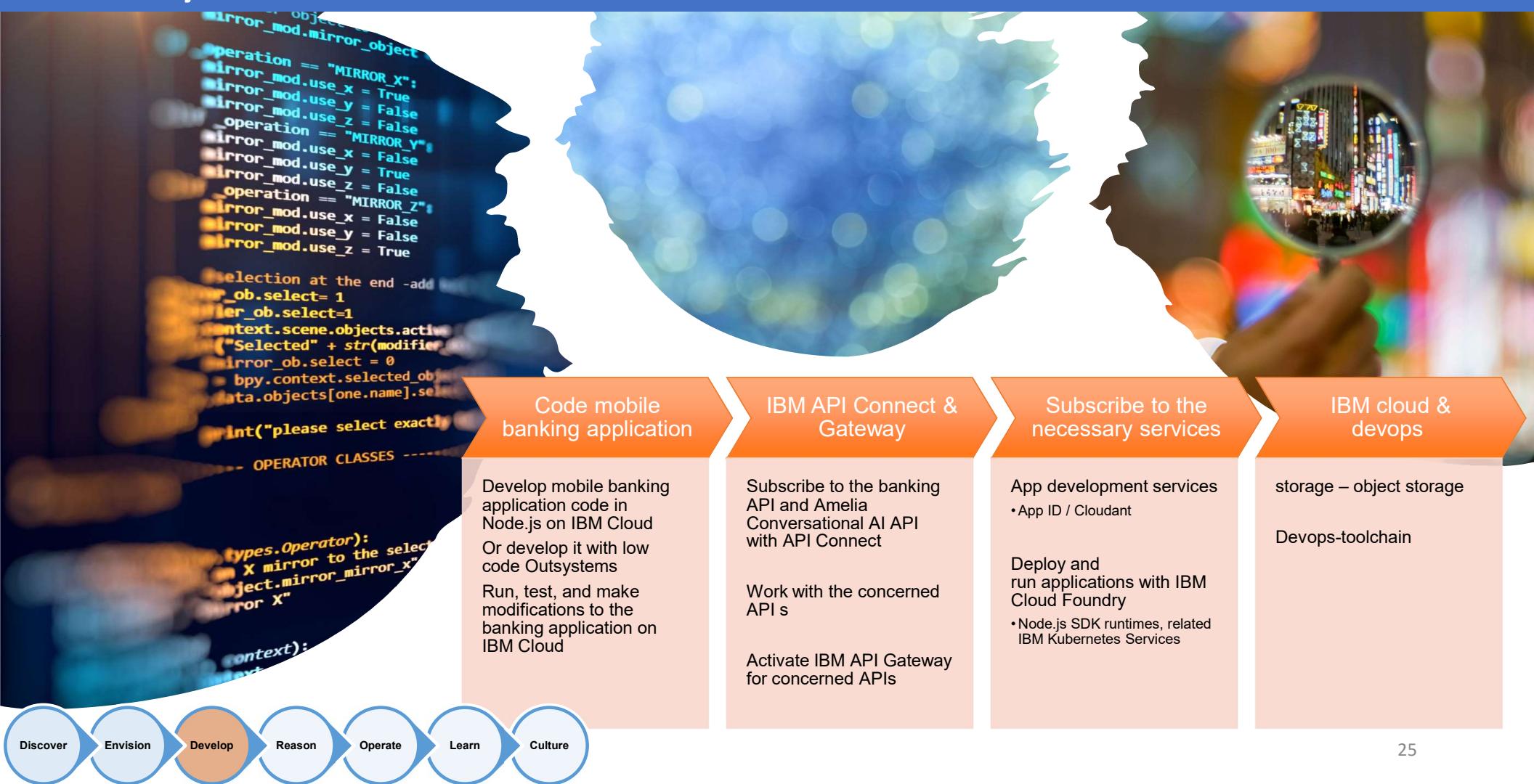




Develop

Produce high-quality code that you can confidently deliver to production. Accelerate time-to-market by using continuous integration, continuous delivery, and automation to deliver in a fully tested production app.

Development Process



App Development

Software

Explore our expanding catalog of software solutions and take advantage of a simplified installation process.

Filters: Starter kits [Clear all](#)

All Categories 10 items

 Go Gin App IBM • Developer Tools Start building your next Go Gin app on IBM Cloud. Starter kits • IBM Kubernetes Service • Red Hat OpenShift	 Java Liberty App IBM • Developer Tools Start building your next Java Liberty app on IBM Cloud. Starter kits • IBM Kubernetes Service • Red Hat OpenShift	 Java Spring App IBM • Developer Tools Start building your next Java Spring app on IBM Cloud. Starter kits • IBM Kubernetes Service • Red Hat OpenShift	 Mobile App with Push Notifications IBM • Developer Tools A basic Hello World starter with Analytics and Push services. Starter kits
 Node.js Express App IBM • Developer Tools Start building your next Node.js Express app on IBM Cloud. Starter kits • IBM Kubernetes Service • Red Hat OpenShift	 Python Django App IBM • Developer Tools Start building your next Python Django app on IBM Cloud. Starter kits • IBM Kubernetes Service • Red Hat OpenShift	 Python Flask App IBM • Developer Tools Start building your next Python Flask app on IBM Cloud. Starter kits • IBM Kubernetes Service • Red Hat OpenShift	 Swift Kitura App IBM • Developer Tools Start building your next Swift Kitura app on IBM Cloud. Starter kits • IBM Kubernetes Service • Red Hat OpenShift



App Development By

Full-stack Visual Development

- Drag-and-drop UI, business processes, logic, and data models to create full-stack, cross-platform apps. Add your own code when needed.

Single-click Deployment

- Deliver apps and update them with one click. OutSystems automatically checks dependencies and handles all deployment processes for you.

Mobile Made Easy

- Easily build great looking mobile experiences with offline data synchronization, native device access, and on-device business logic.

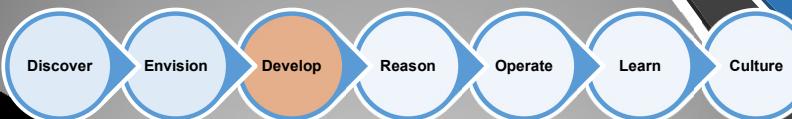
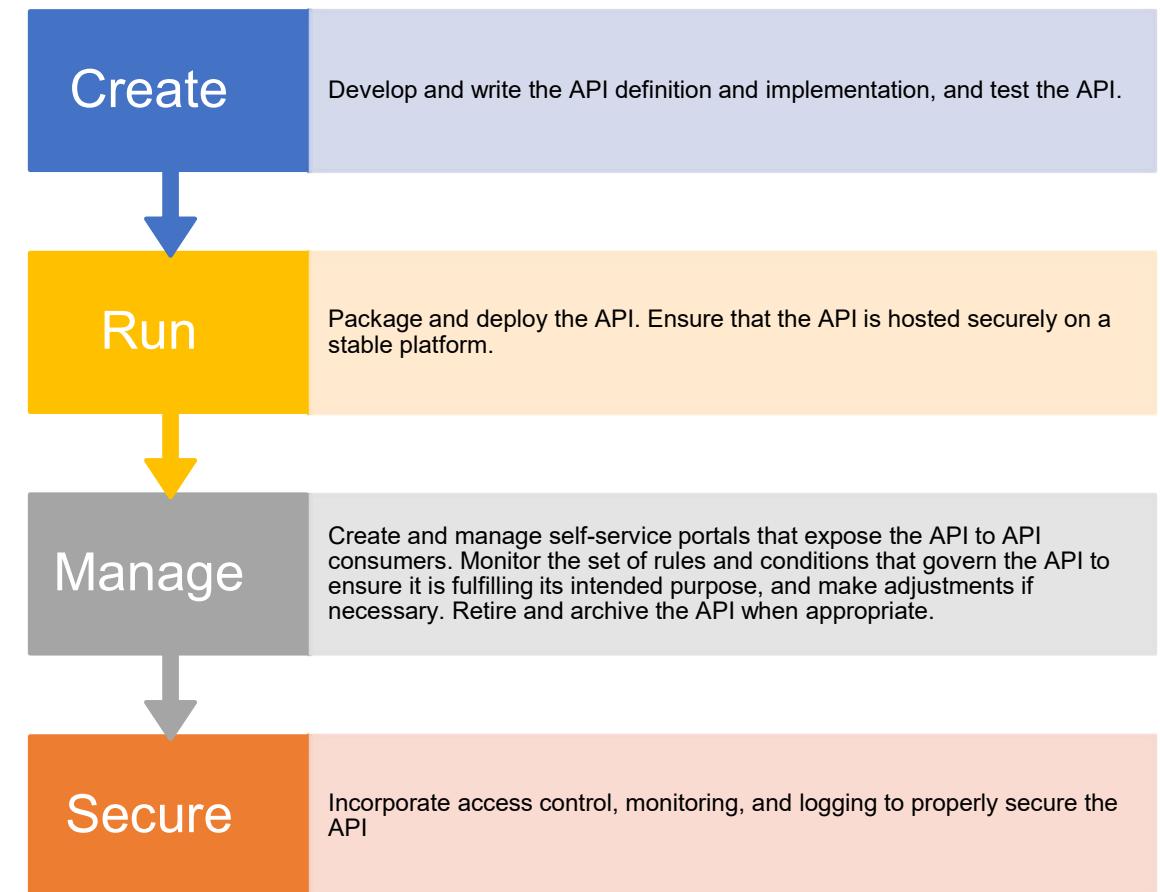


Industry Leaders Rely on OutSystems



App Development

IBM® API Connect



App Development

Benefits of API



IMPROVING
INTERNAL
APPLICATION
DEVELOPMENT

EXPANDING
CHANNEL ACCESS,

ENABLING PARTNERS
AND EXTERNAL
VENDORS TO USE
ENTERPRISE
CAPABILITIES,

THE IDEA OF API
ADOPTION IS
ESSENTIAL TO
SUPPORT DIGITAL
TRANSFORMATION.

App Development

Select Watson services below to get started with your project

Simply pick one or more APIs from the catalog, click Add Services, and get your API credentials.

 Watson Assistant Watson Assistant lets you build conversational interfaces into any application, device, or channel. Lite • IBM	 Watson Discovery Add a cognitive search and content analytics engine to applications. Lite • IBM	 Natural Language Understanding Analyze text to extract meta-data from text, entities, emotion, relations, sentiment, and more. Lite • IBM
 Speech to Text Low-latency, streaming transcription Lite • IBM	 Text to Speech Synthesizes natural-sounding speech from text. Lite • IBM	 Natural Language Classifier Natural Language Classifier uses a combination of rule-based and machine learning techniques to train classification models. Users train their data and the service learns. IBM
 Tone Analyzer Tone Analyzer uses linguistic analysis to detect three types of tones from communications: emotion, social, and language. This insight can then be used to drive high impact communications. Lite • IBM	 Language Translator Translate text, documents, and websites from one language to another. Create industry or region-specific translations via the service's customization capability. Lite • IBM	 Watson Studio Embed AI and machine learning into your own applications and models using your own data. Lite • IBM
 Knowledge Studio Discover	 Machine Learning Machine Learning - make smarter decisions, solve tough problems, and improve user outcomes. Develop	 Watson Knowledge Catalog Discover, catalog, and securely share knowledge across your organization. Reason
 Operate	 Learn	 Culture

IBM
Watson™ AI
services

App Development



Amelia - IPSoft's Conversational AI

- Difference between Conversational AI & Chatbots
 - complex intent recognition capabilities
- Easy integration with cloud solution architecture with given API
- Features
 - high levels of intent recognition
 - Natural Language Understanding
 - self-directed transactional capabilities
 - Educated recommendations
 - Scalable / Autonomy
 - multiple languages

App Development

and run your applications without managing servers or clusters with IBM Cloud Foundry

Automatically transforms source code into containers, scales them on demand, and manages user access and capacity.



dry in the IBM Cloud

Public Applications

Create and deploy apps on IBM Cloud's multi-tenant Cloud Foundry environment available in 5 IBM Cloud Regions. Get started in minutes by deploying your applications, and let IBM Cloud manage them for you.

IBM Cloud Foundry Public is updating some important pricing details.
Please see full details. Don't show this again X

Learn more Create

capabilities

Access Control

Fine grain assignment/dispensing of compute capacity to development teams.

Automatic Health Management

Crashing applications will restart automatically.

Automatic Placement

Applications are automatically placed across multiple data centers.

Automatic Routing

Internet reachable routes are automatically created for your applications.

