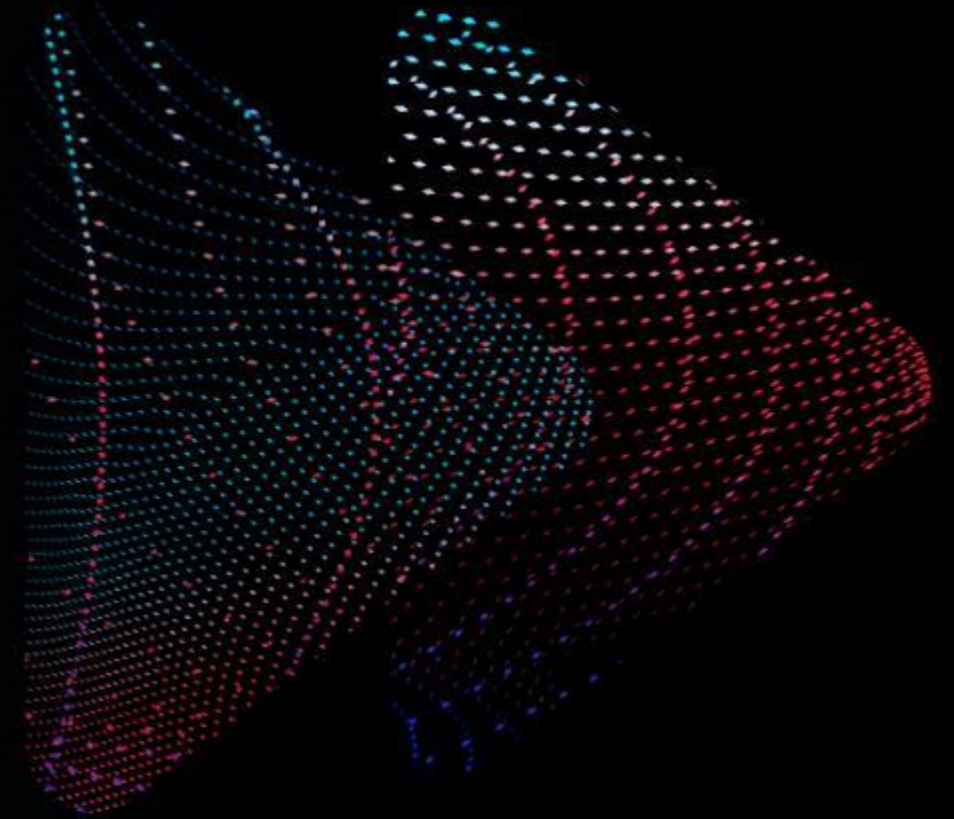


SCALE DIGITAL PARTNER FOR NEXT-GEN ENTERPRISES

Modern Apps

Haritha N



Modern Apps 2.0

Beyond technology,
towards value.

Scale Cloud Native

Towards platforms which deliver enterprise class building blocks and functionality

Backbones, Platforms, Microservices, Serverless

Technology

Outcomes

From Shadow to Mainstream

Rapidly move Shadow IT apps to cloud, with speed and low cost, and the ability to operate at scale.

LowCode, NoCode, Excel Apps

App Cycles

Making App Iterations less painful, wherein its easier to scale an app from a prototype to its full service life cycle.

#FactoryInABox, DevSecOps, Digital QA, ADvantage tools

Experience (Engineering & Developer)

Business Computing

Solve digital scale business problems –
data, edge, intelligence, insights, experience.

MDE, App Generators, Logic Programming

Innovation

Leads in Practice



**Haritha Sarma
Nimishakavi**

Product Owner



**Vinod
Kharade**

**Cloud Native AD – IBM,
AWS & Tanzu**



Sripathi KS

**DevOps , Digital QA, SRE
& Kubernetes**



Deepak KM

Modern Platforms , API & MS



**Prabhu
Ramaswamy**

Low Code Platforms



**Rajesh
Kumar**

**Modern APP Platforms
ADC, HDAP & APP 360**

LOOKING FORWARD (TRENDS AND POST COVID SCENARIO)

Modern App Trends

Uses of cloud native services to maximum extend Focus toward platform as services e.g. Azure DevOps, AppScan, SonarCloud

Cloud platform security - Cloud Platform certification and management (PCI compliant platforms)

Edge, Hybrid & Multi- cloud opportunities in enterprise clients

Data science with Cloud Native way. Create & manage dynamic AI/ML models with cloud native approach.

Event Driven Application Development

Serverless Cloud Native App Development

Cloud Marketplace application development

Enable predicative application analytics using AI/ML

Observability vs. Monitoring

Observability Driven Development (ODD)

Post COVID

- **Low-Code/No-code Development in building apps in Faster and Cheaper ways**
- **Increase in Zero-Touch Deployments and Canary Releases**
- **Increase in the Security requirements due to exploded online app usage**
- **Increased Platform based collaborations**

UNDERPINNINGS OF DIGITAL APPLICATIONS

Modern App Trends



Human Centered Design

Leverage 123Design® philosophy to deliver the experience in no more than 3 clicks



API First

Identify with capabilities needed in the platform and define APIs to enable them



Microservices Based

Develop self-contained micro-services built for change and scalability



Insights Infused

Data driven in-sights and built to support decisions based on data science



DevSecOps Driven

Consistent process and automation to scale platforms across geographies



Cloud Scale

Deployment agnostic application architecture; scale to accommodate data burst

MODERN APPS 2.0 - PRODUCT STRATEGY

Modern App Trends

- Architecture and Dev Platforms
- API & Microservices
- AD on Cloud
- Digital QA
- Opensource based App Development

Digital AD



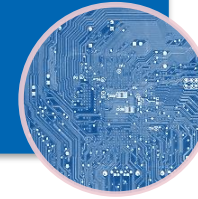
- Low-Code Platforms
- IBM RedHat
- VMWare Tanzu (PCF)
- AWS
- Kubernetes

Cloud Native Platforms



- Digital ways of working (Scale Agile)
- DevSecOps
- SRE
- Observability and remediation

Digital Engineering



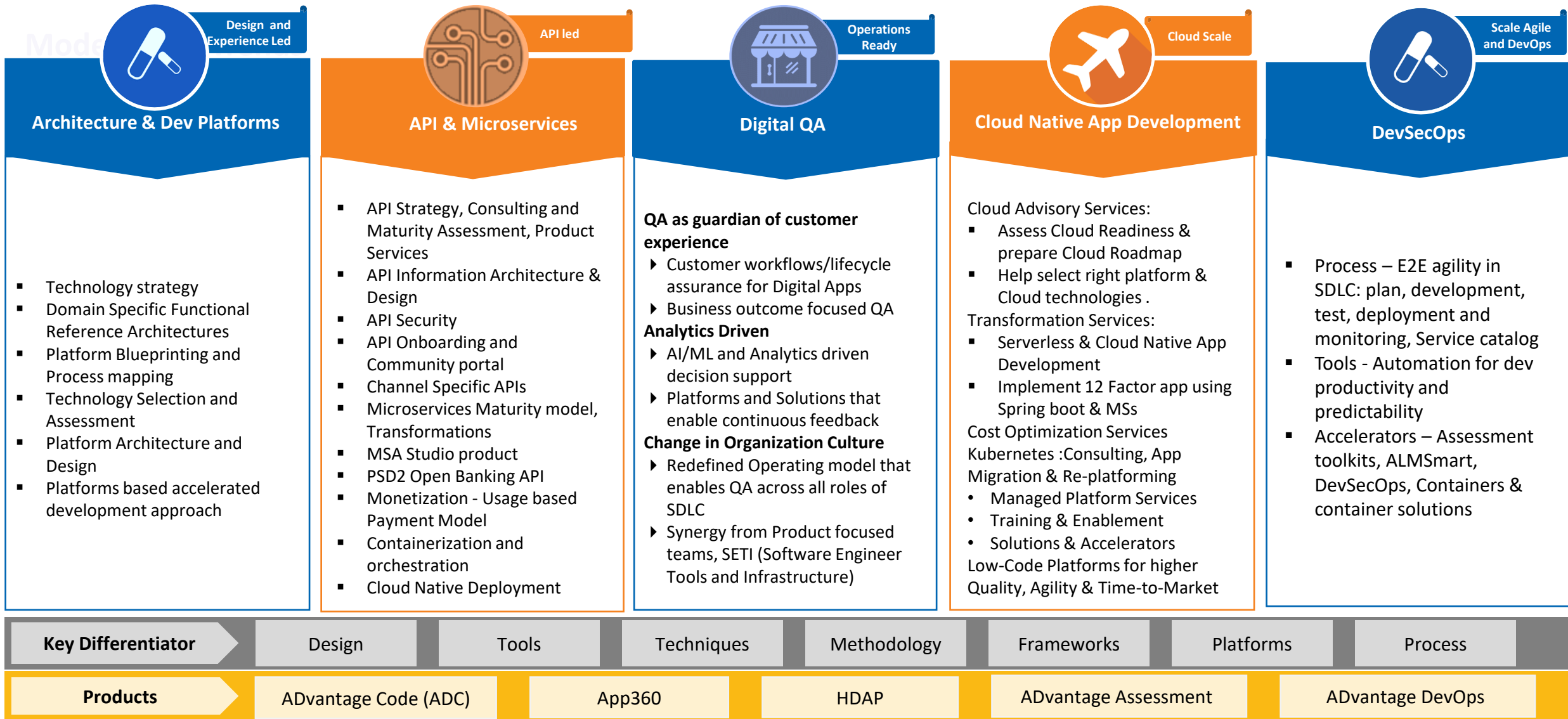
- POC led deals
- ADvantage Code
- ADvantage Assessment
- HDAP

