Measuring Quality and Velocity in DevOps - A Practitioner’s view

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Executive Summary

*Improving quality and reducing lead time towards desired business outcomes*

- Enterprises that have successfully embraced DevOps are well on their way to accruing real benefits
  - 63% Of the organization have implemented DevOps and are expanding [1]
  - 4X Increase in DevOps Market Size from $2.5B to $10B+ till 2023 [2]

- Cognizant’s DevOps journey over the last four years helped our clients in their digital transformation journey and has also truly enabled us to deliver with faster time to market, lower total cost of ownership and reduced IT costs.

- Early on, we comprehended that DevOps is a journey and not an end state, thus we approached our challenges to continuously evolve and provide better services to our clients.

- We tackled multiple issues during DevOps industrialization, such as, lack of common definition; cultural issues; technology spread; organizational resistance; divergent tools; architectural differences.

- This deck outlines Cognizant’s approach towards Industrialization across the length and breadth of the organization, how we stayed diligent and continuously measured our performance to ensure enterprise DevOps success.

- Today, with our extensive experience in Agile and DevOps, as well as the addition of OCM and modern technologies, Cognizant helps enterprises go beyond localized Agile-DevOps adoption to achieve enterprise agility.

DevOps is more than a strategy for success…

### 2015 – DevOps, State of Affairs

#### TOOLS
- Multiple tools for the same cause
- Manual configuration
- Lack of chain integration
- Pockets of excellence

#### PROCESS
- Manual overheads
- Lack of adoption
- High elapsed times
- Technology based processes

#### PEOPLE
- Minimal understanding of DevOps
- Lack of transparency
- Inertia to change
- Redundant roles

### 2019 – DevOps, a way of life

#### Engineering Excellence
End to end DevOps platforms along with tool installation recipes, assets, add-ons, etc.

#### Process
End to end process replete with reference architecture, patterns, playbooks, KPIs, etc.

#### People
Robust enablement of people complemented by clarity of roles and effective communication

#### Maturity Assessment Framework
Aid projects in deploying effective DevOps solutions through a level-based maturity assessment framework

#### Organization Change Management
Promote awareness and adoption through publication of newsletters / best practices, DevOps tools communiques, practitioner speak, “TopSolve” App for solving issues…
Engineering Excellence towards serving the market

**ENTERPRISE CONTINUOUS DELIVERY**
- DevSecOps pipeline for hybrid ecosystem
- Continuous validation
- Environment automation
- Release orchestration

**FEEDBACKAMPLIFICATION**
- Log management
- Event co-relation
- Operational analytics

**CONTAINERIZATION**
- Containerized pipeline (build & deploy)
- Containerized environments
- Orchestration

**SECURITY, RELIABILITY & RESILIENCY**
- Embedded security within pipeline
- R2 services (Resiliency & Reliability)

**NEXTGEN DEVOPS**
- Leverage SaaS, PaaS
- Cloud Native services & tools
Assets and frameworks to accelerate transformation

1. REFERENCE ARCHITECTURE
   - Blueprints of DevOps solution for various technology stacks used across the industry

2. SOFTWARE ASSETS
   - Software components to address specific situations, unaddressed by leading products, across DevOps value-chain

3. TOOL INSTALLATION RECIPES
   - Best practices for enabling automated installation of tools to prevent error-prone installation across the enterprise

4. ADD-ONS
   - Plug-ins that accelerate Continuous Delivery pipeline across self service based automation, quality gating, CI accelerators, containerization and environment management

5. FRAMEWORK TEMPLATES
   - Pre-defined templates to enable context setting for architects doing assessments for DevOps readiness and requirements gathering
‘Process’ - *integral in shifting to new work patterns*