Runtimes

java <small>Liberty</small> Liberty For Java	.py Python	.php PHP
.js SDK for Node.js	.rb Ruby	.go Go
.swift Runtime for Swift	.net ASP.NET Core	tomcat Tomcat



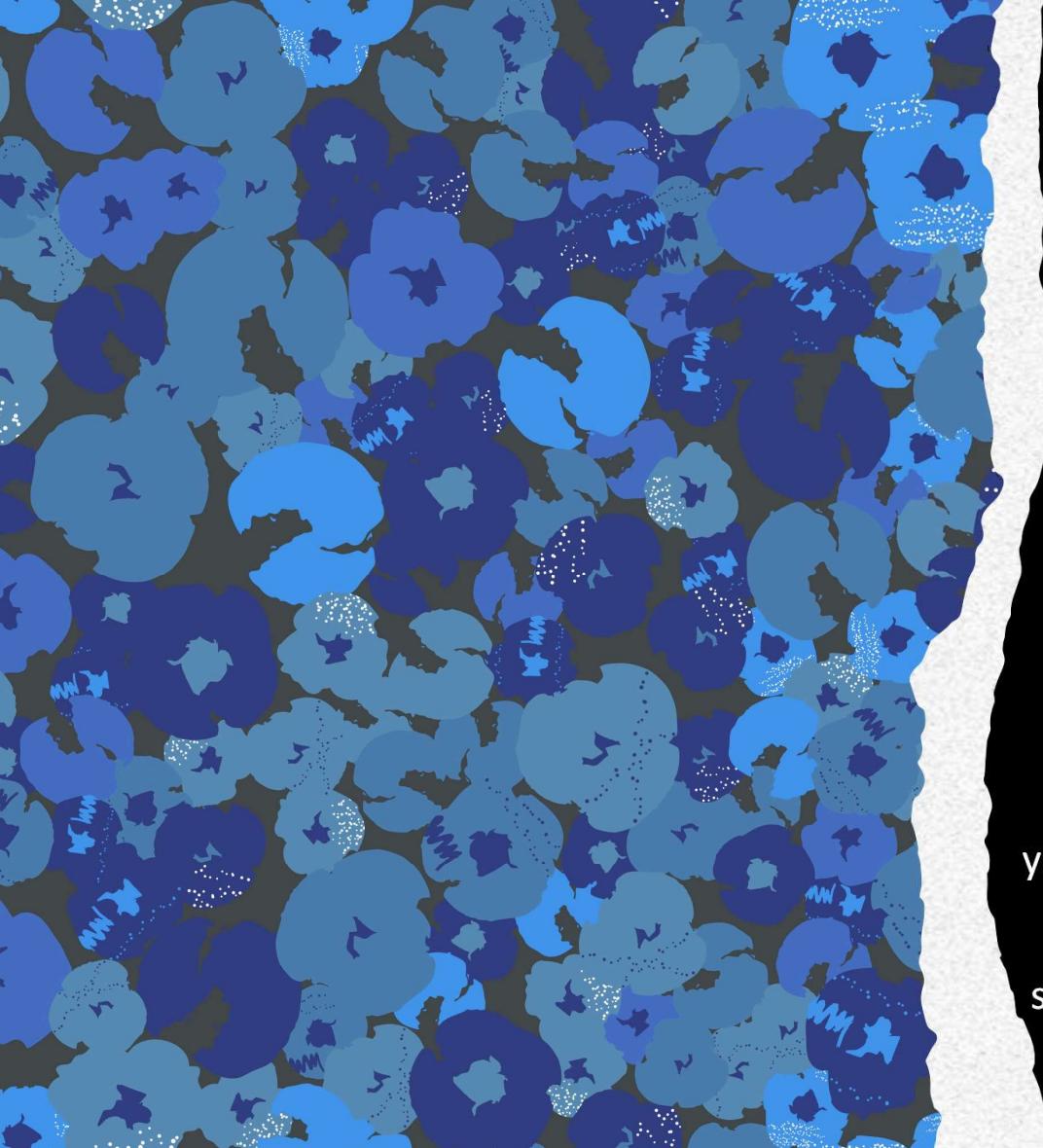
App Development Services

Power your apps. Add cloud services including caching, data persistence, and Watson services to your app.

Db2 Warehouse A fully managed, elastic, cloud data warehouse built for high-performance analytics and machine learning. IBM	Mg Databases for MongoDB MongoDB is a JSON document store with a rich query and aggregation framework. IBM	Cloud Object Storage Developer enabled data storage for cloud applications integrated with IBM Cloud services Lite + IBM
Event Streams IBM Event Streams is a high-throughput message bus built with Apache Kafka. It is optimized for event ingestion into IBM Cloud and event stream distribution between your services and applications. IBM	App ID User Authentication and User Profiles for your apps. IBM	Rd Databases for Redis Redis is a blazingly fast, in-memory data structure store. IBM
Pg Databases for PostgreSQL PostgreSQL is a powerful, open source object-relational database that is highly customizable. IBM	Cloudant A scalable JSON document database for web, mobile, IoT, and serverless applications. Lite + IBM	Watson Assistant Watson Assistant lets you build conversational interfaces into any application, device, or channel. Lite + IBM

The services highlighted with red circles are App ID, Cloudant, and Cloud Object Storage.



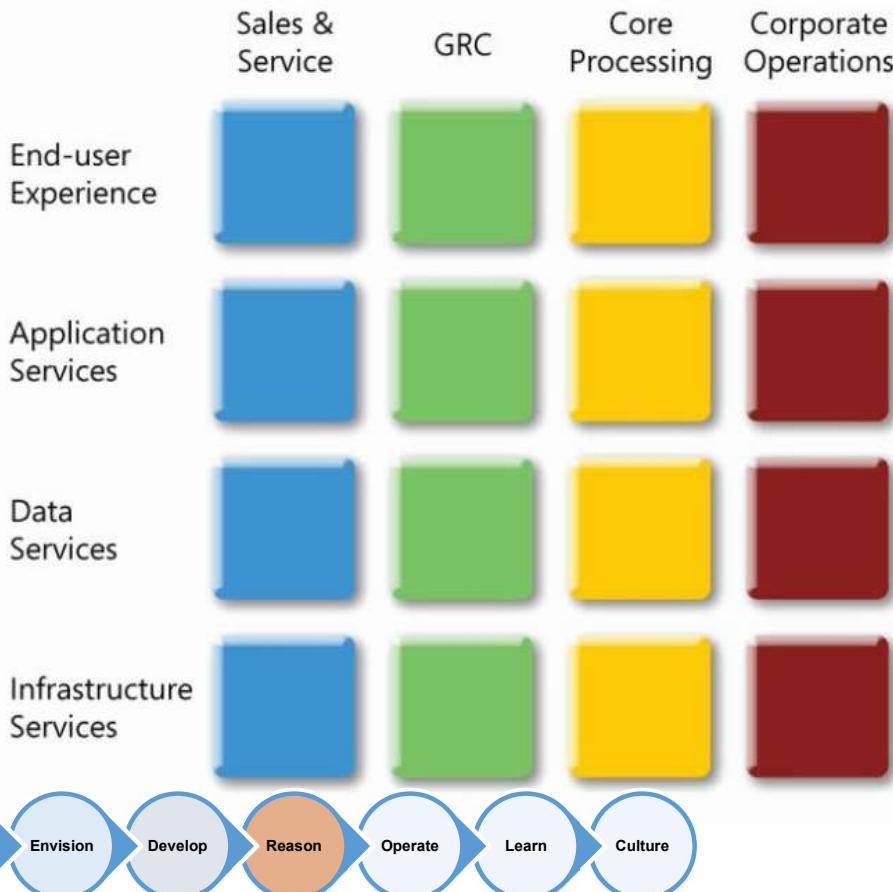


Reason

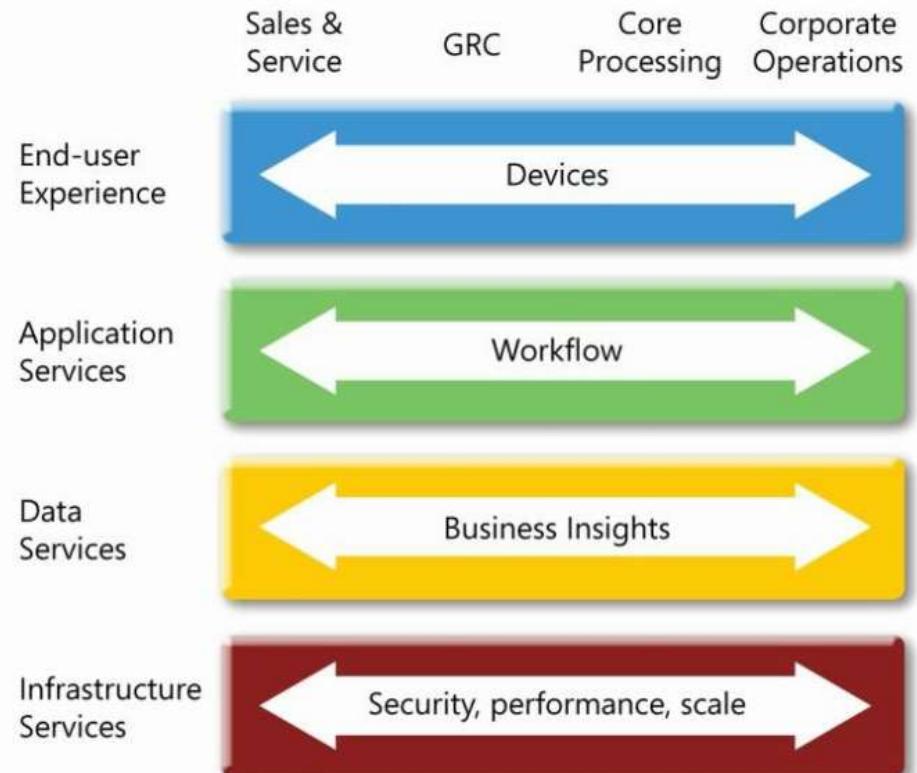
Build a solid information architecture to enable you to turn data into knowledge. Develop analytic models using machine learning approaches. Integrate AI into solutions and into the execution of the method practices.

Revolution of Banking

Banking – The Old Way, Silos

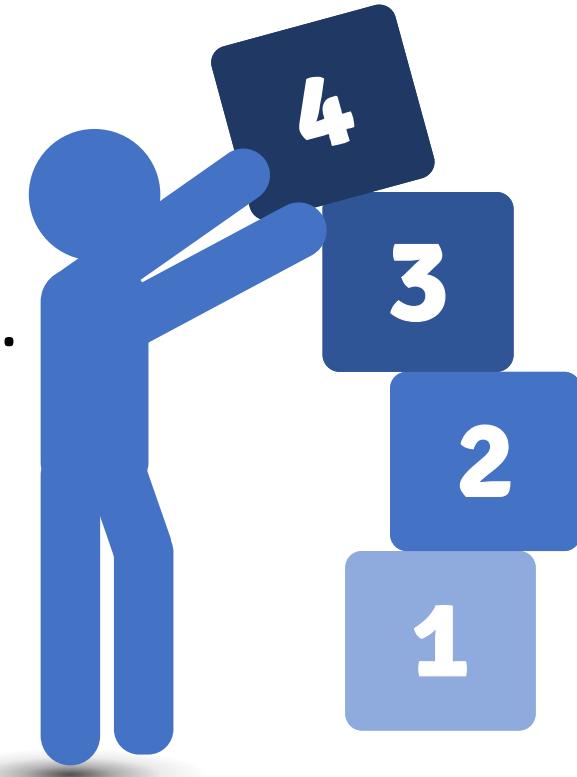


Banking – The New Way,
Modular & Integrated Platform

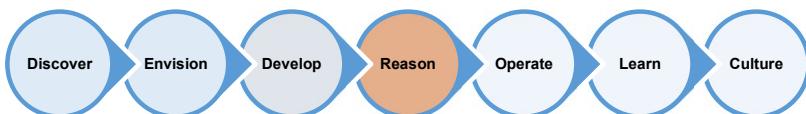
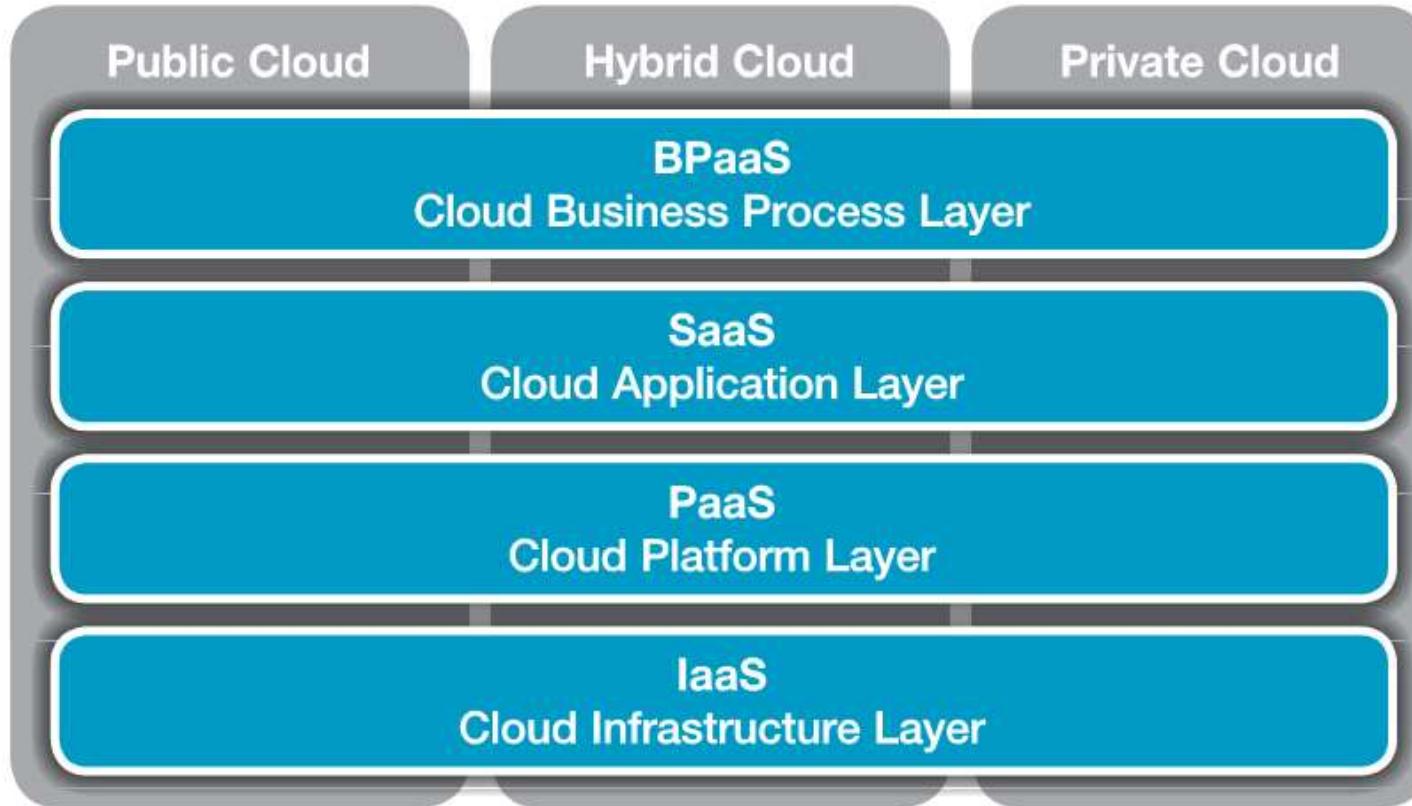


Factors to consider when launching banking apps

- Clearly define the ROI for cloud-based projects.
- Choose service providers with proven expertise in cloud services management.
- Sign outsourcing contracts that use pay-per-use cloud delivery models.
- Understand data confidentiality and regulatory requirements.