Pilot led Transformation



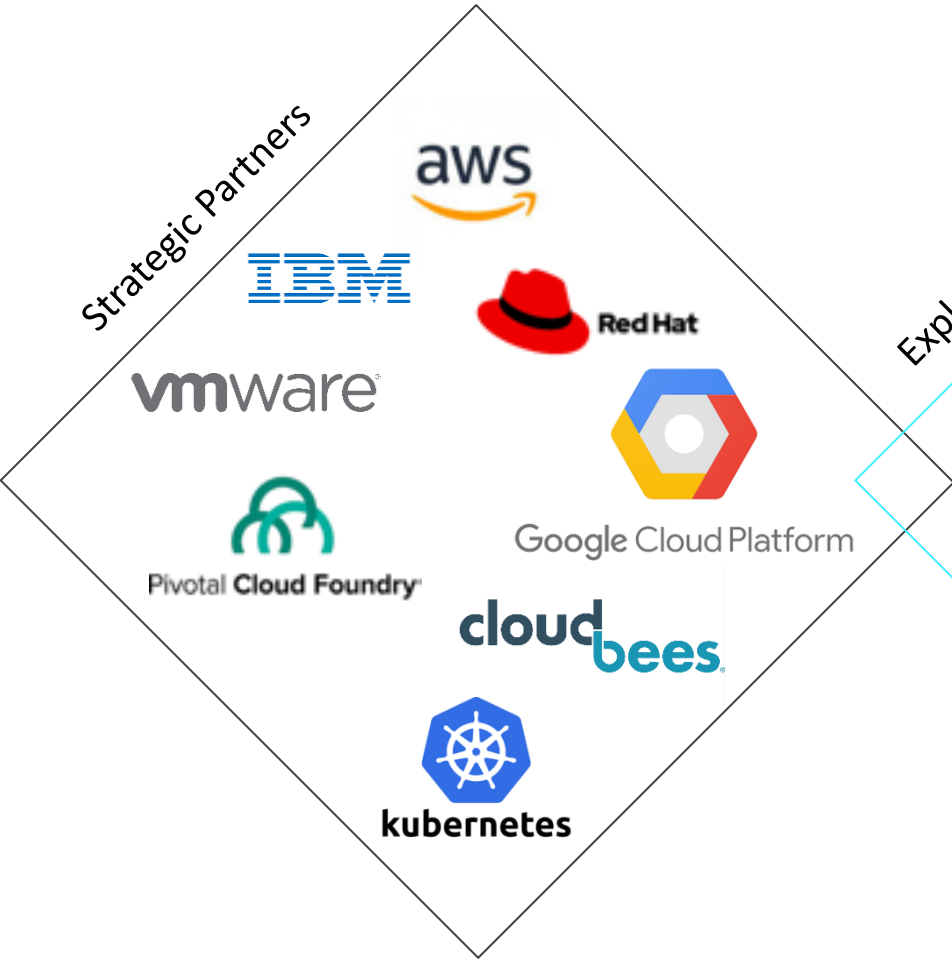
App360

MODERN APPLICATION DEVELOPMENT (AD) | PORTFOLIO SERVICES

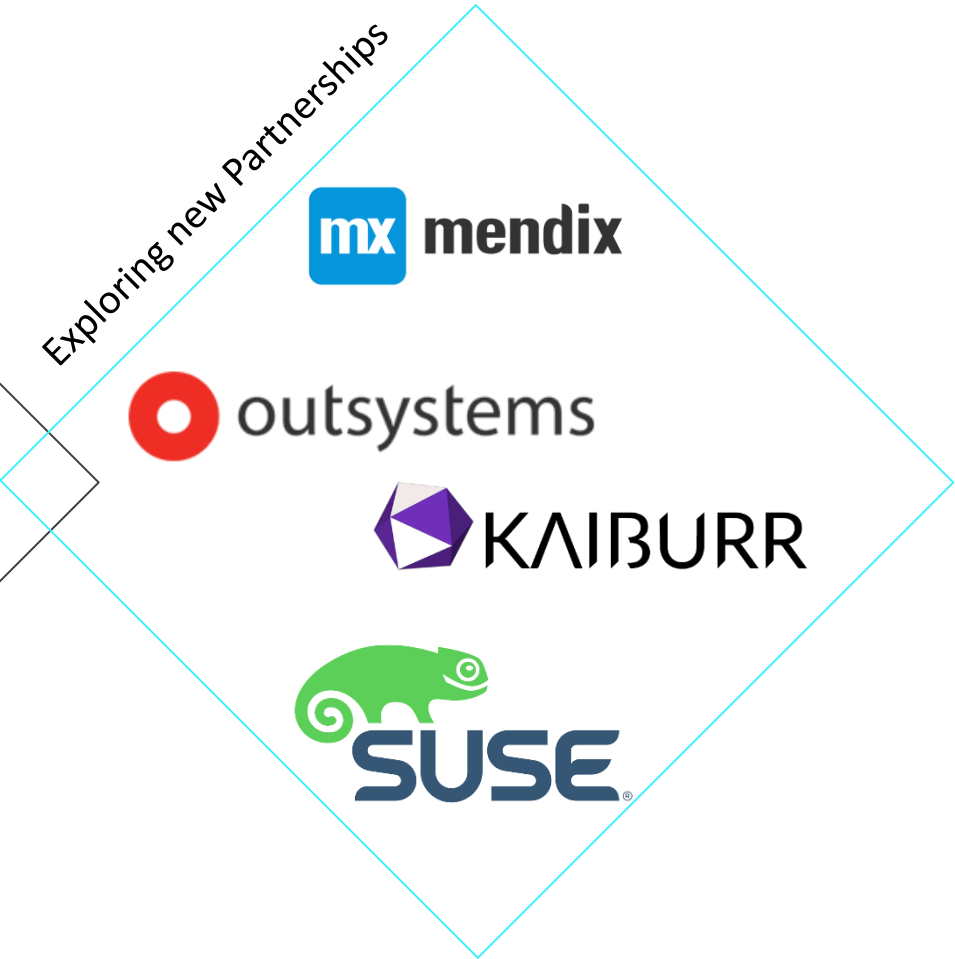


PARTNERSHIPS AND ANALYST RECOGNITIONS

Strategic Partnership with Key Technology companies



Exploring new Partnerships



Leader & top player in DevOps Consulting 2020
iSG

Leader in Cloud Customer Journey Services 2020
iSG

Leader and Top Service Provider for DevOps Services, 2018, 2019
IDC

Leader among top 3 in Digital Transformation Services (aaS), 2019
iSG

Leader, Next-gen Agile Services, DevOps, Next-gen ADM 2019
iSG

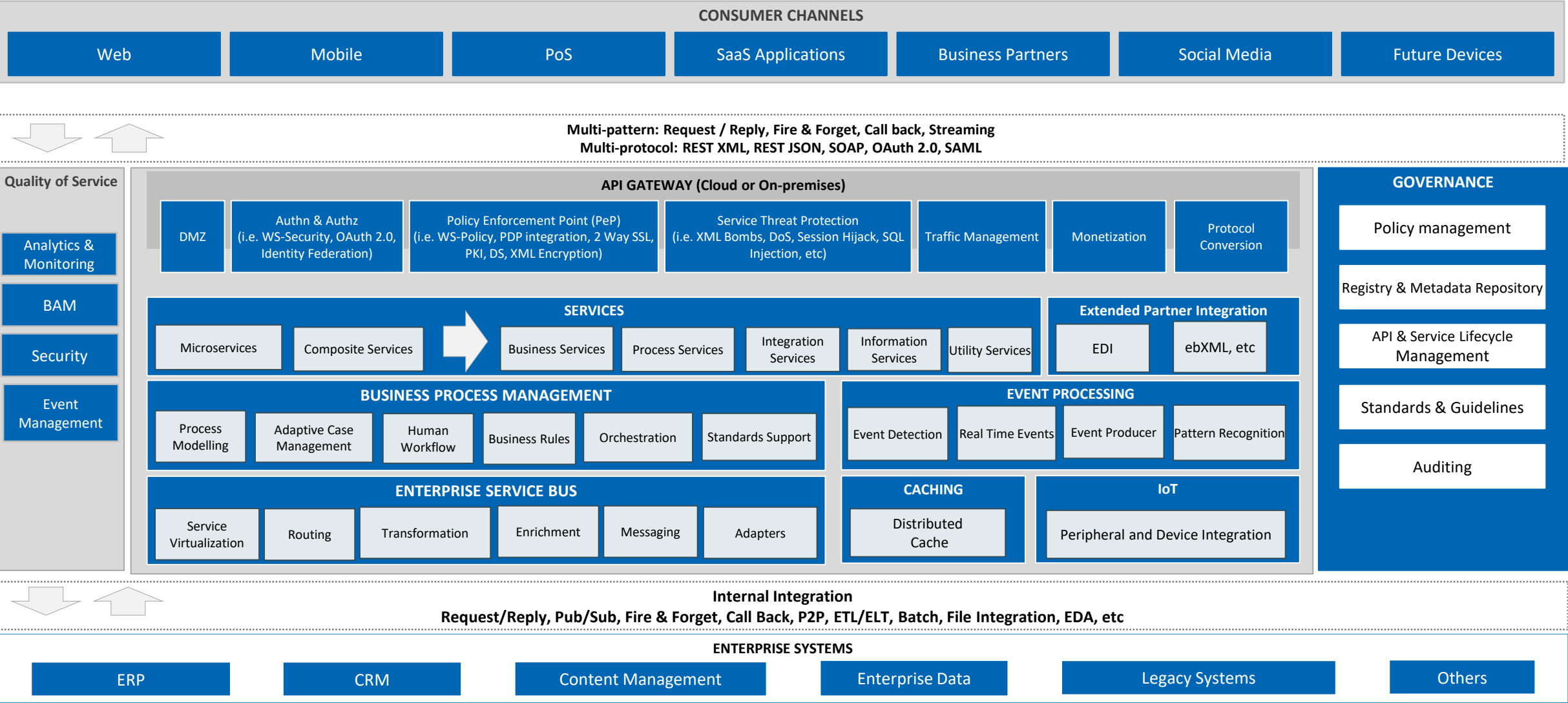
Leader among top 2 in Digital Transformational Platforms (PaaS), 2019
iSG

Leader for Application Modernization and Migration services, Wave™ 2019
Forrester

Leaders in Application Modernization Services, 2018
EVEREST

Details : <https://www.hcltech.com/about-us/alliances>

MODERN AD | REFERENCE ARCHITECTURE



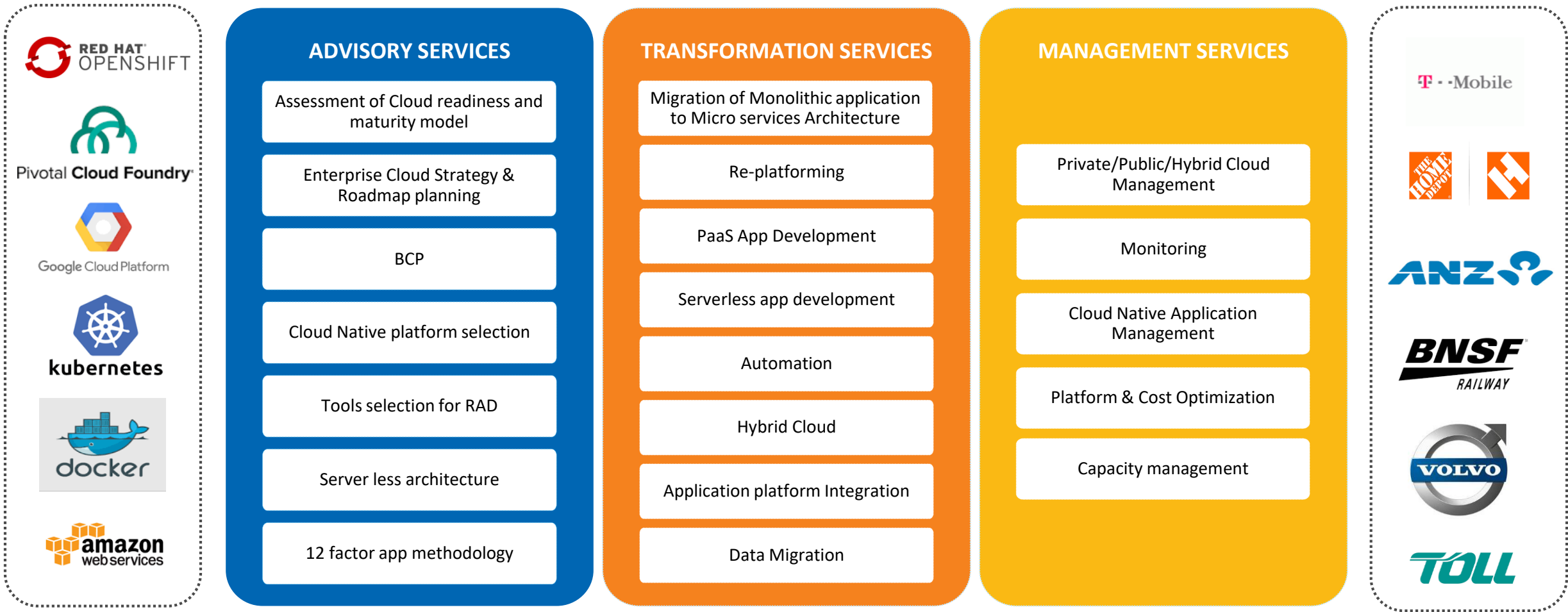
API CAPABILITIES SNAPSHOT

Focus Areas	Assess > Transform > Integrate > Govern > Measure > Improve					
Customers						
Partnerships						
Service Offerings	API Consulting <ul style="list-style-type: none"> API Landscaping & Discovery API Adoption, Conception & Roadmap Enterprise Transformation approach API & Micro Services Maturity model, KPI and Metrics 		Training & Enablement <ul style="list-style-type: none"> Extensive Training and certification content Training programs across all levels Technical training, cook books and job aids 		Solutions & Accelerators <ul style="list-style-type: none"> MAS Studio ADvantage Code – Newage AD Framework Cookbooks and job aids Point solutions PSD2, Containers and Microservices 	
Value Add & Differentiators	Ready to use open source solutions	Managed Services, T&M, Outcome based models	Design, implementation and support services	Case studies with proven value	Tools and technology expertise for COTS and Opensource	Reference architecture, migration scripts, Best practices
Delivery & SME	5000+ SME		10+ Technology Partners		50+ Fortune 500 Customers	

DEVSECOPS CAPABILITIES SNAPSHOT

Analyst report	Leader in DevOps Consulting in USA, UK and Global 2019-20 ISG		Leader among Top 3 in Digital Transformation Services (aaS), 2019 ISG		Leader among top 2 in Digital Product Creation & Customization, 2019 ISG		Leader and Top Service Provider for DevOps Services 2018 IDC		Leader in Next Gen ADM Services & Agile Dev, 2019, 2018, 2017 ISG					