<table>
<thead>
<tr>
<th>DEVOPS REFERENCE ARCHITECTURE</th>
<th>DEVOPS PATTERNS</th>
<th>BUSINESS OUTCOME DRIVEN KPI DEPLOYMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Each building block is broken down into key processes</td>
<td>• Complete set of patterns</td>
<td>• Business outcome measures defined to suit the engagement needs</td>
</tr>
<tr>
<td>• Framework to be used as guiding principles</td>
<td>• Baselined solution themes</td>
<td>• Organization baselines for promoting improvement culture</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>5X5 DEVOPS MATURITY MODEL</th>
<th>OUTCOMES</th>
</tr>
</thead>
<tbody>
<tr>
<td>• 5 vectors x 5 point scale</td>
<td>• Value delivery to client, efficiently &amp; effectively</td>
</tr>
<tr>
<td>• Framework to objectively assess DevOps maturity</td>
<td>• Comprehensive and consistent scaled out deployment</td>
</tr>
<tr>
<td>• Tool to identify process / tool / culture gaps</td>
<td>• Automatic best practice adoption</td>
</tr>
</tbody>
</table>

Maximization of automation

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‘People’ - *heart to DevOps engagement success*

**Team knowledge**
- Team members to be DevOps certified

**Client knowledge**
- Awareness of DevOps by key client stakeholders

**Agile & DevOps roles**
- Identification of key roles
- Team composition
- Adoption of 2-2-2 model

**Cross-functional team**
- Identification of SDLC roles
- Cross skilling of team members

**Collaboration**
- Face 2 Face (including videos) meetings held for Ceremonies

**Governance**
- Quarterly cadence
- Participation of key stakeholders in governance meetings

**Agile / DevOps Mindset**
- % of ceremonies where Agile / DevOps mindset demonstrated

**Innovation**
- Ideas implemented in the last 6 months to the client
- Organizational / client awards

**Team Motivation**
- Spot recognitions for individuals & teams
- Happiness index scores

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**Talent Management Lifecycle**

**ASSIMILATE**

**DEVELOP**

**ENGAGE**

**REWARD / RETAIN**
Business outcome driven performance measurement

IDENTIFY
Identify the measures and mechanism to monitor business outcomes like
Velocity, Product / Service Quality Index, Cost Savings, Wait time Reduction, etc.

MEASURE
Deployment of necessary tools for measuring the performance of DevOps projects

MONITOR
Establish organization baselines at 4 levels
- Best in class
- Performing
- Functional
- Inception
to govern DevOps KPIs and outcomes

BENCHMARK
Compare the organization baselines with industry benchmarks (Gartner, State of DevOps, Hackett, etc.)
DevOps maturity assessment framework

Delivery Excellence’s maturity assessment frameworks help maintain an upward trajectory and promote a competitive edge as we constantly benchmark within and outside to maintain best in class standards.

**KEY OBJECTIVES**

- Accelerate Digital delivery by scaling up the adoption of Agile and DevOps practices.
- Drive outcomes by recommending proven IPs, frameworks and assets.
- Enhanced end user experience - business value and client satisfaction.

**Maturity Levels**

- **Initial (L1)**: Embracing
- **Approaching (L2)**: Adapting
- **Growing (L3)**: Established
- **Sustaining (L4)**: Measured
- **Optimizing (L5)**: Effective

**DevOps Maturity**

- **Build**
- **Deploy**
- **Verify**
- **Measure & Monitor**
- **Release**

**Agile Maturity**

- **People**
- **Process and Practice**
- **Overall Agile Maturity**
- **Requirements Engineering**

**Key Digital Tenets**

- **Tools**
DevOps implementation ‘best practices’

**ENGINEERING**
- Two layered demos (internal and external)
- Dedicated additional sprints for code refactoring, technical debt, code optimization
- Auto scaling to reduce down time
- Green / blue deployment for fast recovery / fail strategy

**PROCESS**
- Consensus based estimation technique
- Story prioritization through MoSCoW principle enabling holistic view
- Tool enabled multivendor coordination
- Robust SOW authoring with DoD and DoR
- Writing user stories at feature and sub task level
- Focused action plans to improve DevOps Maturity across projects

**PEOPLE**
- Customized training module on DevOps and Agile frameworks for new resources
- Cross skilled resources across technologies trained by SMEs
- Retrospective meetings through gamification
- Dedicated time for innovation in sprints
DevOps effectiveness – where we stand today..

- Org performance has improved from 2017 to 2018
- Current Org performance better than Industry
- Org performance has been good in 2017 and 2018
- On par with Industry
- Post production defects has been zero in 2017 and 2018
- 1.5 X better than Industry
- Org performance is better than Industry in increased automation and reduced wait time

Maturity assessments reveal that there is a steady movement of projects towards higher maturity levels, while the project base has increased 5 times from 2016 to 2019.