Cloud Service & Deployment Models



IBM Cloud



An open, standards-based
cloud computing platform



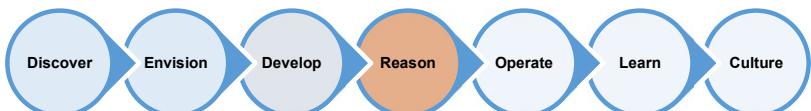
Combines platform as a
service (PaaS) with
infrastructure as a
service (IaaS)



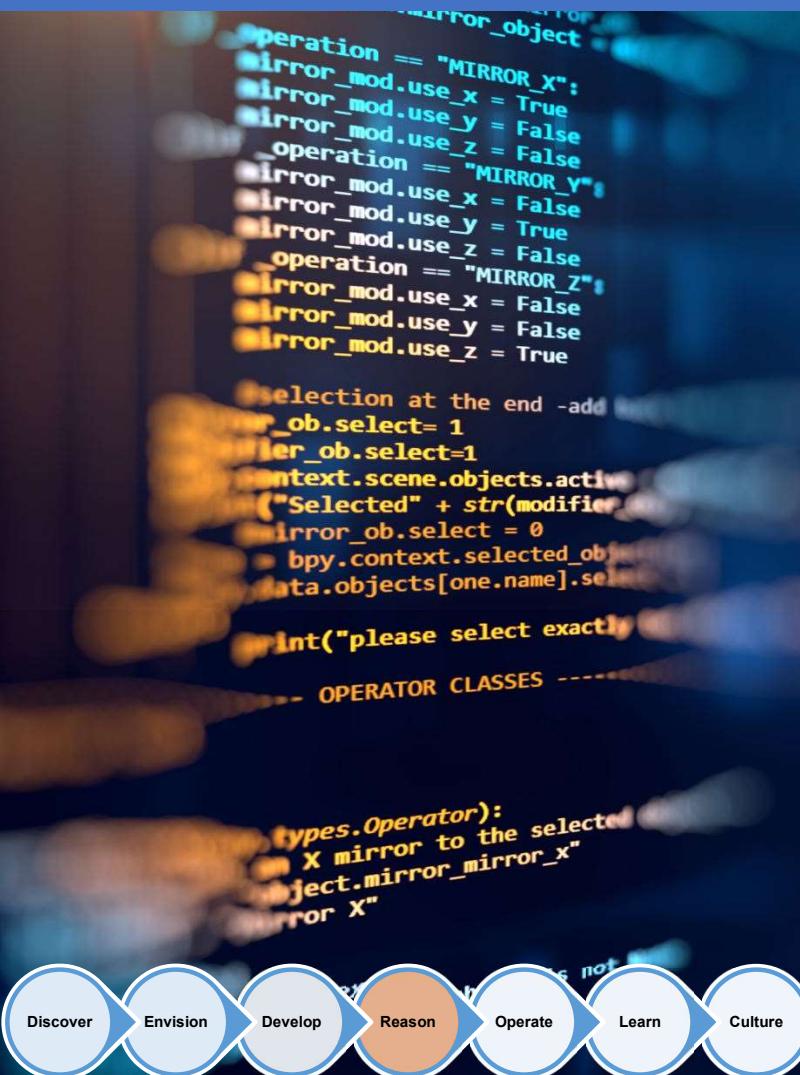
Includes a catalog of diverse
platform and infrastructure
services



Used to rapidly build, deploy,
and run business applications,
infrastructure, or both



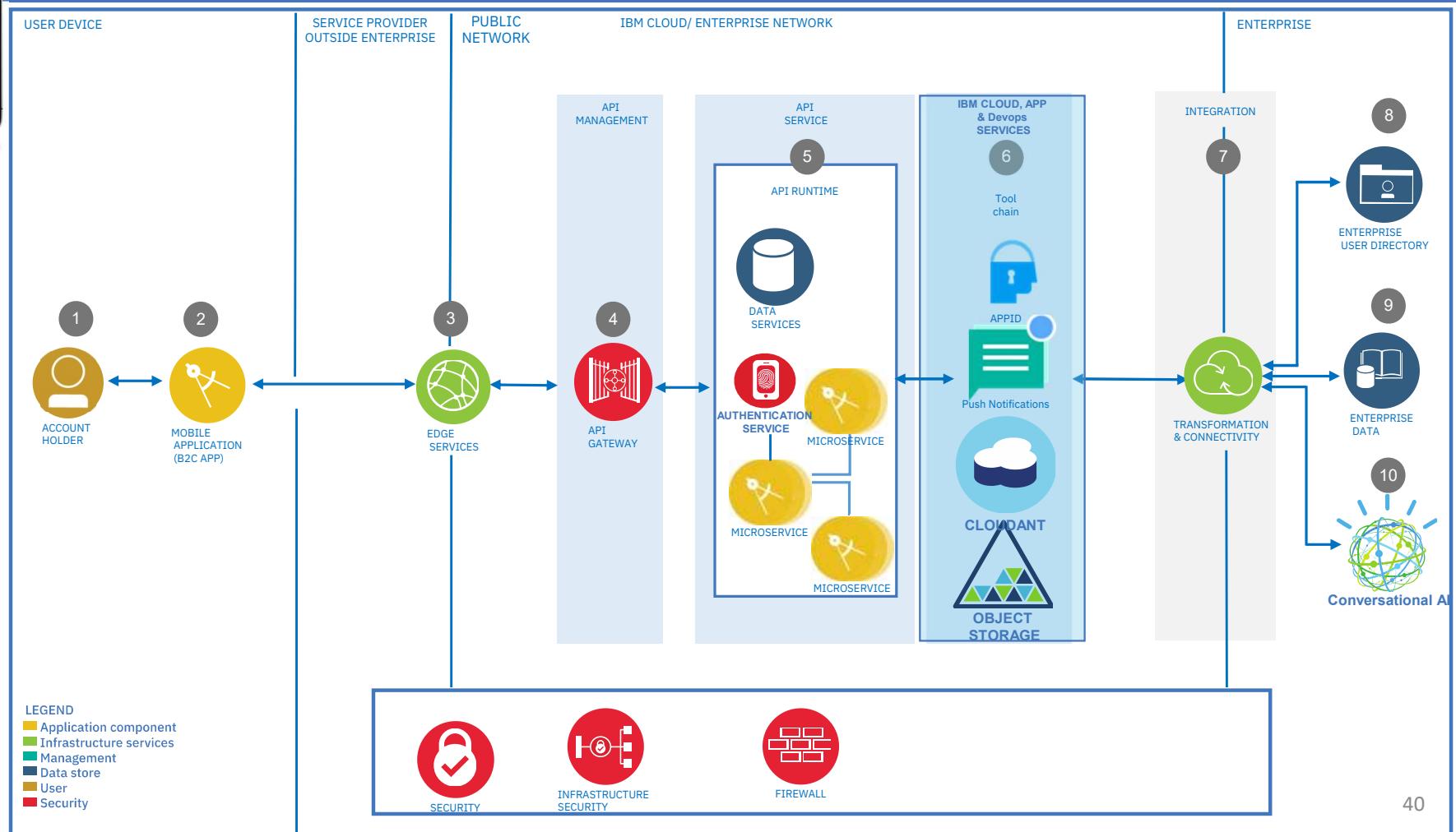
IBM Cloud for Application Developers

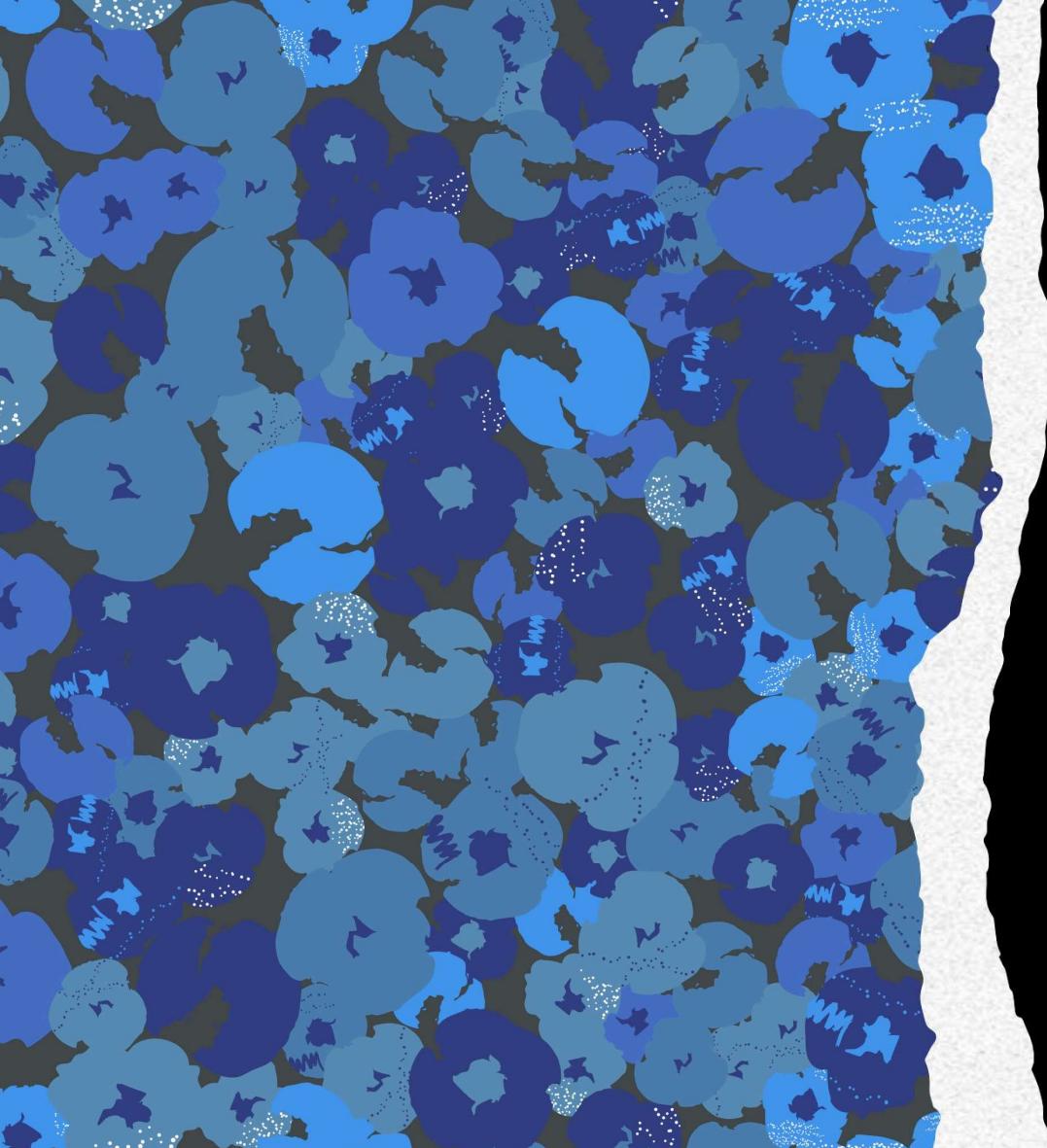


- enables application developers to focus on application capabilities by providing the following resources on the cloud:
 - Runtimes on which to run applications
 - A catalog of selectable services, such as databases, mobile support, analytics, artificial intelligence, and security, which are used to build applications
 - Ability to integrate with data from the organization and traditional workloads that are running in on-premises systems
 - DevOps capabilities and tools, including code-editors, version control, deployment pipelines, and hosting, monitoring, and scaling apps