Customers														
Marquee Technology Partnerships and Alliances														
Service Offerings	DevOps Consulting		Design, Implementation and support services		Integrated tooling and platform development		DevOps for Mainframe, ERP and COTS products		Reference architecture, migration scripts, Best practices		Managed Services, T&M, Outcome /Transaction/ Service Catalog /Utility based model			
Labs & Solutions	DevOps lab on Cloud with reference solution for different tech stack		Noida: Digital delivery centre helping create multi disciplinary teams (UX, Modern Full stack technologies, AI, Big Data, AR/VR) Chennai: Advanced technology labs for mobile payments, wallets, D2C innovation, and multichannel commerce Amsterdam: Scaled Agile Delivery Centre and Digital Co-Innovation lab				 Self Service portal, ChatOps, Release mgmt., Kubernetes		 Agile and DevOps platform to support Continuous Delivery		 Bring productivity in app dev via automation		 Single window 360° view of Agile & DevOps metrics	
Delivery & SME	6350+ SME		650+ Projects		20+ Marquee Technology Partners			60+ Fortune 500 Customers						

CLOUD AD & PAAS CAPABILITIES OVERVIEW



ENTERPRISE CLOUD NATIVE MATURITY MODEL

Superior digital experiences must be built, they can't be bought

Level 0 - Legacy Apps on Dedicated Infrastructure

Level 1 - Cloud Ready

- Self-contained application
- SSO/Security
- Create immutable application images for the application
 - Ex. If you are using an application container, like Docker, immutable container images can be built using tools like Jenkins.

Level 2 - Cloud Friendly

- Applications decoupled from the underlying infrastructure, and all major application components (or tiers) should be decoupled from each other.
- Ex. decouple application from storage and data management tiers. This may also include configuration data, logs.
- If the application is multi-tenant, data tier should be shared across tenants.
- Decouple the application from network constructs. Use a naming service, rather than rely on IP addresses and ports. This may simply be DNS across tiers, or injecting IP Addresses and ports as part of the deployment (this works for static application components), or a service naming, registration and discovery scheme.