Projects shifting from low to higher maturity levels

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# Representative experience

<table>
<thead>
<tr>
<th>CLIENT</th>
<th>PRE-DEVOPS SCENARIO</th>
<th>VALUE DELIVERED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multinational Banking and Financial Services Company</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>▪ Multiple pockets of DevOps with varying of maturity</td>
<td>Metrics to drive DevOps alignment established</td>
</tr>
<tr>
<td></td>
<td>▪ Low Agile adoption</td>
<td></td>
</tr>
<tr>
<td></td>
<td>▪ Minimal test automation</td>
<td></td>
</tr>
<tr>
<td>Multinational Automotive Manufacturer</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>▪ Disjointed engineering &amp; governance tools</td>
<td>25% reduction in defect leakage to testing</td>
</tr>
<tr>
<td></td>
<td>▪ Lack of integrated engineering environment</td>
<td></td>
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<tr>
<td></td>
<td>▪ Lack of dashboard to monitor delivery metrics</td>
<td></td>
</tr>
<tr>
<td>Leading European Mobile Telecommunications Company</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>▪ Features taking longer to reach customers</td>
<td>40% reduction in TCO</td>
</tr>
<tr>
<td></td>
<td>▪ Unstable releases</td>
<td></td>
</tr>
<tr>
<td></td>
<td>▪ Complex team structure</td>
<td></td>
</tr>
<tr>
<td></td>
<td>▪ Low level of Automation and DevOps adoption</td>
<td></td>
</tr>
<tr>
<td>Leading Broadcasting &amp; Cable Television Company</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>▪ 3 releases per year</td>
<td>27 releases per year</td>
</tr>
<tr>
<td></td>
<td>▪ 425 user story points</td>
<td></td>
</tr>
<tr>
<td></td>
<td>▪ 12 weeks of releases duration</td>
<td></td>
</tr>
<tr>
<td>Leading Telecom Services Provider</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>▪ Manual SDLC</td>
<td>TTM improved by 58% when compared to pre DevOps state</td>
</tr>
<tr>
<td></td>
<td>▪ Siloed tools and processes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>▪ Code quality issues</td>
<td></td>
</tr>
</tbody>
</table>
“The passion to change the world for better is a more powerful force than defense to keep it the same.”

- Simon Sinek
Thank You

Prabha Anand
Delivery Excellence, Cognizant
Typical enterprise DevOps toolchain

Cognizant DevOps Framework
COTS Tools augmented with In-house Assets and Accelerators

<table>
<thead>
<tr>
<th>Requirements &amp; Design</th>
<th>Source Code</th>
<th>Build / CI</th>
<th>Unit Testing</th>
<th>Code Quality, Coverage &amp; Repo</th>
<th>Cloud Services Platform</th>
<th>Non Production Environment Provisioning</th>
<th>Deploy to NPE Environment</th>
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<tbody>
<tr>
<td>TFS</td>
<td>TFS</td>
<td>Maven</td>
<td>JUnit</td>
<td>Nexus</td>
<td>Fortify</td>
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<td>Gradle</td>
<td>unit</td>
<td>FxCop</td>
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<td>puppet</td>
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<tr>
<td>Confluence</td>
<td>Bitbucket</td>
<td>Jenkins</td>
<td></td>
<td>sonarqube</td>
<td>[ ]</td>
<td>IBM</td>
<td>openstack</td>
</tr>
</tbody>
</table>

Log Tickets

- JIRA
- ServiceNow
- BMC REMEDY

Monitoring & Feedback

- Dynatrace
- Splunk
- ELK
- Cognizant Insights
- APPDYNAMICS

Update CMDB

- ServiceNow
- AppDynamics

Deploy to Production

- Jenkins
- Docker
- TFS
- [ ]
- Urban(code)
- Deployment

Release Management

- [ ]
-RELEASE
- PLUTORA

Integration & Functional Testing

- SOASTA
- HP
- Automic
- uDeploy
- Jenkins
- Docker

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