Mobile App Architecture

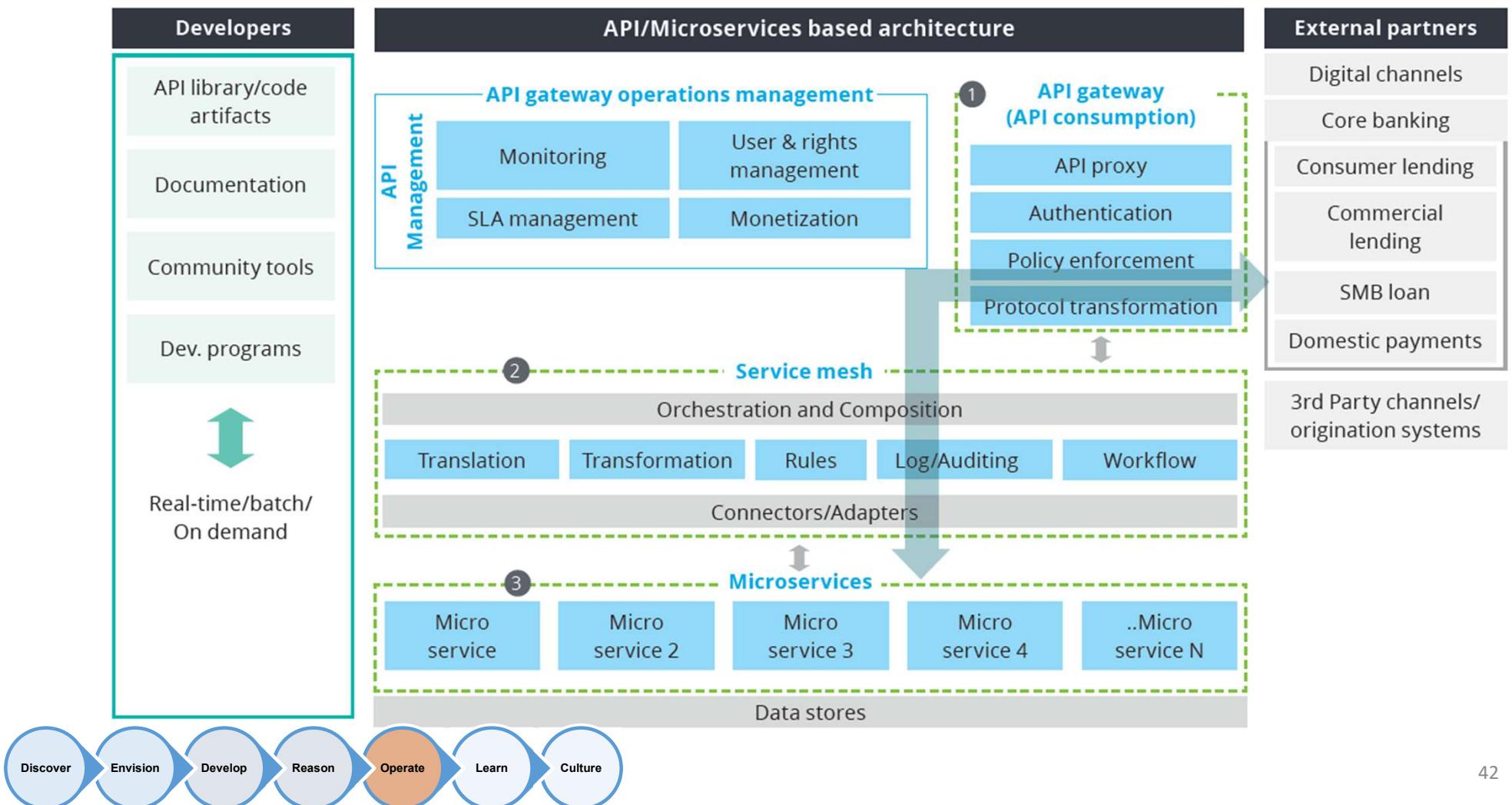




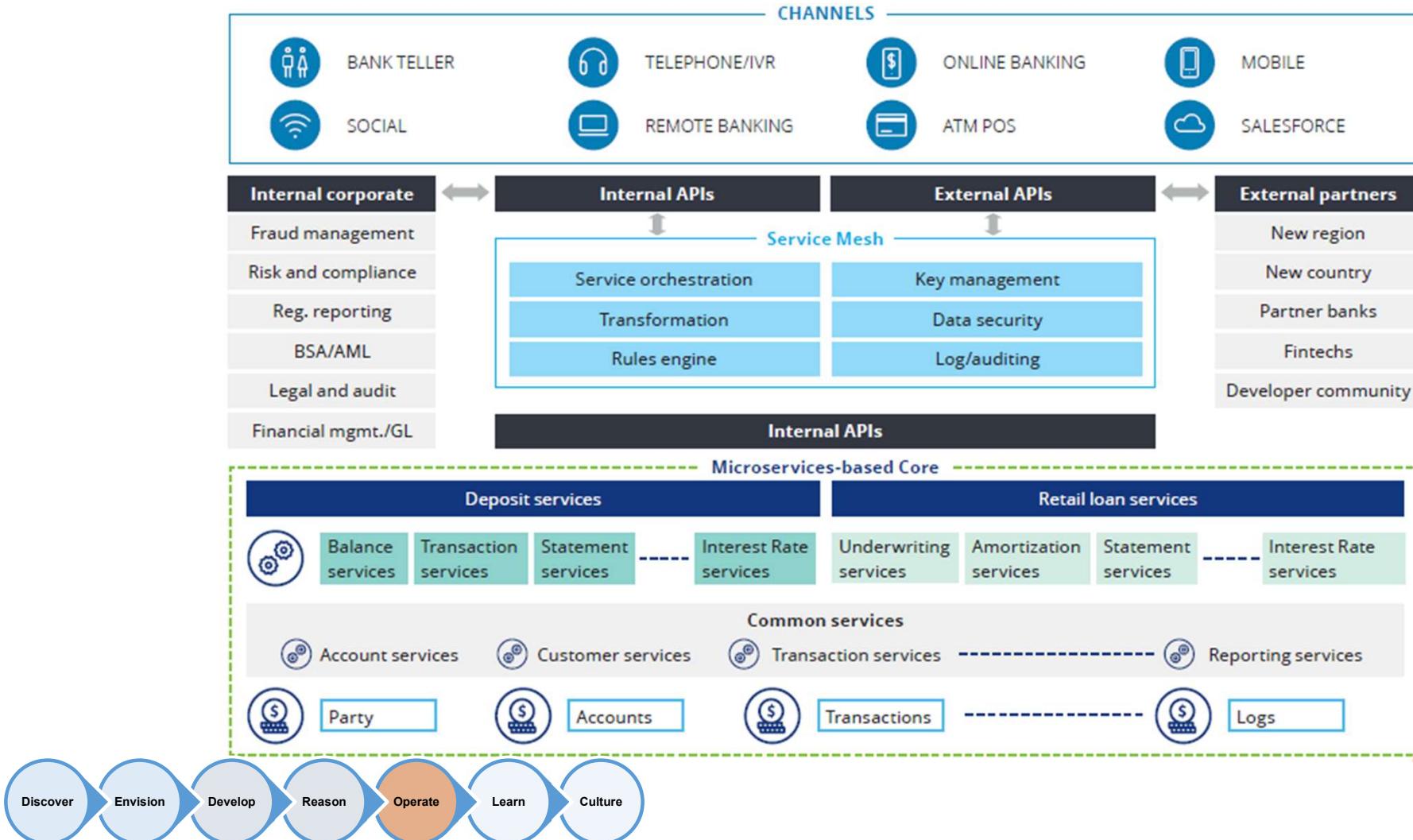
Operate

Ensure operational excellence with continuous application monitoring, high availability, and fast recovery practices that expedite problem identification and resolution.

Microservices-based Architecture



Microservices-based Core Banking Ecosystem



Microservices-based Architecture

Benefits of Microservices-based Architecture

- Microservice architecture gives the freedom to independently develop and deploy services.
- A microservice can be developed by a fairly small team.
- Code for different services can be written in different languages (though is not encouraged)
- Easy integration and automatic deployment (using open-source continuous integration tools such as Jenkins, Hudson, etc.).
- Easy to understand and modify for developers, thus can help a new team member become productive quickly (short learning curve).
- The developers can make use of the latest technologies.
- The code is organized around business capabilities.
- Starts the web container more quickly, so the deployment is also faster.
- When change is required in a certain part of the application, only the related service can be modified and redeployed—no need to modify and redeploy the entire application.
- Better fault isolation: if one microservice fails, the other will continue to work (although one problematic area of a monolith application can jeopardize the entire system).
- Easy to scale and integrate with third-party services.
- No long-term commitment to technology stack.



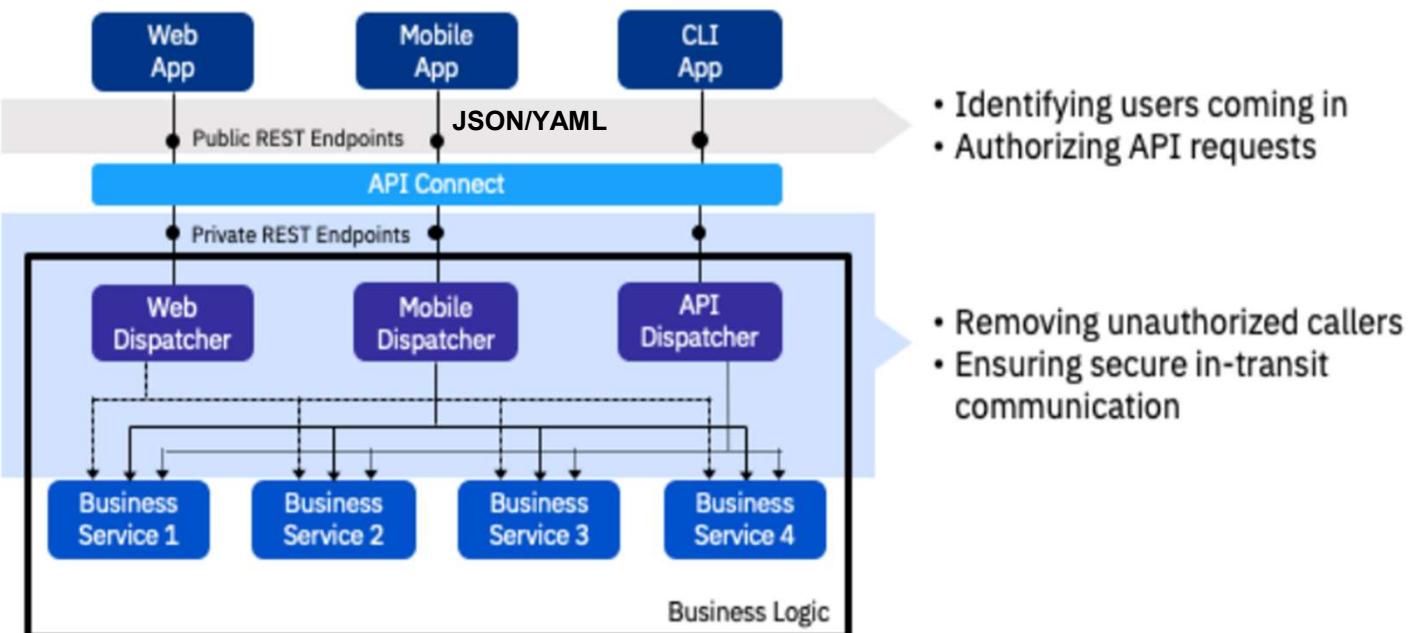
Security – Encryption is the most effective way

Protocols such as OpenID Connect, OAuth 2.0, and SAML

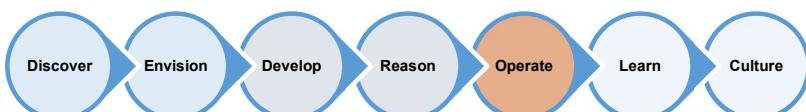
Following security concepts were considered when we design and implement microservices and API-based applications or services:

- Maintain user-level E2E trust across the entire journey.
- Ensure it is enforced at the right place with the right level of granularity.
- Group the APIs and use an API gateway to apply configurable security policies consistently.
- Don't forget to log, monitor and detect.

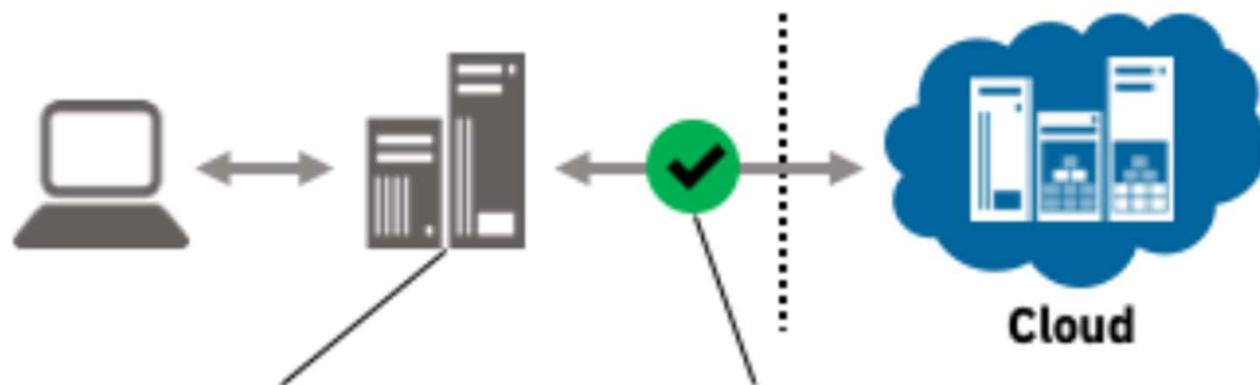
Microservices security



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Security – Encryption is the most effective way



- The encryption software is installed as part of the on-premise corporate gateway server
- The software allows to identify and encrypt defined fields in the http stream sent to the cloud

Data is encrypted before it leaves the company's premises

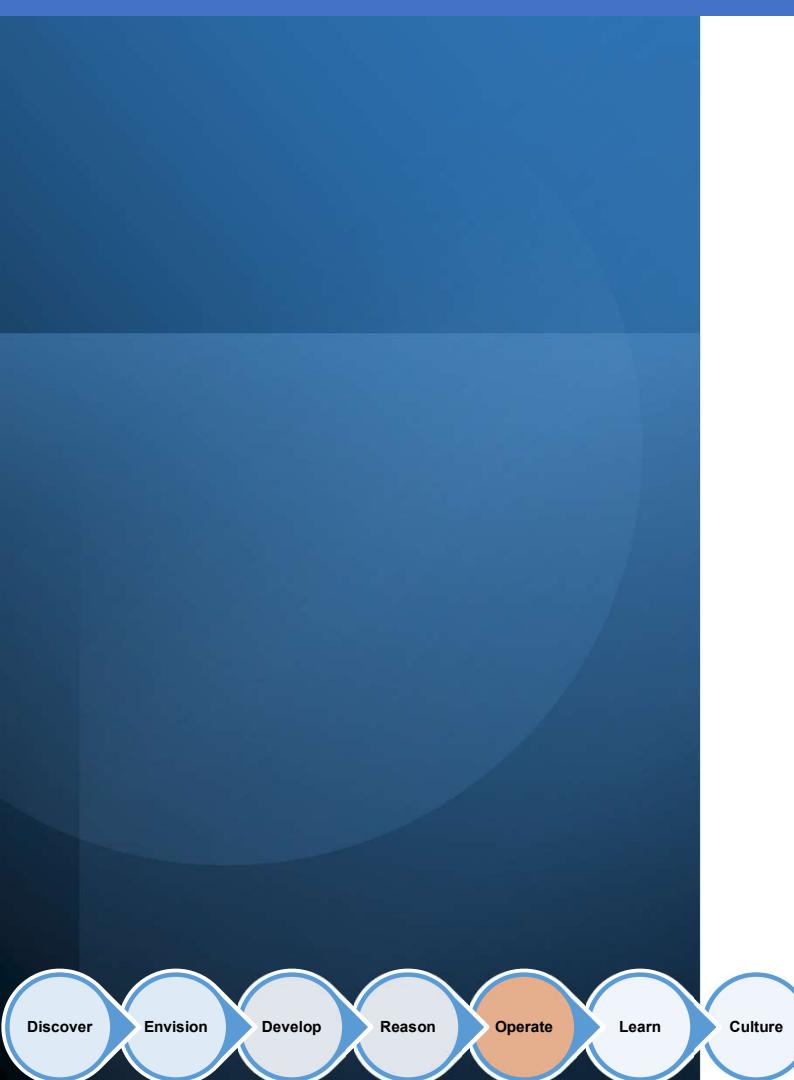
On-premise Encryption

Solutions are available on the market that allow the on-the-fly encryption of data before it is sent to the cloud independent from the logic that is implemented in the cloud application

What security technologies and controls are most effective to protect data in the cloud?