Level 3 - Cloud Resilient

- Proactive failure testing
- Cloud Agnostic runtime
- Bundled metrics and monitoring
- Abstract application blueprints, deployment policies, scaling policies, affinity and placement rules
- Each application service must be elastic and resilient
 - It has multiple instances and can survive instance failures
 - The application designed in such a way that failures in one service do not cascade to other services

Level 4 - Cloud Native

- Microservices Architecture
- API-first design
- DevOps
- Self Healing
 - Application is able to detect or anticipate changes and react to them in a fully automated manner.
- Separate out application management & control functions, from the application itself
- Easy migration across providers

Moving to Cloud Native Platforms is more than a technology transformation, it's a new way to develop products

CLOUD NATIVE DEVELOPMENT WITH KUBERNETES

HCL is the first Indian GSI to obtain Kubernetes Certified Service Provider (KCSP) by CNCF



Kubernetes Focused Services



Consulting &
Advisory Services



Application
Migration & Re-
platforming Services



Managed Platform
Services



Training &
Enablement



Solutions &
Accelerators

Partnerships focus



Strategic Business
Partnership



kubernetes

Premium Consulting
Partner



ARCA
Partnership



Premium Consulting
Partner



VMware



Premium partner



Premier Partner



Reseller
Partnership



Gold certified
partner

EMERGING TECHNOLOGIES - LOW/NO CODE PLATFORM

Low-code development platforms (or rapid-application development platforms) provide 'citizen developers' with tools to build simple process applications with little oversight. ... Low code platforms are a reaction to traditional application development that are based on detailed system requirements and hand coding.

Low-Code Platforms Features & Capabilities

- Drag-and-drop design and development
- Integration with other apps
- Visual modeling
- User management and team roles
- Built-in workflow
- Security
- Reporting and monitoring

Customers

CLIFFORD
CHANCE

Market Leading Platforms



Microsoft
Power Apps



Visual Builder
Cloud



Google App
Maker



PEGA



Appian



mx



Betty
Blocks



HCL Leap
(IBM Forms XP)



CUBA
Platform



now



8



outsystems



mrc
m-Power
Platform

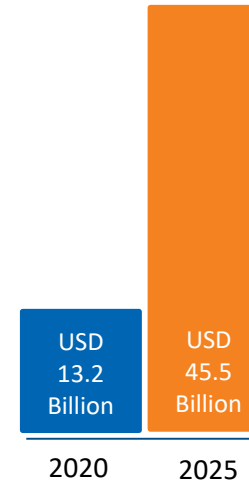


Vuforia
Studio



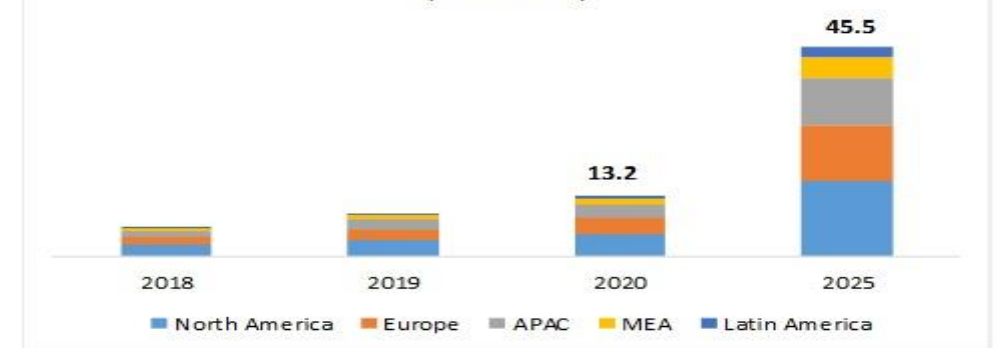
BMC Helix
Platform

CARG
28.1%



- The low-code development platform market is estimated to grow at USD 13.2 billion in 2020 and projected to reach USD 45.5 billion, at a CARG of 28.1% from 2020-2025
- Among industries, the BFSI industry is expected to hold the highest share in the low-code development platform market
- Emerging regions such as APAC and MEA offer several untapped and unexplored opportunities in the low code development platform market
- The market growth is attributed to the increasing need of digitalization and maturity of agile DevOps practices

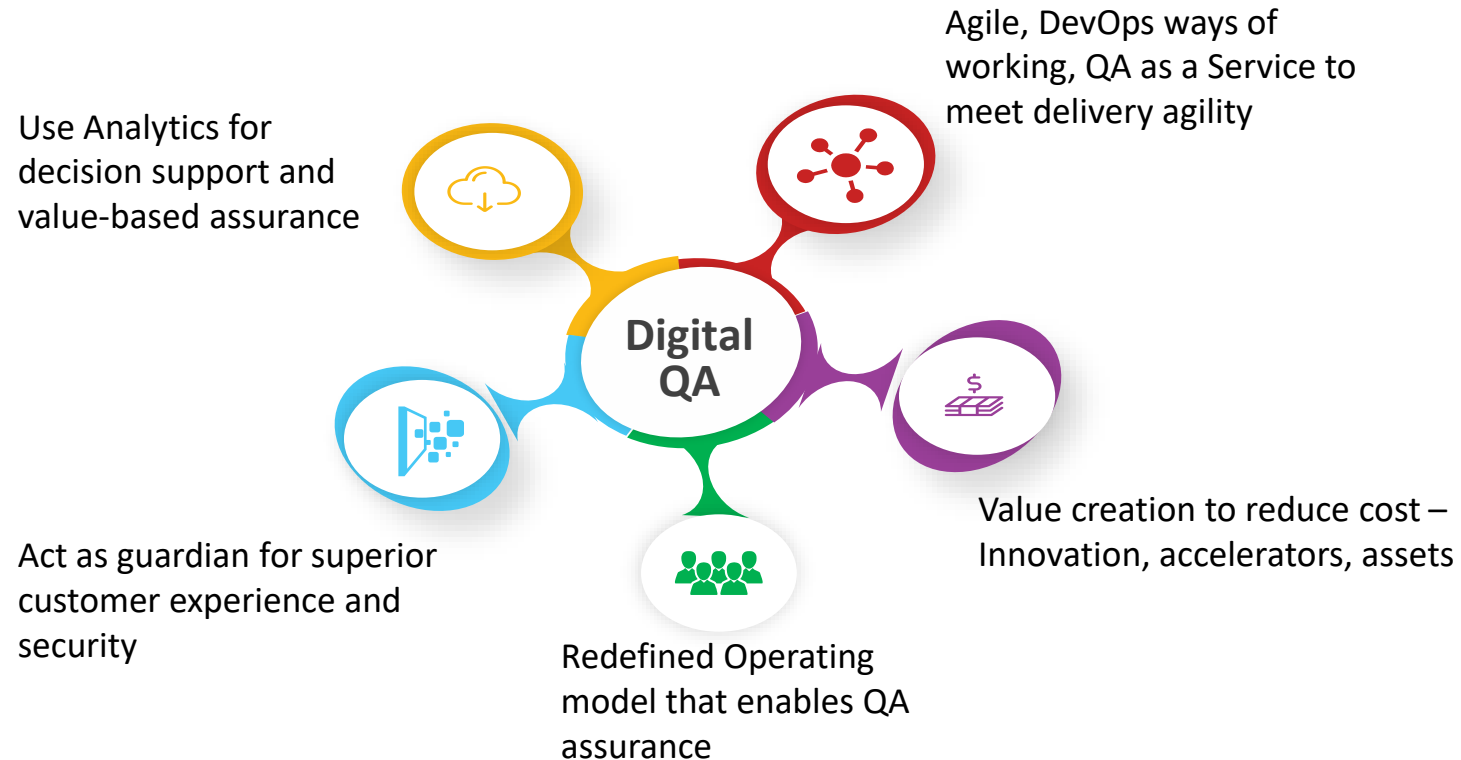
Low-Code Development Platform Market, By Region
(USD Billion)



Source: MarketsandMarkets Analysis

DIGITAL QA

Digital QA keeps quality at the core of the Business strategy and provides accelerated continuous delivery by combining Speed, Quality, Security and Intelligence



QA as guardian of customer experience

- ▶ Customer workflows/lifecycle assurance for Digital applications
- ▶ Business outcome focused QA

Analytics Driven

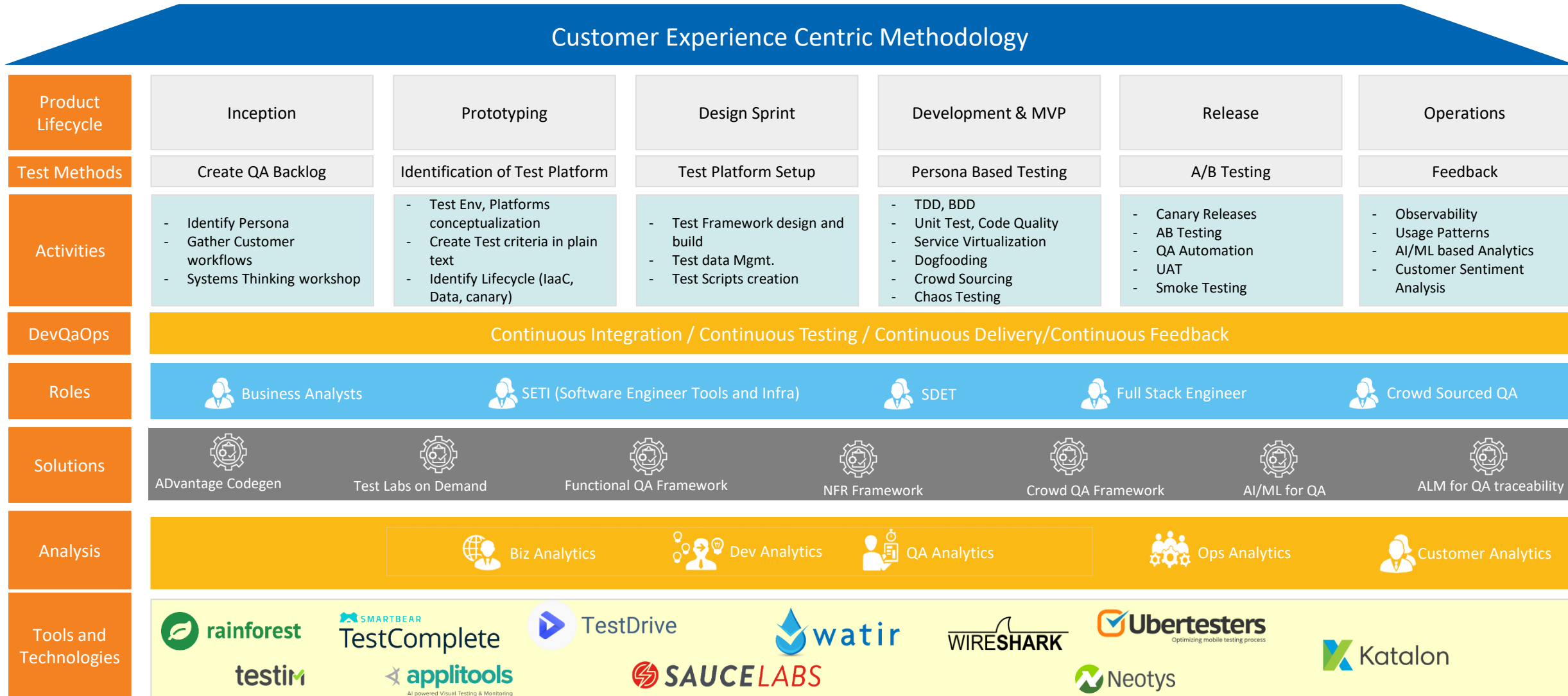
- ▶ AI/ML and Analytics driven decision support
- ▶ Platforms and Solutions that enable continuous feedback

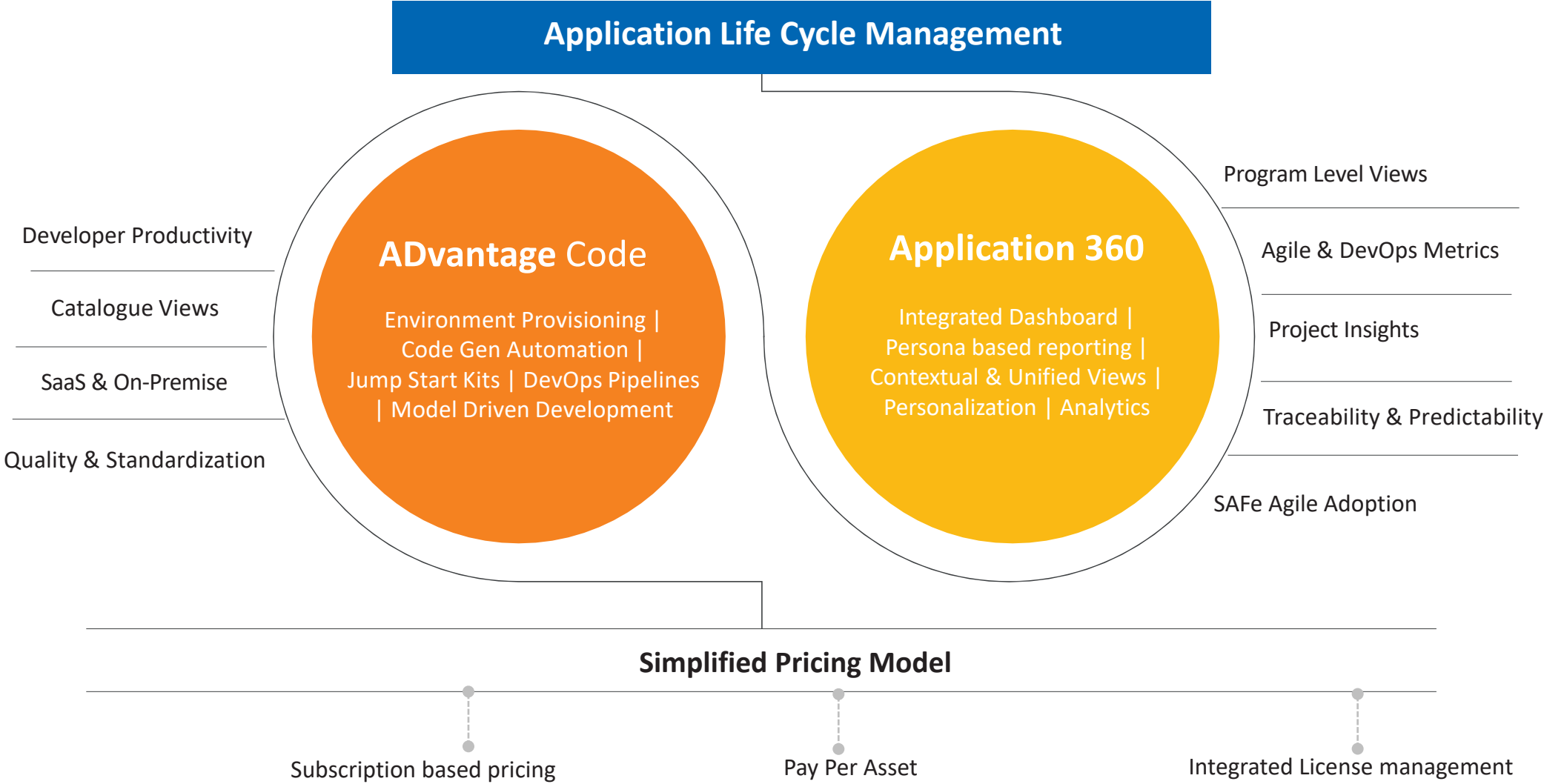
Change in Organization Culture

- ▶ Redefined Operating model that enables QA across all roles of SDLC
- ▶ Synergy from Product focused teams, SETI (Software Engineer Tools and Infrastructure)

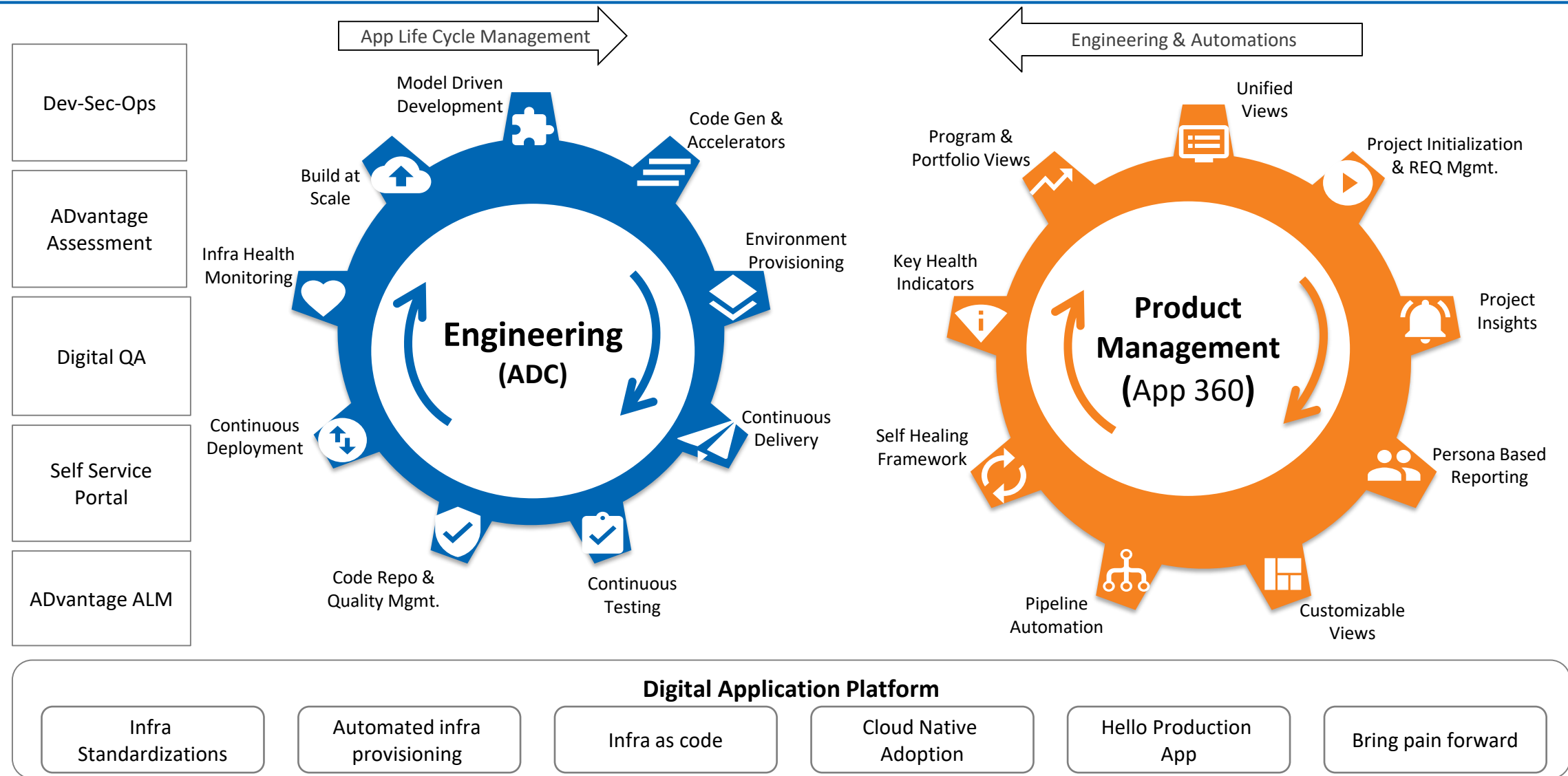
Quality is not a one-time job and not a one team's job