Is ITIL relevant now?



Traditional IT management (ITIL)

Operations team is often working in isolation, disconnected from the development team

Performed by operations team AFTER product ship

Primarily process-driven

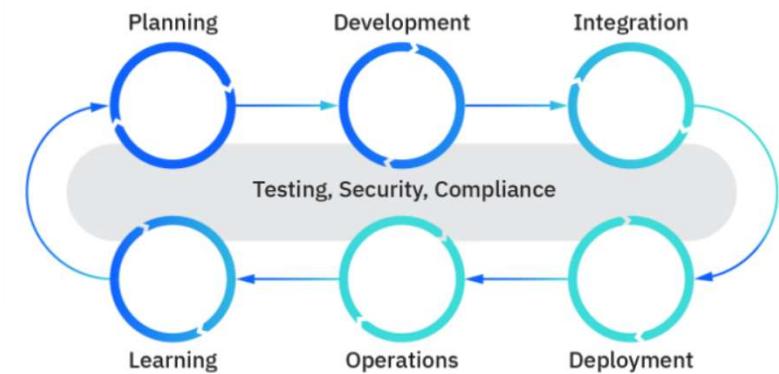
Devops and Cloud management

Development team sees successful operations as part of their job

Operations goals defined and addressed throughout the DevOps lifecycle

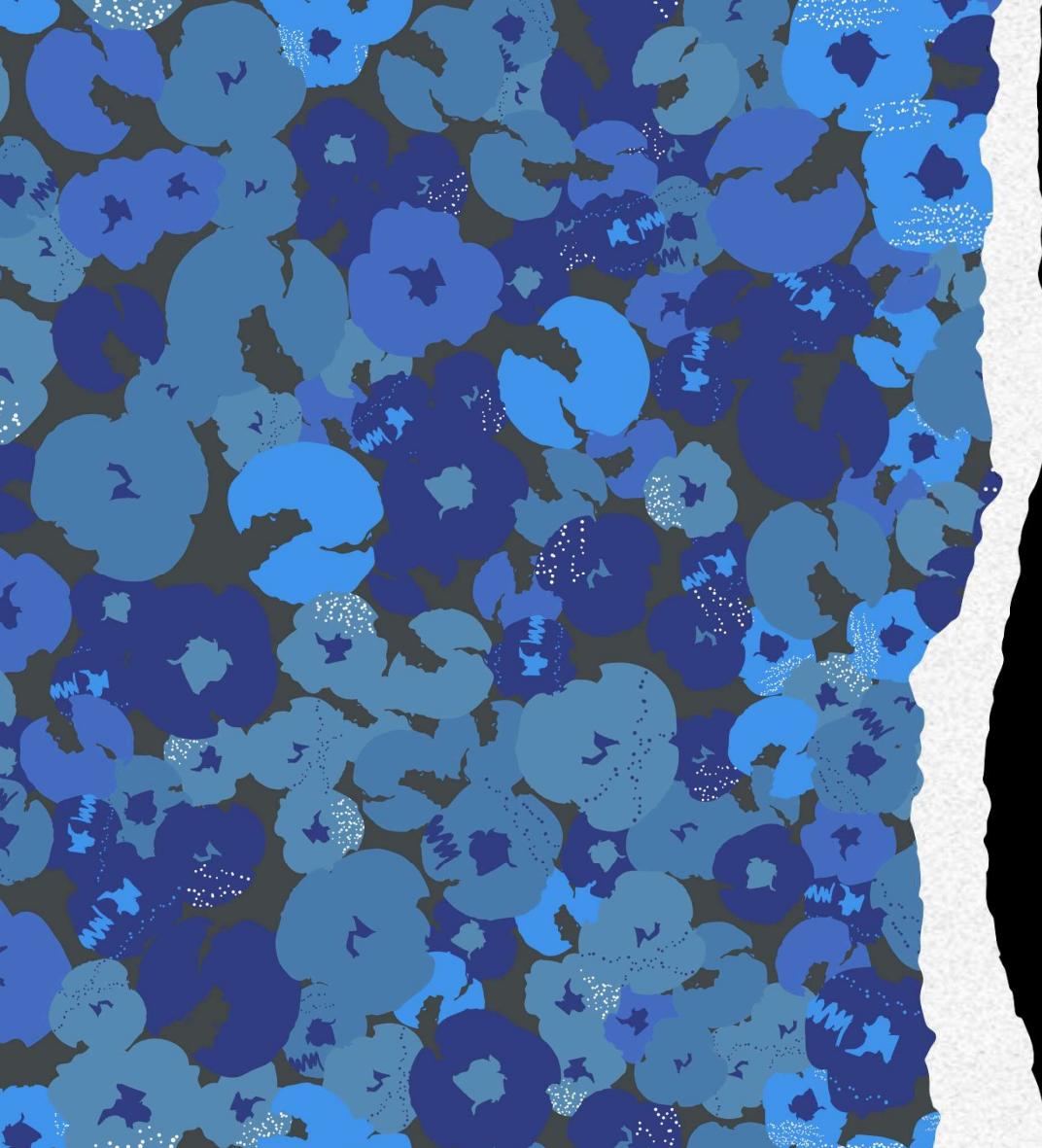
Heavily focused on embedded and automated capabilities at all stages

DevOps Practices



KEEP THE OPS IN DEVOPS

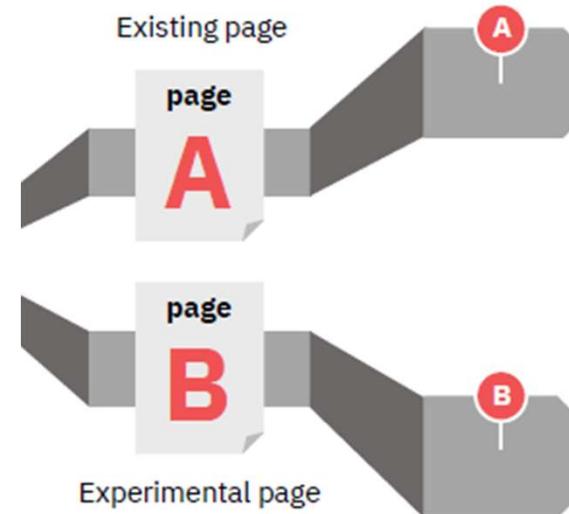
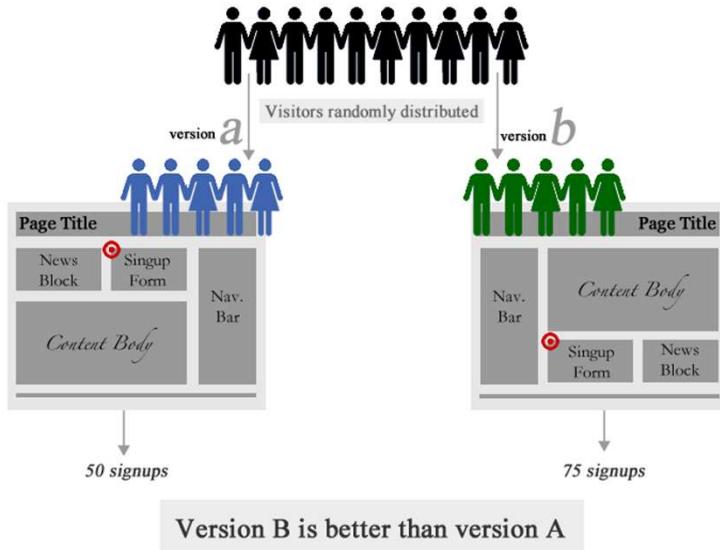
- Enable agile for operations. Implement agile and continuous delivery practices for operations in the same way you do for development.
- Refine for the cloud. Revisit the activities of plan, design, deliver, operate, and control then transform them to better fit the needs of cloud based operations.
- Realize the benefits. Support applications in the cloud to ensure an “always on” experience for your customers.



Learn

Continuously experiment by testing hypotheses, using clear measurements to inform decisions, and driving findings into the backlog so that you can pivot.

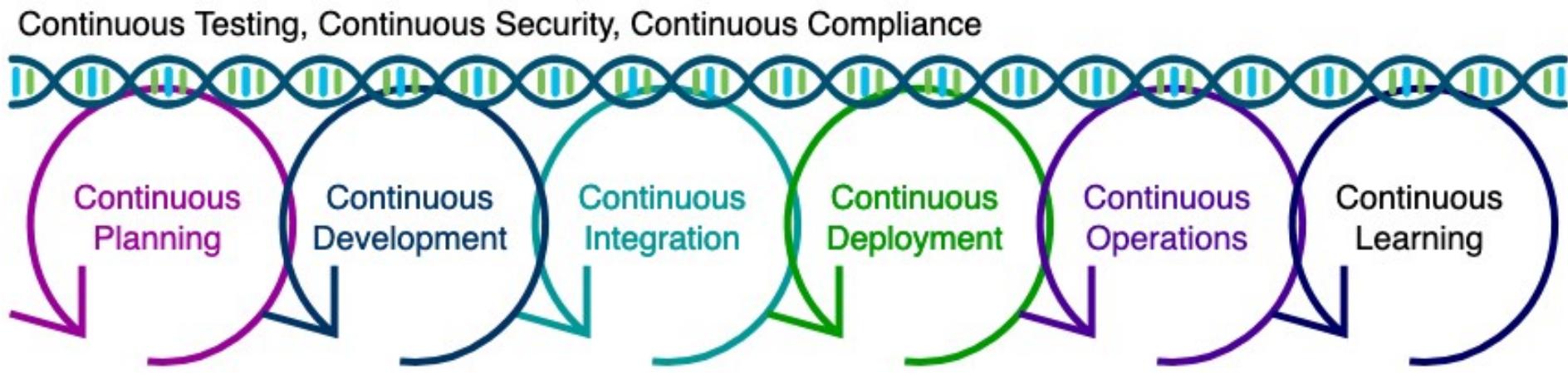
The Continuous Cycle



- Hypothesis Driven Development
- Compare versions of app
- Continuously learn based on outcomes of experiments



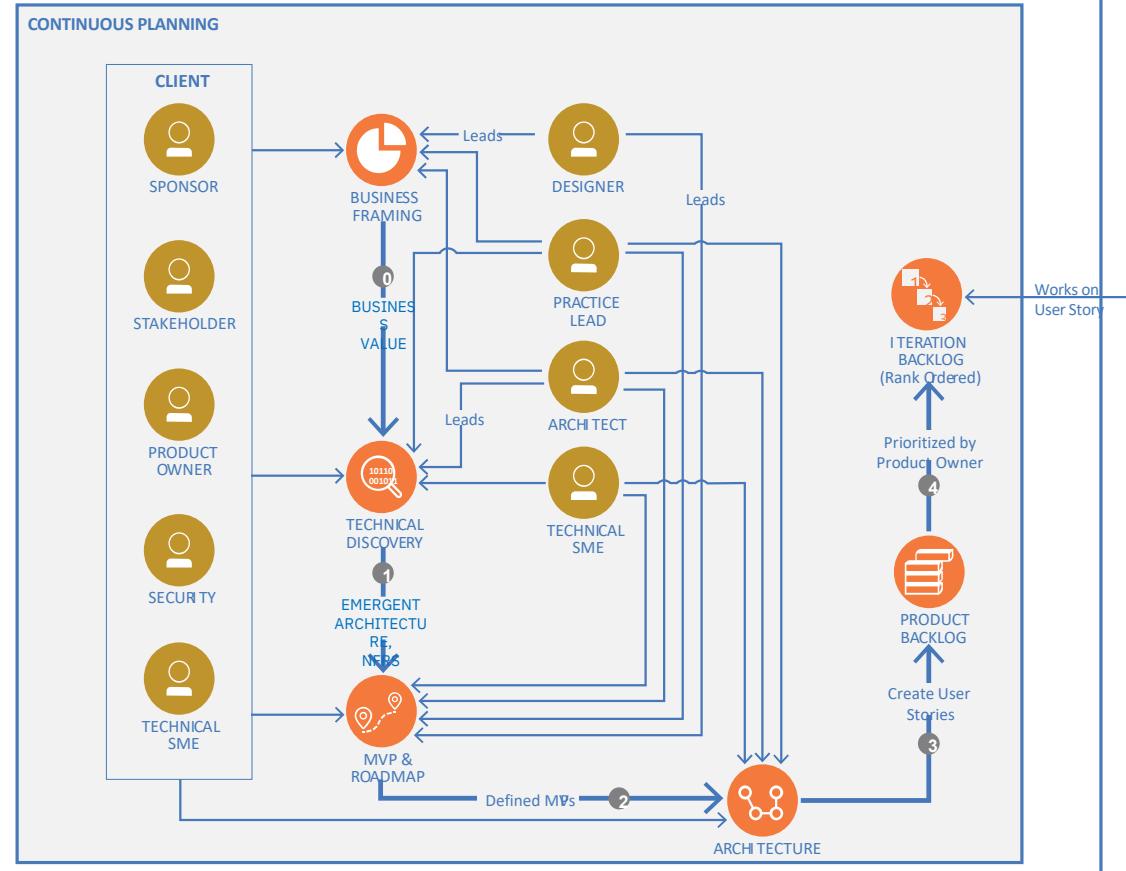
Continuous Integration and Continuous Deployment (CI/CD) for Cloud