DIGITAL QA METHODOLOGY





MODERN AD FRAMEWORKS



DIGITAL APPLICATION PLATFORM (DAP)

Today applications are built on cloud using cloud native services. The manual approval process and then manual provisioning of these cloud services create delays which hampers the developer productivity.

The aim of AD in Box is to provide self services capability along with automation in cloud native service and service development. This improves the developer experience while working on cloud native services.

Features / Capability

Scenarios / Use cases

Benefits

Self Service & Autonomous

- Catalog based Self Services portal for developers
- Developer can choose services required based on development nature.
- ChatOps is also available for self services

- Eliminates manual approvals, reduces time and improves traceability.
- Auto approval rules can be setup to further reduce dependency.

Cloud native services provisioning

- Developer can provision cloud native services on demand.
- Developer can destroy services used after development completed

- Automated provisioning of services.
- Using Infra as Code, state of infrastructure is versioned.
- Standardization in cloud native services provisioning

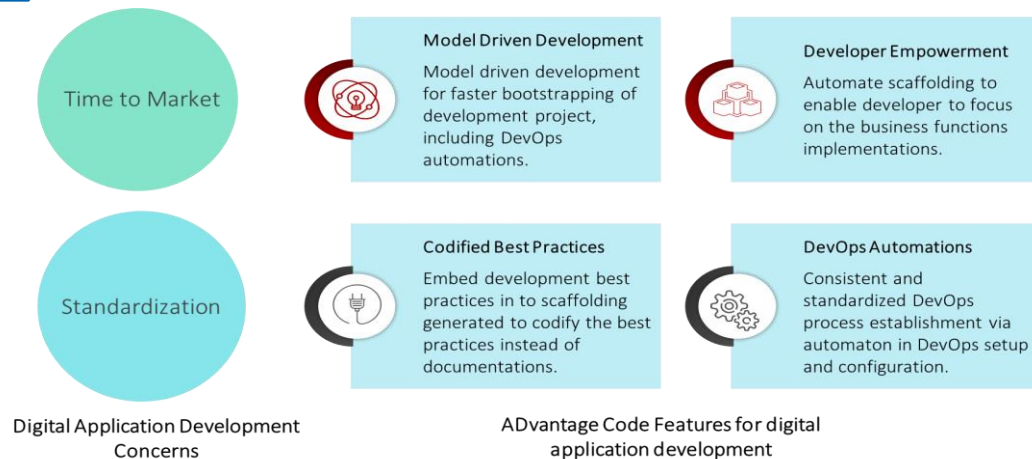
Development Automation

- Auto generation of scaffolding code for microservices, cloud native services and API's
- Auto generation of DevOps pipelines.
- Deployment of cloud native services

- Standardization in development and coding practices
- Standardization DevSecOps implementations in development.

ADvantage CODE

Why



Benefits

- Bring consistence and standardization across development teams.
- Automate application scaffolding creation to enable developer focus on solving business problem.
- Help customer to onboard the DevOps journey quickly.
- Enable the full stack development.
- Build a part of NFRs automatically in scaffolding to enable NFRs take care from start of development itself.