Continuous Delivery Pipeline



The Continuous Cycle

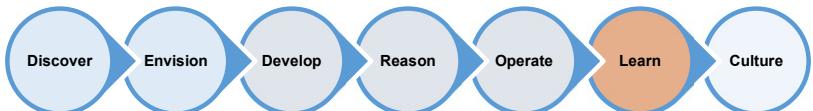


Patterns for planning success include these criteria:

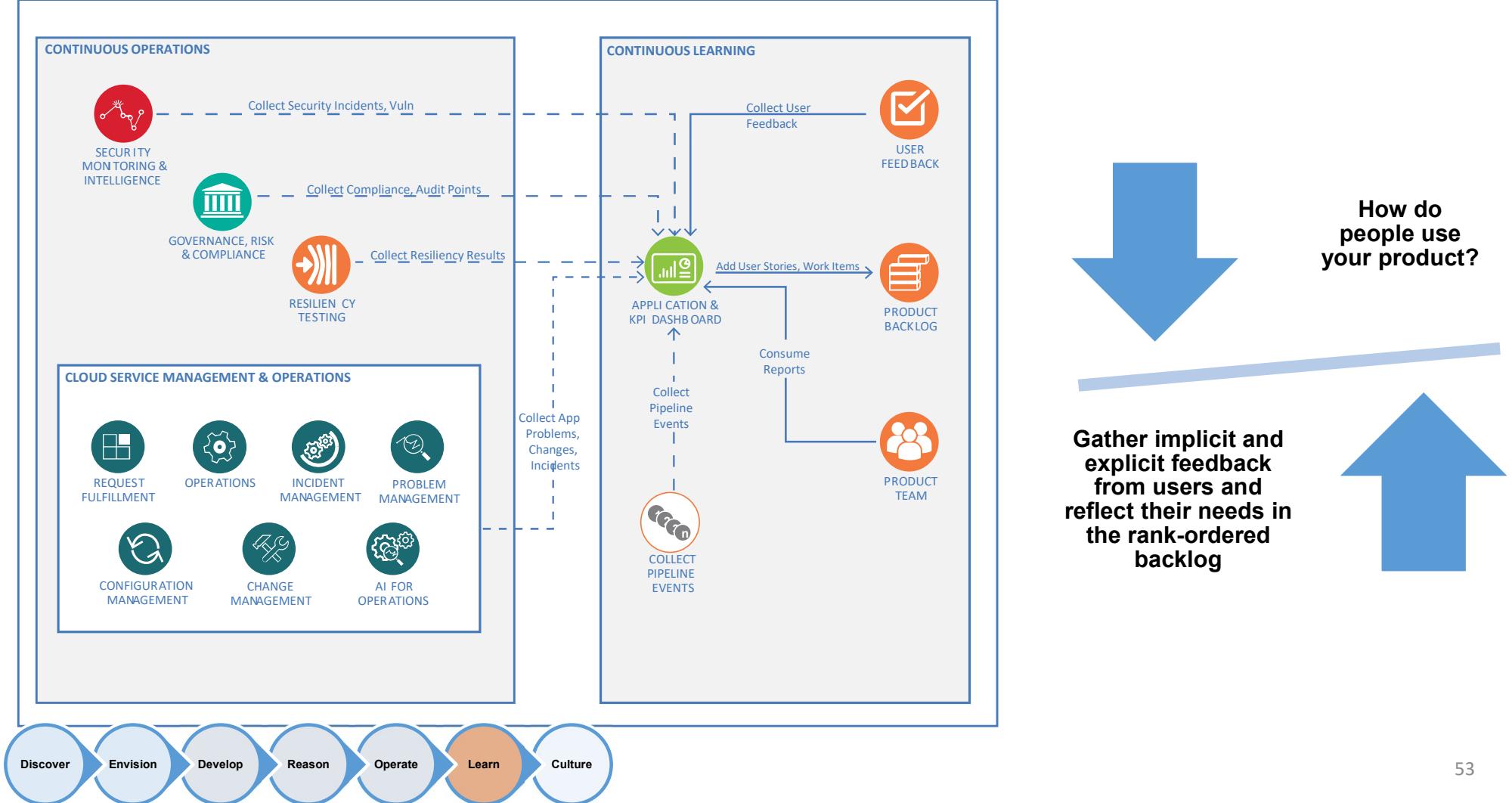
Being inclusive of key stakeholders, such as development, operations, QA, security, audit, business, and users

Clear, well-defined, and properly scoped user stories

Intake of technical debt and defect work items as part of normal backlog capacity

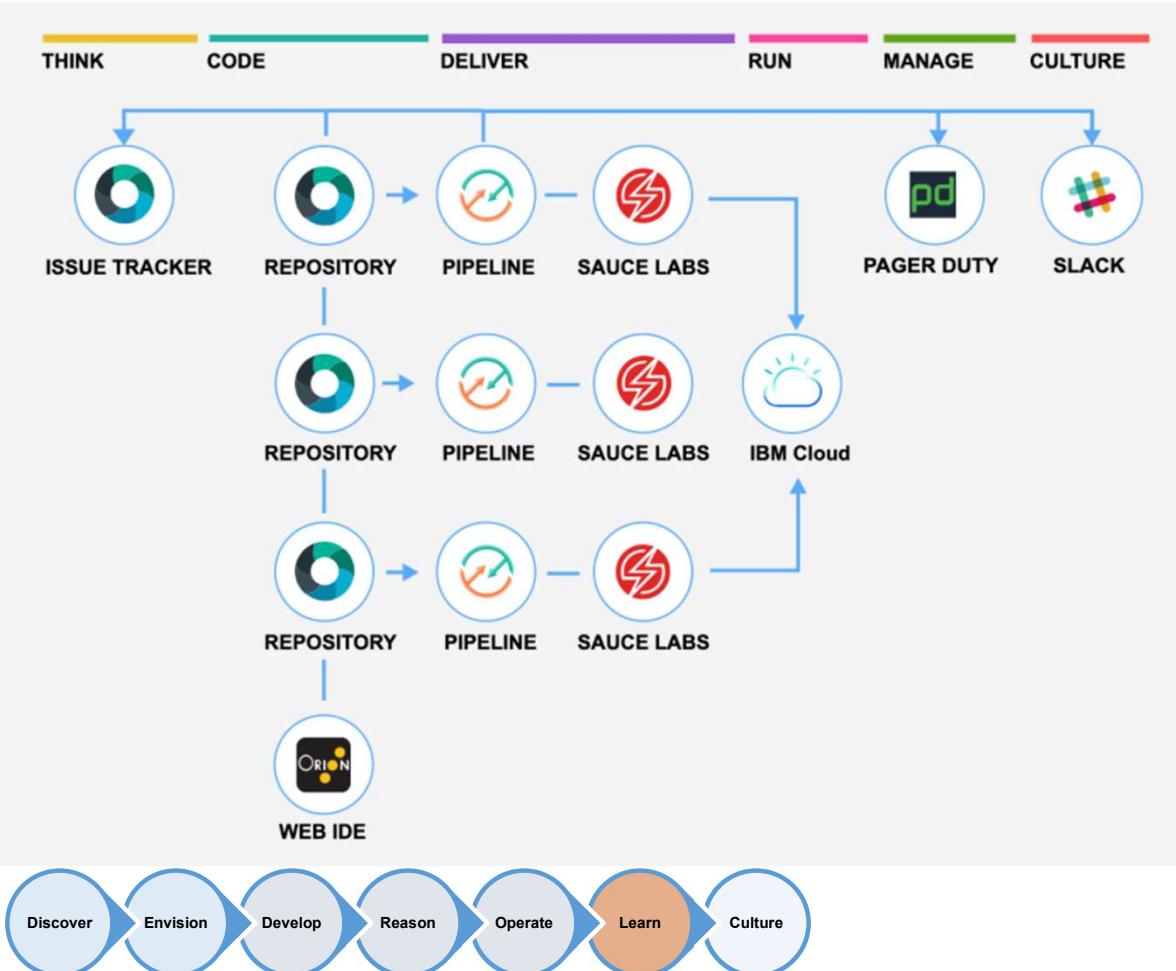


The Continuous Cycle



Automate Operations Tasks to ensure Operational Excellence

Toolchains

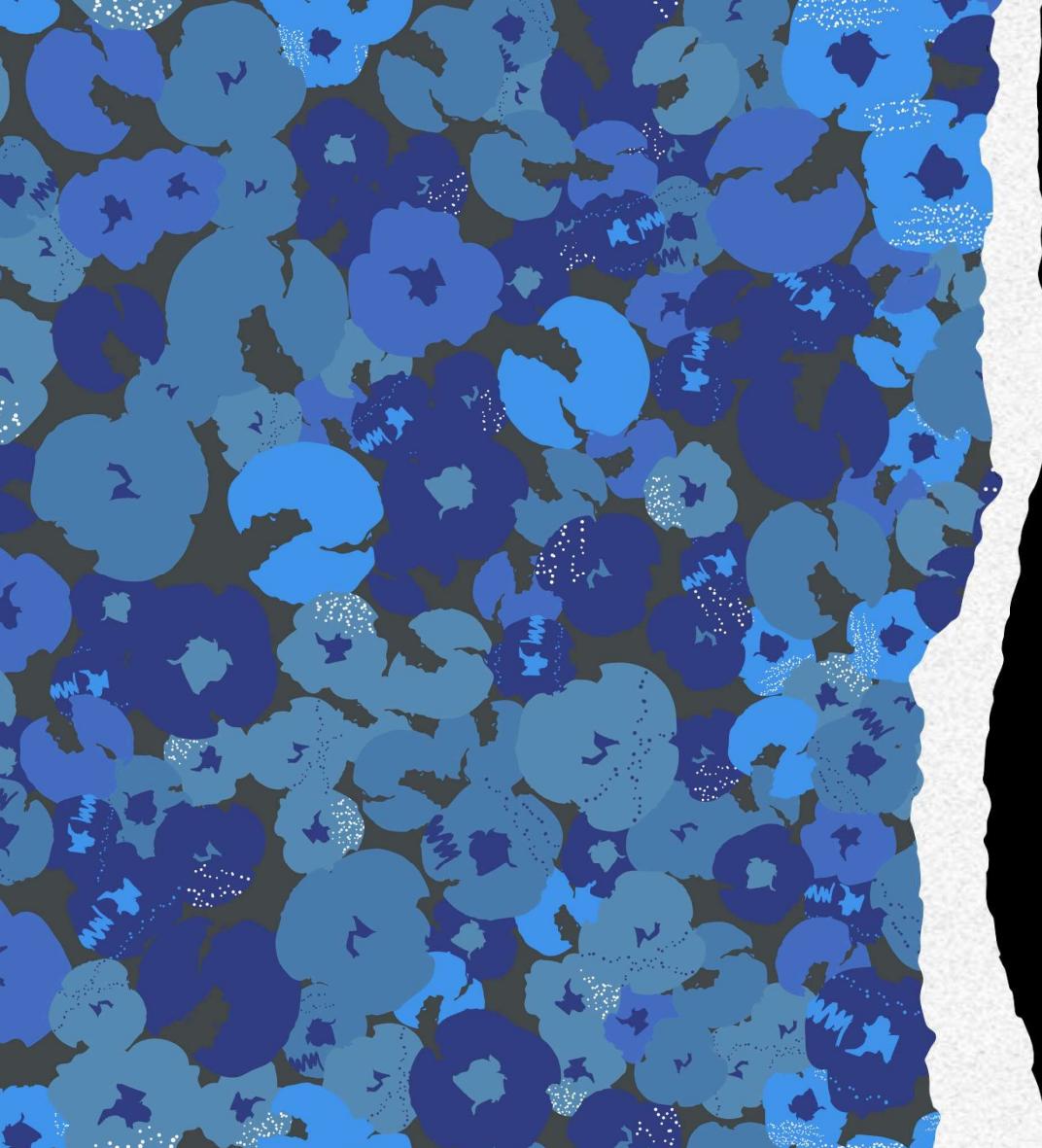


IBM Cloud Delivery Pipeline Summary:

- Automated deployment to production in 30 minutes
- Stages:
 - Build
 - Unit Tests
 - Deploy to Staging
 - SEO Build
 - Deploy to Pre-Production
 - Functional Tests
- Components:
 - Git
 - Unit test
 - Blue-green deployment
 - Search engine optimization
 - Blue-green deployment
 - Automated test

In a cloud based CI/CD and DevOps environment:

- wait times are eliminated
- processes for build, integration, testing and deployment are fully automated
- Small code base in microservices, thus release cycles are short, in terms of minutes.



Culture

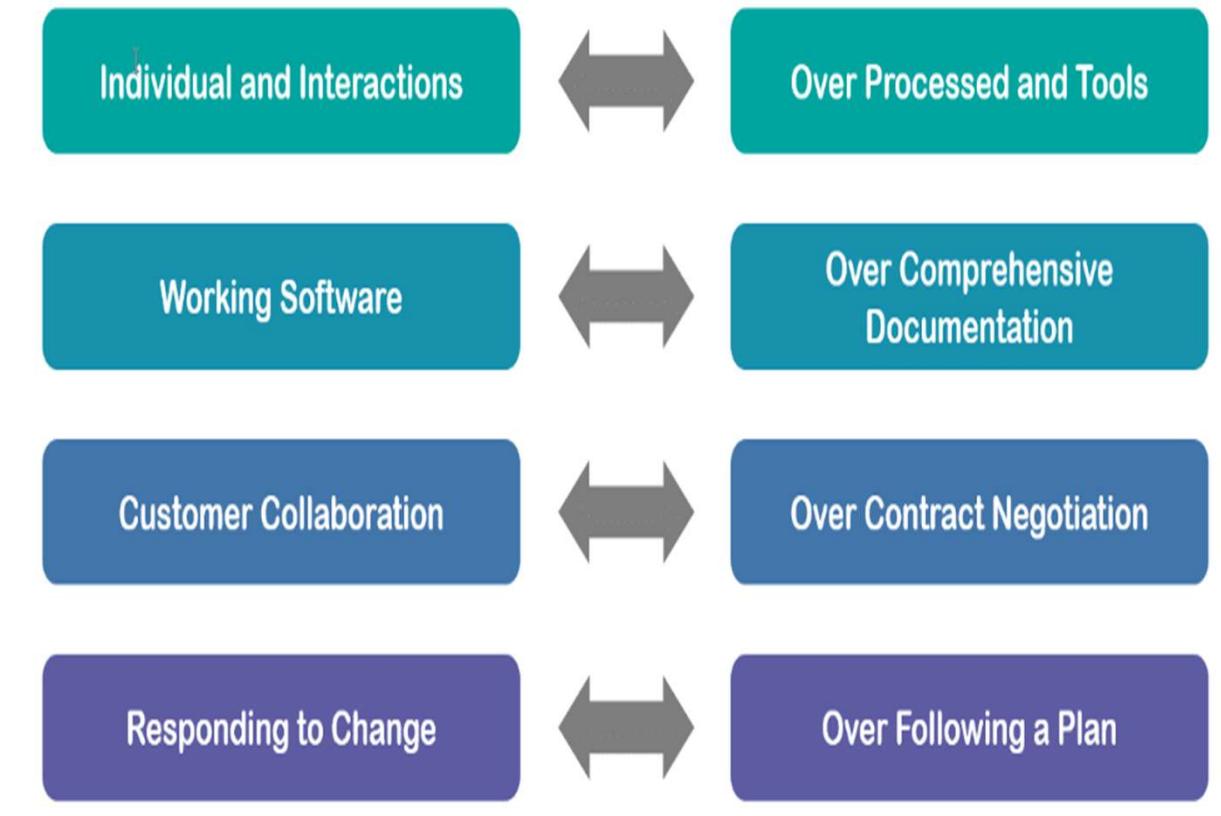
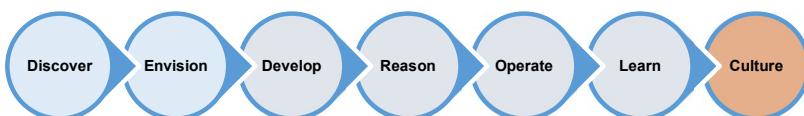
Transform your organization by combining business, technology, and process innovations that help you create teams that quickly learn from market experiences

The Scrum Culture – Agile Approach

How can we deliver the right outcomes at the **speed** the market demands?

Agile principles

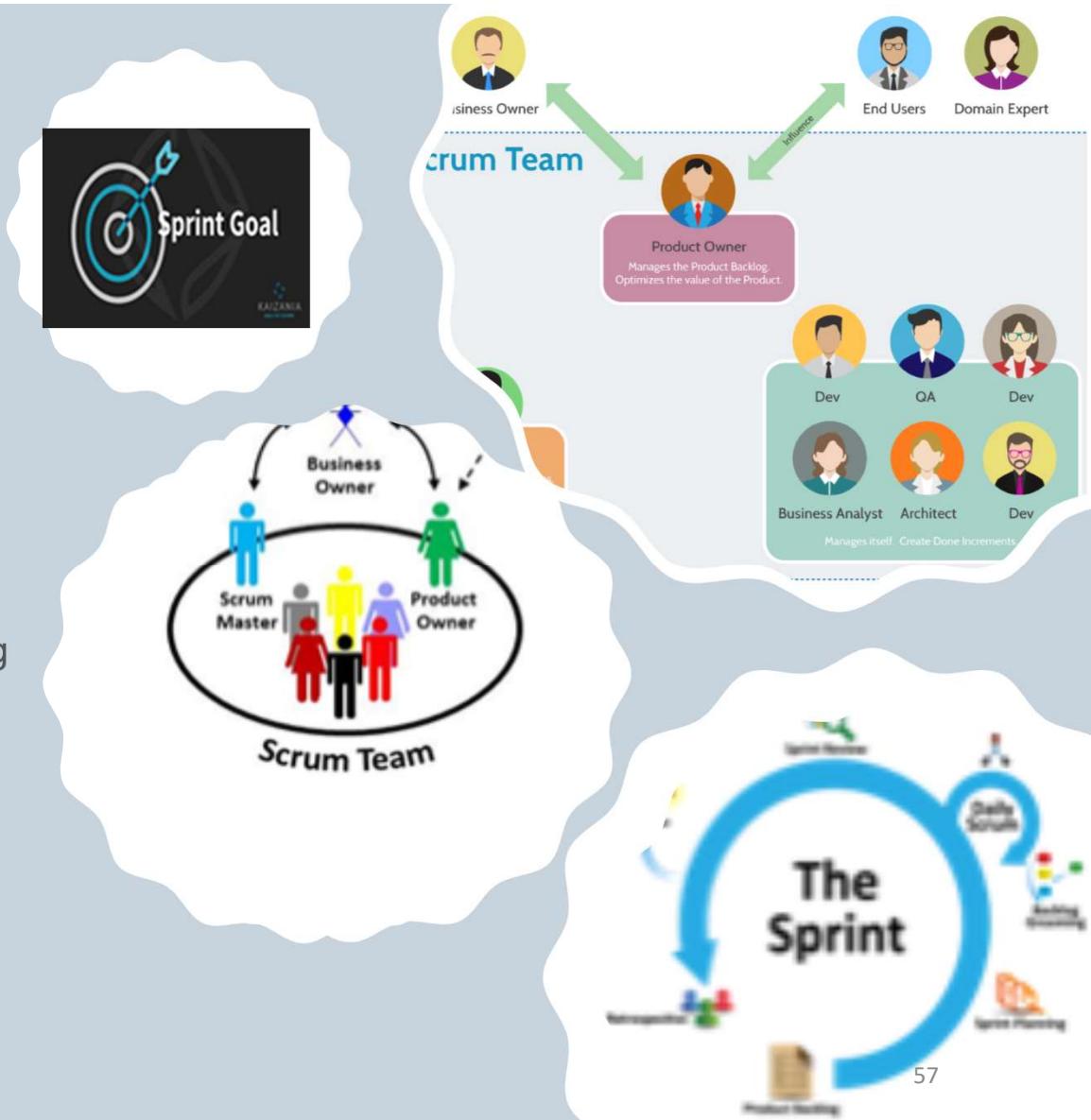
- Mindset
- Focus
- Value
- Scrum as a framework



Scrum Development Team's Goals and Structure

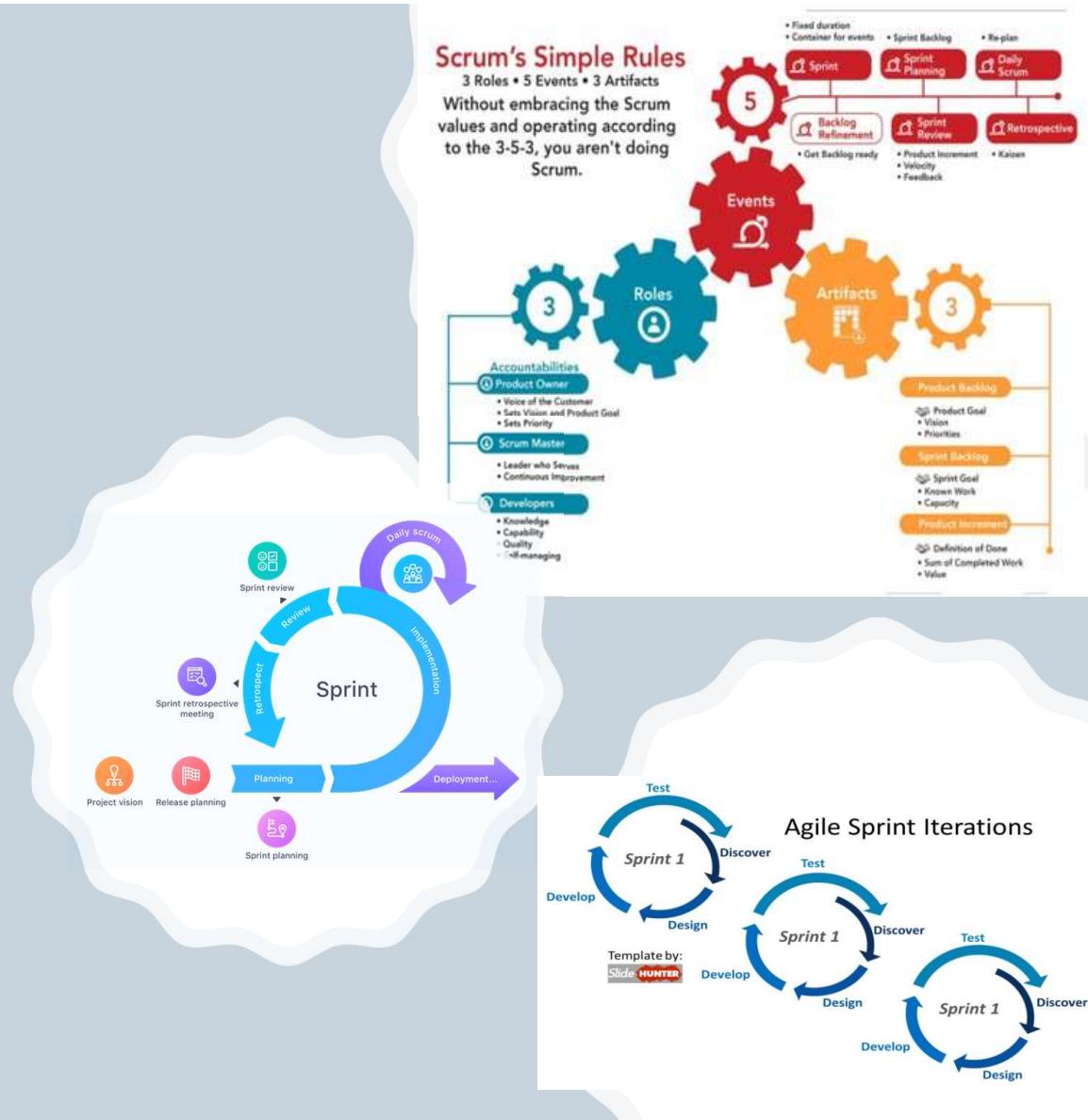
Scrum is an agile process to focus on delivery the business value in the shortest time, via a series of sprints.

- **The Product Owner** - the voice of the customer, responsible for communicating the vision to the team
- **The ScrumMaster** -the keeper of the process, facilitate team communication
- **The Scrum Team** - responsible for the delivery of the product., report daily status in the daily scrum



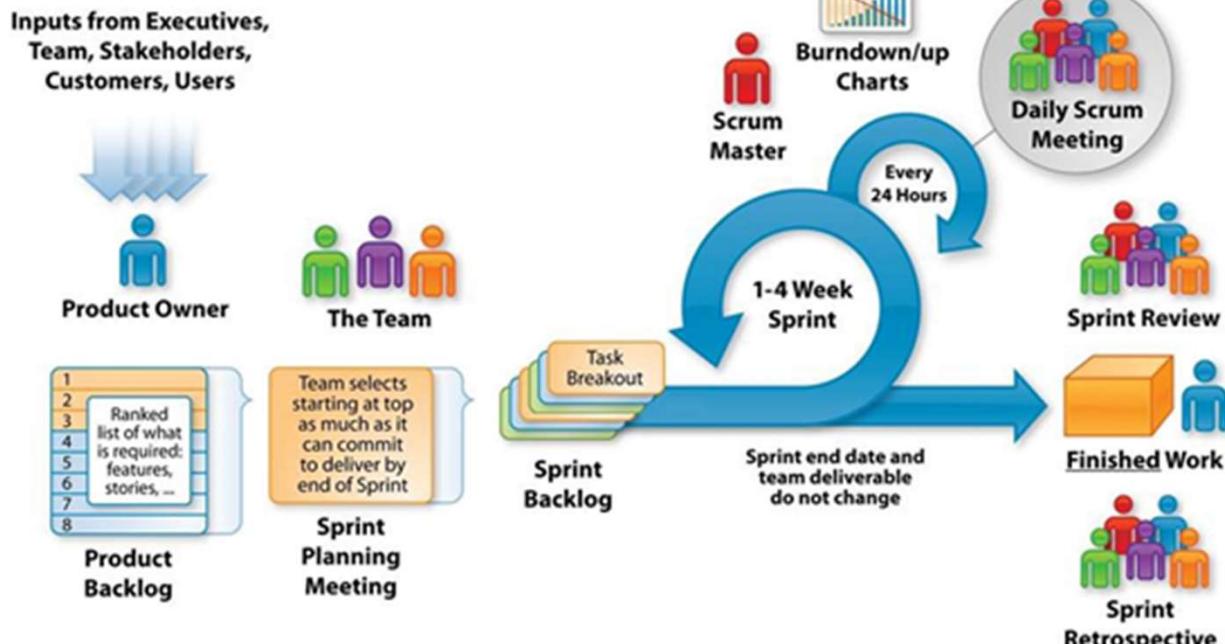


- **Product Backlog** "To do" list and constantly revisited
- **Sprint Backlog** – selected for the Sprint for implementation
- **Increment** - usable end product from a sprint
- **The Sprint** - The heartbeat of Scrum, the time period needed to finish an increment
- **Sprint Planning** - work to be performed during the meeting by the development team
- **Daily Scrum** - keep track the progress and make adjustments
- **Sprint Review** - provide feedback on the increment.
- **Sprint Retrospective** - identifies improvements

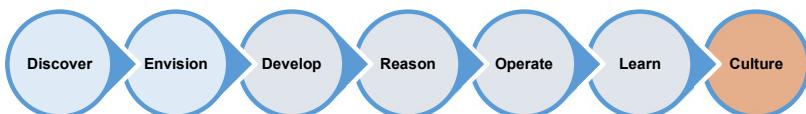


Scrum As An Agent Of Culture Change

The Agile - Scrum Framework



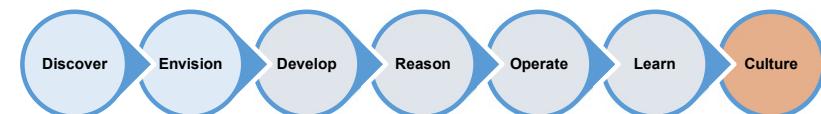
- planning meeting at the start of the sprint
- create a sprint backlog
- tasks to perform during the sprint.
- continually inspecting and adapting the process.
- progress via a series of sprints.
- helps to deliver valued products iteratively and incrementally





The last best experience that anyone has anywhere becomes the minimum " The last best experience that anyone has anywhere becomes the minimum expectation for the experiences they want everywhere."