15 - 25%

Improvement in time to market

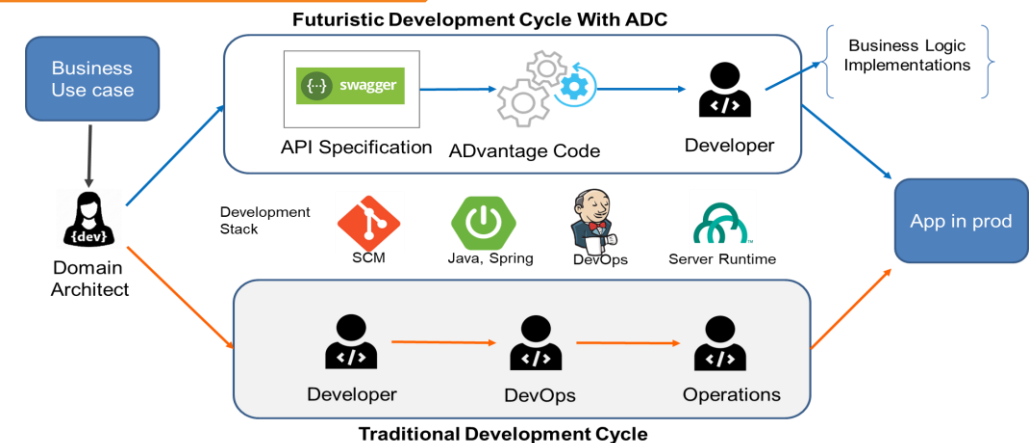
20 - 35%

Improvement in project bootstrapping time

30 - 50%

Reduction of Developer Rework

Enhanced Development Cycle

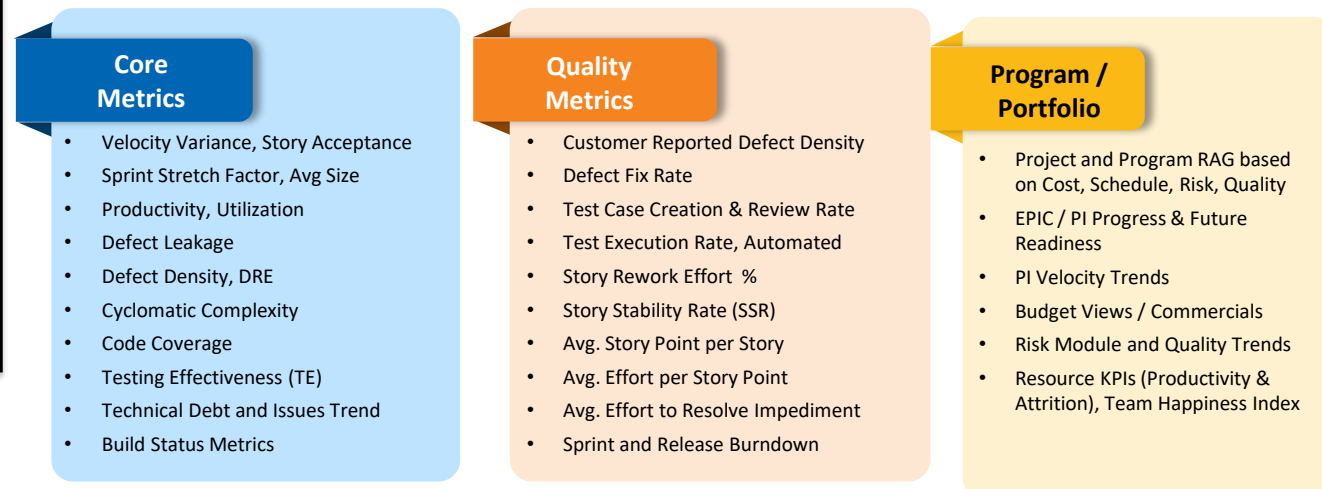
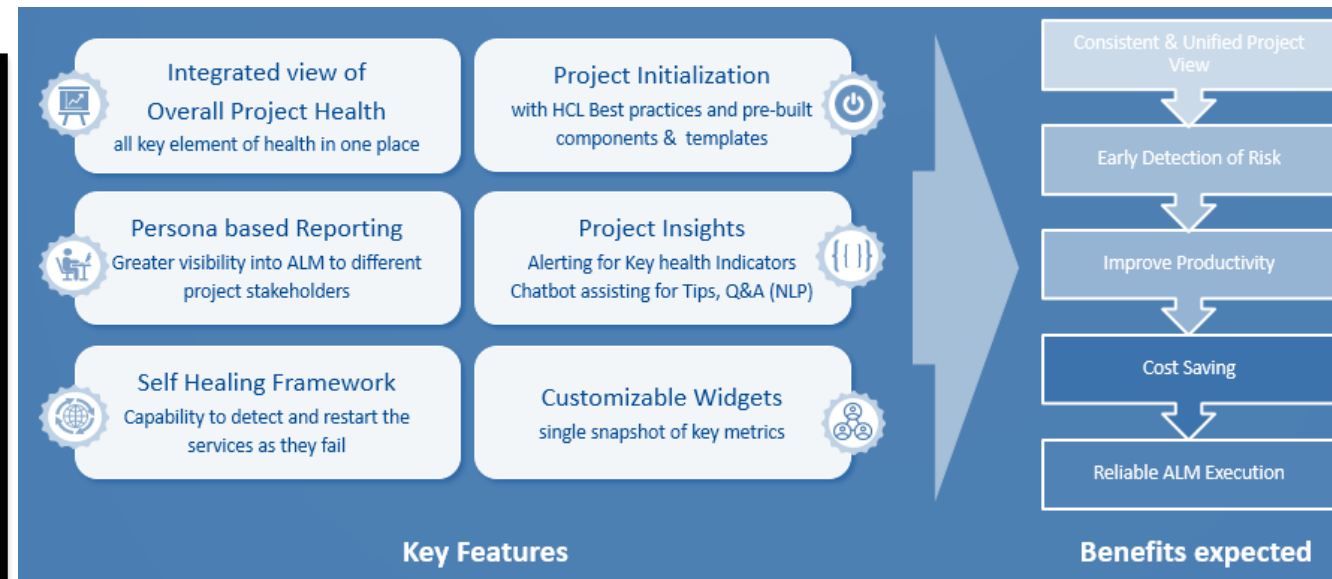
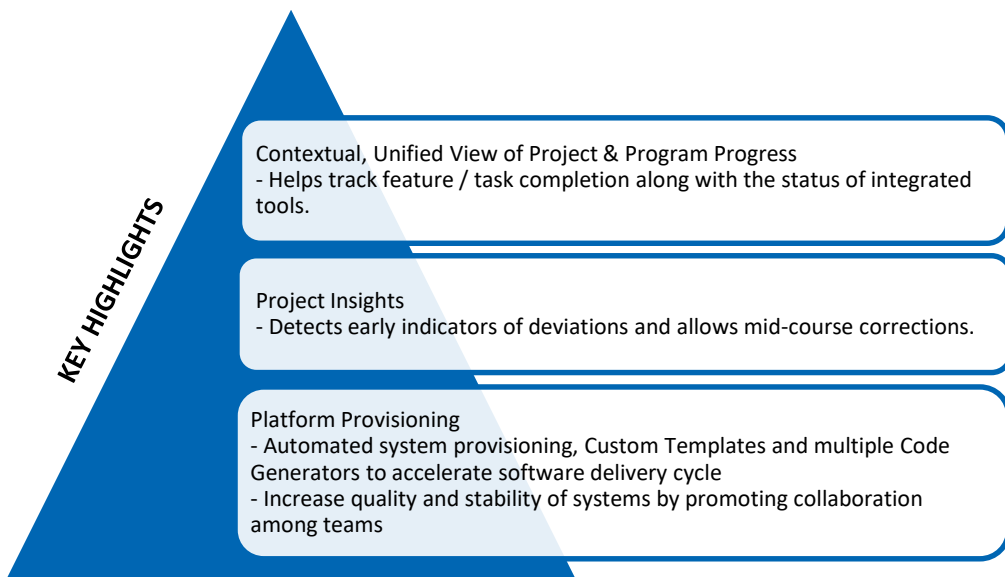


Supported Tooling



HCL

- HCL's way of bringing fragmented processes & tooling of Agile SDLC & DevOps together
- An integrated dashboard with traceability from portfolio-level EPICs to tasks
- Provides 360-degree view to various stakeholders and helps foreseeing risks to mitigate
- Reduces development effort and aids in improving productivity & quality aspects
- Making data-driven decision-making easier and help the enterprises align strategy with execution.



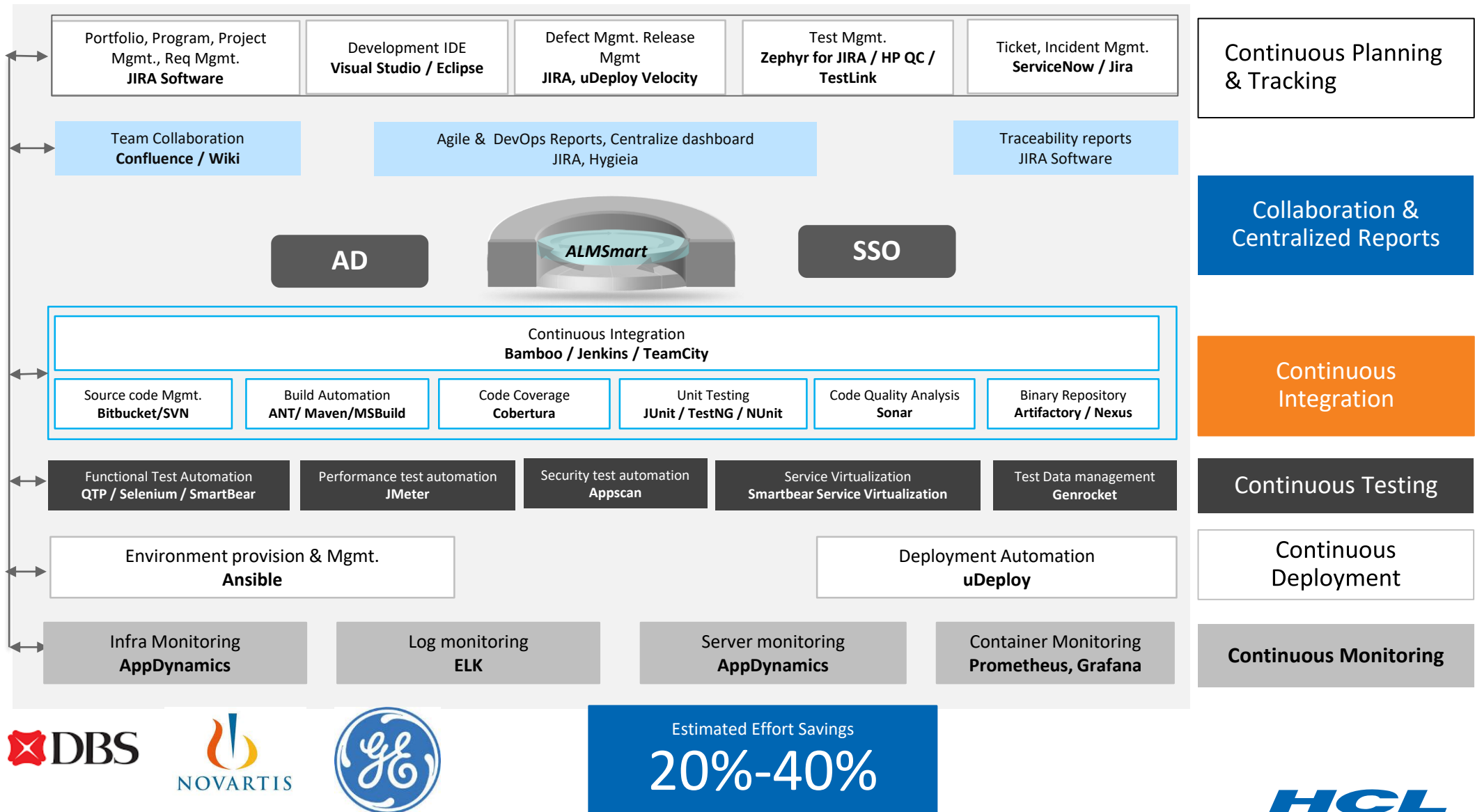
App360 for enhanced planning, measurement, control and reporting of activities, in all the stages of application delivery lifecycle.



ADVANTAGE ALM | REFERENCE FRAMEWORK WITH TOOLS AND PROCESS AREAS

ADVantage ALM provides enhanced planning, control and feedback of activities in all the stages of application delivery lifecycle with the integrated toolset.

ADVantage ALM is tool agnostic and built upon leveraging existing tool investments available.



A LEADING TELECOM PROVIDER

Based out of USA

API

- ❖ Create a modern web platform that can be accessed through
 - ❖ Multiple customer channels - retail, call center, online
 - ❖ Multiple devices – Tablets, laptops, desktops
- ❖ Platform available to partner channels with proper controls and security in place
- ❖ Ability to accelerate time to market for travel money card app and other apps to enable marketplace innovation

Solution

- ❖ App Platform built with common UI components and templates prebuilt as per UX guidelines
- ❖ Iterative development and loose coupling between UI and Backend APIs, resulting in fast mockups of UI, and parallel development on APIs

Technology Stack

- ❖ APIGEE API Platform, HTML5 / CSS3 / JS, CSS Visual Libraries, Swagger, JSON, OAuth

Benefits

- ❖ API platform enabled with continuous integration and continuous delivery
- ❖ Created Channel specific lightweight micro-services
- ❖ APIs are extensible, and can evolve with changing needs
- ❖ Common Services such as Authorization, Security, Error handling, Logging, Mocks and Regression Testing built into the framework.