Bridget Van Kralingen, senior VP of IBM



Conclusion

The implementation of conversational AI is a critical function to any future investment roadmap not only because of the potential business gains but to exceed customers' evolving expectations through interactive technology.

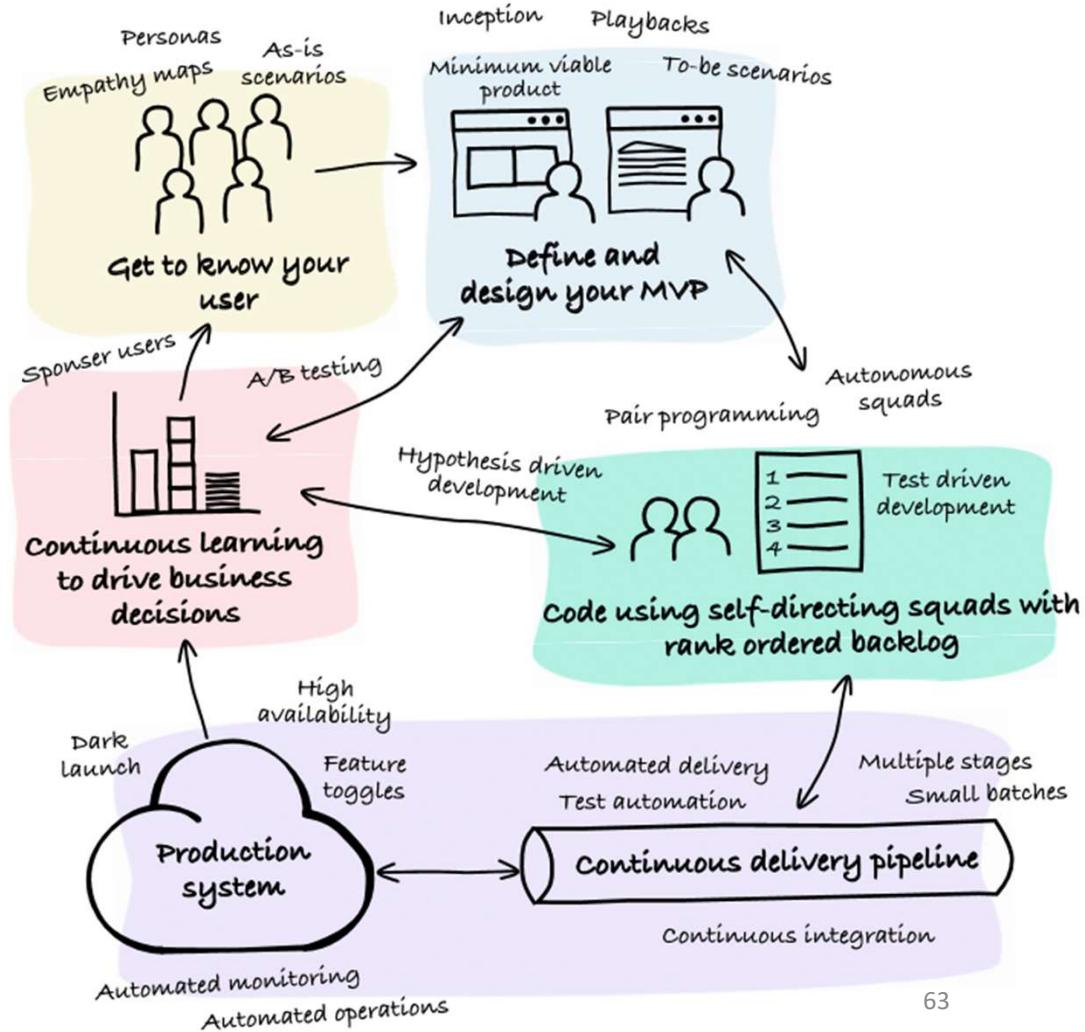
Thank you



Innovation is the unrelenting drive to break the status quo
and develop anew where few have dared to go.

The Garage Experience

- Co-create, co-execute, co-operate
 - Identify a business opportunity
 - Use EDT to identify target users, define hypotheses, and create a MVP
 - Design, build, and deploy an MVP
 - Transform by adopting the method to meet objectives for speed and quality



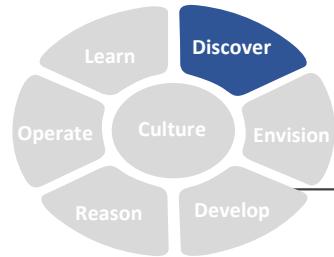
IBM Garage Method - Develop



**Create quality code
through collaboration
and Automation**

continuous integration, continuous delivery,
automation

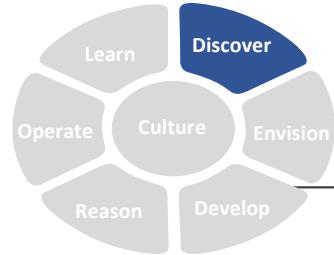
IBM Garage Method - Reason



**Apply AI techniques in order
to make better decisions**

infuse AI into your business so that you can make
the right decisions faster and more accurately.

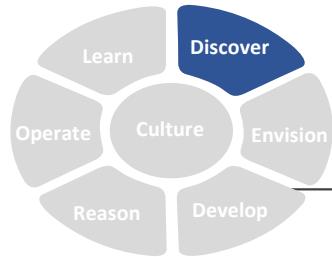
IBM Garage Method - Operate



Focus on operations excellence

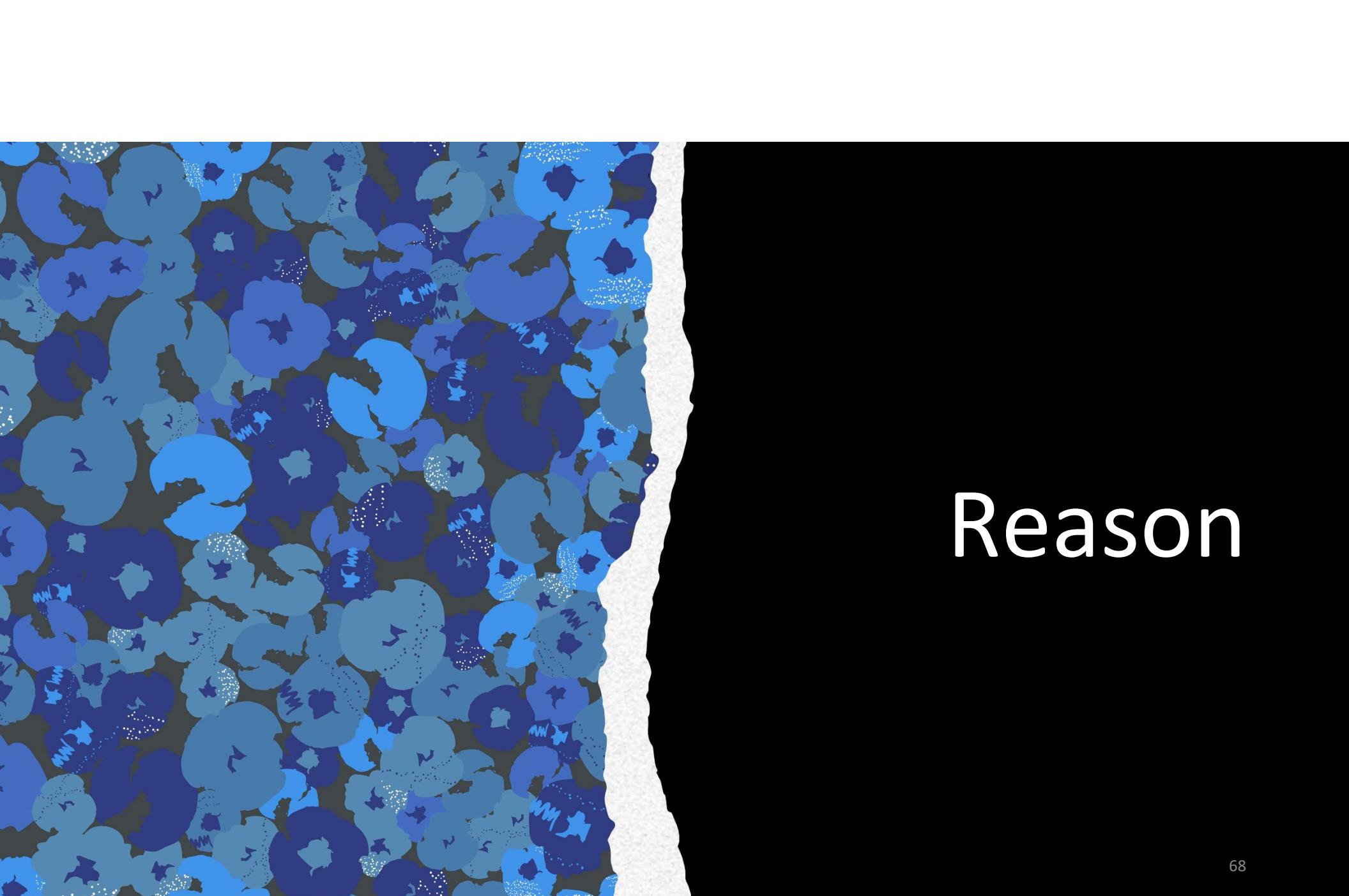
follow high-availability and fast-recovery practices to ensure that your apps are always available.

IBM Garage Method - Learn



Continuously learn based on outcomes from experiments

Hypothesis-driven development, A/B test, data-driven approach, cognitive analytics tools



Reason

The Power of Conversational AI and its potential business value

Advanced capabilities, advanced AI solution, multi-intent recognition and context switching

- uses NLP to understand and speak in coherent and human like sentences
- uses neural network algorithms to detect multiple intents, handle and triage them so that most important processes are handled first
- based on expert, data- based decision making
- can distill customer's words and intents for actionable results
- context awareness

Benefits

***To provide personalized service/information and focus on improving customer service**

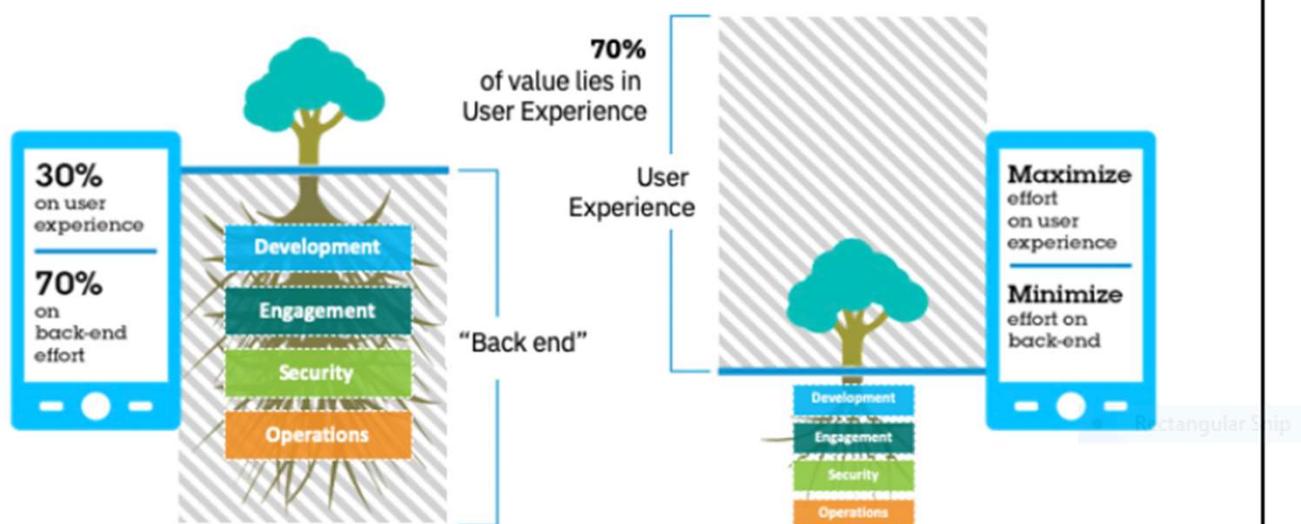
- to help customer to accomplish their goals by automating interaction
- to help customer to resolve a transaction, reach a resolution more quickly with desired results
- Higher customer satisfaction, greater customer loyalty

***Allows business to experiment and adjustments and changes can be adapted quickly without depleting resources and the information learned can be used to further enhance the product/service**

- Reduce cost in the LT, increased in ROI
- Operational efficiencies
- Greater business value and gains

1. THE NEED FOR A MULTI-CHANNEL PLATFORM

70% of the apps value lies in the user experience



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8

Singapore's challenge: Ageing population, Inevitable digitalization



Content

- Part 1: What is the Problem
 - IBM Garage Method Step 1: Discover
 - IBM Garage Method Step 2: Envision
- Part 2: How you intend to solve the Problem based on what we have covered with you in the Cloud Computing Module
 - IBM Garage Method Step 3: Develop
 - IBM Garage Method Step 4: Reason
 - IBM Garage Method Step 5: Operate
 - IBM Garage Method Step 6: Learn^[L]
IBM Garage Method Step 8: Culture
- Note: Yes, Culture is at the heart of the IBM Garage Method. I put this at Stage 7 for convenience.
- Elaboration on Part 1:
 - Apply the Enterprise Design Thinking Process to uncover and disassemble the business challenge as is covered in what U cover with you in Cloud Computing => Lecture Notes: IBM Garage In Action Part 1 and 2. You can also refer to Lecture Notes: Agile Cloud Culture for relevant items you want to use.
- Elaboration on Part 2:
 - I would like you to give me evidence that you can (i) apply what you have learnt from me, and (ii) defend why you choose this approach instead of another approach.