A LEADING TELECOM PROVIDER

Based out of USA

DEVOPS

Customer wanted to Establish:

- ❖ Embrace DevOps CICD for zero touch deployment to build & deploy 30+ applications as a part of Digital transformation
- ❖ CICD pipeline to be portable & easily maintainable
- ❖ Build DevOps competency for enterprise level DevOps

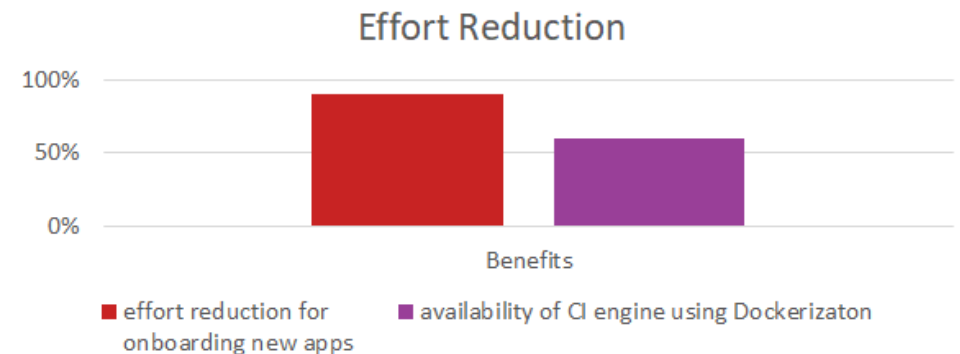
Solution

- ❖ Established CI/CD pipelines to perform the build, unit testing, static code analysis (SonarQube),
- ❖ Generate documentation site & security analysis (AppScan)
- ❖ CD pipeline picks build, deploy the application to PCF, post the application deployment, trigger a continuous testing to perform Functional and performance testing.
- ❖ Implemented pipelines to build and deploy Springboot/Angular application into Jfrog Artifactory and Docker image for AWS POC

Technology Stack

- ❖ Jenkins, Stash/Bitbucket, Gradle, SonarQube, JFrog Artifactory, Docker, PCF/AWS, Selenium, SauceLabs, Splunk, Rally

Benefits



A LEADING TELECOM PROVIDER

Based out of USA

PCF – Cloud Strategy

- ❖ Early adopter of the Cloud Native applications
- ❖ They wanted to go with full blown Cloud Native infrastructure using PCF and AWS, to achieve true horizontal scaling with PCF and AWS, integrate with corporate LDAP, their application monitoring tools.
- ❖ Use hybrid cloud architecture for PCF
- ❖ Move towards unified platform for application deployment by leveraging the advantages of Cloud native application architecture on PaaS

Solution

- ❖ Move microservices to PCF platform. To begin with HCL moved 40 microservices on to PCF platform in 4 months.
- ❖ Integrated with Splunk, Kafka, Eureka and Logstash
- ❖ 400 applications to use services from PCF
- ❖ Integrated CI/CD
- ❖ Implemented Blue-Green deployment strategy

Technology Stack

- ❖ 12 Factor Apps, Microservices/API, RESTful services, SpringBoot, Spring Cloud Services, Docker

Benefits

- ❖ Increase in Application density on AWS by reducing number of AWS instance, indirectly saving cost
- ❖ Improving Developers delivery effort and reducing time to market. Developer can pretty much manage the delivery



A LEADING FREIGHT RAILROAD COMPANY

- ❖ Ephemeral environment – Ability to setup and teardown environment to aid in integration testing
- ❖ Experimental infrastructure - Ability for teams to standup and tear down environment to experiment

Solution

- ❖ Legacy Applications Migration
 - ❖ Utilities to migrate legacy web-apps to Springboot, Dockerized standalone applications
 - ❖ Utilities to add/enhance integration tests
 - ❖ Utilities to migrate legacy build scripts to Gradle
 - ❖ Utilities to upgrade opensource and third party library dependencies
 - ❖ Utilities to spin up and tear down infrastructure during integration tests
- ❖ Modern apps
 - ❖ Utilities to prep environment for integration tests e.g. DB2, MQ, Kafka, Cassandra etc.
 - ❖ Utilities to spin mock API's
 - ❖ Identify and operationalize security, logging, monitoring side cars

Technology Stack

- ❖ **Open-shift - Redhat OpenShift, Docker, Jenkins, Chef ,Checkmarx, SonarQube**



Benefits

- Infrastructure cost savings , Application server license cost savings
- Autonomous delivery teams, Improved developer productivity
- Foundation to Continuous Delivery
- Reduced cycles in technology evaluation
- Flexibility to migrate K8S managed cloud services e.g. Google GKE

A LEADING FREIGHT RAILROAD COMPANY

DEVOPS

Customer wanted to Establish:

- ❖ Cloud Infrastructure(auto creation and provisioning of infra on Azure) , Continuous Integration, Continuous Delivery ,Continuous Deployment , Logging and Monitoring Stack.
- ❖ DevOps Journey on Azure cloud for Movement Planner and Crew Management

Solution

- ❖ 200+ micro services using Springboot continuously deployed to all CaaS environments.
- ❖ Monitoring of cloud infrastructure resources to application KPI, including availability SLA
- ❖ Implemented real-time distributed streaming and event platform
- ❖ A robust logging solution on a 5 node ElasticSearch cluster
- ❖ Environment provisioning using Terraform, Cloud Init, Ansible.
- ❖ Implemented CaaS environment management interface using Portainer for development team to interact with the platform.

Technology Stack

- ❖ Terraform, Jenkins, Codenarc, SonarQube, Junit, Jococo, Artifactory, Nexus, Selenium, ElasticSearch, FluentD, Kibana, Prometheus, Grafana, AlertManager, Springboot



Benefits

- ❖ 5+ deployments per day.
- ❖ 96% code quality accuracy
- ❖ Complete Automated testing
- ❖ Better predictability and reliability practices

A LEADING FREIGHT RAILROAD COMPANY

DEVOPS

- ❖ Company undertaking Enterprise Transformation aimed to improve Time-to-Market, Improve Quality, Reduce Costs and Improve Customer Satisfaction using its proprietary Product Development Lifecycle.
- ❖ HCL is providing Consulting, Training, Implementation and Support for this Enterprise Transformation
- ❖ Decentralized processes and missing strategy and roadmap for DevOps, LMA, EA, BA, Application architecture (multiple apps) and Implementation., tools selection
- ❖ Missing metrics and governance across programs
- ❖ Unaligned / unskilled workforce with the transformation

Solution

- ❖ Customised the product development lifecycle processes to fit the execution needs
- ❖ Built DevOps strategy and roadmap
- ❖ Standardized tools across the enterprise
- ❖ Established CI/CD pipelines with integrated tools, LEAN process flows and approval gates
- ❖ Provided the infrastructure architecture for Kafka messaging
- ❖ Service Virtualization, ELK and other tools setup
- ❖ Provided Enterprise architecture and Business architecture consulting and implementation
- ❖ Established metrics and governance for Continuous improvement

Technology Stack

- VersionOne, Jenkins, GitHub, Gradle, SonarQube, Artifactory, Docker, Chef, ELK, Tibco, Kafka, Java, Groovy, CA SV

ALMSmart



Benefits

- ❖ 5+ deployments per day.
- ❖ 96% code quality accuracy
- ❖ Complete Automated testing
- ❖ Better predictability and reliability practices

A LEADING FREIGHT RAILROAD COMPANY

- ❖ Migrate from VM's to Containers
- ❖ Migrate legacy application server based applications to containerized applications
- ❖ Upgrading third party dependencies to support migration
- ❖ Enhancing Integration test to maintain testability of migrated apps
- ❖ Ephemeral environment – Ability to setup and teardown environment to aid in integration testing
- ❖ Experimental infrastructure - Ability for teams to standup and tear down environment to experiment

Solution

- ❖ Legacy Applications Migration
 - ❖ Utilities to migrate legacy web-apps to Springboot, Dockerized standalone applications
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Technology Stack

- ❖ Redhat OpenShift, Docker, Jenkins, Chef ,Checkmarx, SonarQube



Benefits

- ❖ Infrastructure cost savings , Application server license cost savings
- ❖ Autonomous delivery teams, Improved developer productivity
- ❖ Foundation to Continuous Delivery
- ❖ Reduced cycles in technology evaluation
- ❖ Flexibility to migrate K8S managed cloud services e.g. Google GKE

HCL

*Relationship*TM
BEYOND THE CONTRACT

\$9.94 BILLION | 150,400+ IDEAPRENEURS | 46 COUNTRIES