Government @ Speed

How to Build a Minimum Viable Product

Engines and Vehicles Compliance Information System case study,
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Building a Minimum Viable Product at Speed

A Lean and Agile Government Story
We Will Share with You:

- 1. EV-CIS Background
- 2. The Challenge & The Lean Workshop
- 3. The Minimum Viable Product
- 4. SAFe PI Planning
- 5. The Software Factory
- 6. Outcomes
Engines and Vehicles Compliance Information System (EV-CIS) Background
The U.S. EPA’s Mission is to **protect human health and the environment.** The Office of Transportation and Air Quality supports that mission by implementing regulatory programs to

- Ensure that vehicles and engines comply with emissions standards for their full useful life
- Harness the power of compliance data
EV-CIS is a collection of secure web tools used to **collect, analyze** and **report** vehicle and engine emission and fuel economy information.
Engines and Vehicles Compliance Information System

19,000+
Registered users

29,278
Certified engine and vehicle families

42,358
Certificates of Conformity issued
Engines and Vehicles Compliance Information System

2,031
Manufacturer companies

13
Engine and vehicle industries

38
Countries
The Challenge & The Lean Workshop
The Challenge

EPA’s goal is to introduce a **new product line** offering major benefits to their users and **streamlined processes** using a **new technology stack** and implemented with a **limited budget**.
How to Get to MVP at Speed
EPA’s Product Roadmap

- **Reduce** the burden on the regulated community
- **Reduce** the number of roles for users
- **Reduce** the number of resubmissions
- **Create** user-friendly interfaces
- **Leverage** existing services
- **Unify** process for compliance submissions
- **Utilize** technology that has longevity
Lean workshop goals:

- Streamline processes for defect and recall reporting
- Reduce waste and duplication
- Reuse services
Lean Workshop Outcomes

Reduced the number of user roles
Reduced the number of Defect and Recall data collection processes

With specific objectives from the lean event, EPA identifies a single process for all compliance reporting needs.
The Minimum Viable Product
The MVP

With the lean workshop under our belts, we had to start thinking about what the minimum viable product would contain.

- What was critical?
- What are the minimum requirements needed for quality data?
- What can be sacrificed for a later build if we need to pivot?
The MVP & Product Vision

The MVP must meet the goals set forth in the product roadmap.

- Streamline multiple collection processes into one framework
- Reduction of burden to regulated community and EPA staff
- Improve overall submission process
- Improve quality of data
- Greater data availability for EPA users
Designing the Product

- Understand the user’s journey and current pain points
- Design for reuse
- Apply minimum viable product practices
Improving the User Experience

Moving to a Task-Based Approach

Before (Role-based)

After (Task-based)
Applying a streamlined approach to the user experience based on roles and tasks, the teams developed a workflow for how the regulated community would efficiently perform work in fewer steps.
**Defect and Recall Reporting** was identified as the first pilot product for the new compliance reporting framework and uses:

- User-Centered Design practice
- Minimum Viable Product
- SAFe Framework for Program and Software Execution
SAFe PI Planning
SAFe PI Planning

✅ Product roadmap
✅ Lean workshop
✅ Initial MVP design

It’s time for SAFe PI Planning!

The team had participated in 12 SAFe PI Planning Events previously.
Rising to the Challenge

At the joint EPA - CSRA SAFe PI Planning event, we determined the following was needed to meet this challenge:

- Accelerate development rate to about 2x current velocity
- Re-use pilot code to jumpstart the transition from Java to Single Page Application
- Design for future re-use
The team created and voted on a plan to implement Defect and Recall Reporting

<table>
<thead>
<tr>
<th>Features</th>
<th>Sprint 1</th>
<th>Sprint 2</th>
<th>Sprint 3</th>
<th>Sprint 4</th>
<th>Sprint 5</th>
<th>Sprint 6</th>
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<th>Sprint 14</th>
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<tbody>
<tr>
<td>Mockups &amp; user flow for submitters</td>
<td>Home Page Prototype</td>
<td>Update MFR Cert &amp; Compliance pages</td>
<td>Industry &amp; Document Clean Up</td>
<td>Family &amp; Model Details Screen</td>
<td>Address user feedback - Home Pages</td>
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<tr>
<td>Compliance Home Page Prototype</td>
<td>Update Prototypes from user feedback</td>
<td>Report Setup &amp; Description Submission Processing</td>
<td>Family &amp; Model Details Submission Processing</td>
<td>Data Driven Functionality</td>
<td>New Cert &amp; Compliance Documents</td>
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Multiple Kanban Teams

Teams needed to be creative to deal with the compressed time line.

Transitioned entirely to Kanban to accelerate development work.

Productivity increased by 47% over scrum. Code quality remained consistently high.
The Software Factory
CSRA’s Agile development team implemented Defect and Recall Reporting in the software factory.
Inside the Software Factory

- Team felt like it was in *Kobayashi Maru* test at times
- EPA was realistic about the vision of the product and worked collaboratively with the team to stay true to the MVP
- Transparency, communication, incremental delivery, and pivoting quickly were key to keeping everything on track
- Use of ALM tools for visual management of data was critical for communications
High yield software factory with continuous build AWS cloud environment.
Squeezed every bit of automation into DevOps pipeline.

In 6 months, pushed 22 releases to the government for the joint EPA/CSRA teams to inspect/adapt.
The budget required close monitoring. Each week, the PM team would:

- Review Financial Burn Rate
- Feature Burndown
- Risk Identification and Mitigation Strategies

New risks might trigger a discussion on MVP choices. Risks and finances were reviewed weekly with management team.
Product Management

Staying on schedule required close monitoring of MVP:

- Regular weekly meetings
- Review of tracking dashboards: features, stories, discovery of new requirements
- Identify any dependencies or risks
- Turn around responses to requirement questions quickly
- Thorough and iterative testing
Outcomes
“We've seen, time and again, when people focus on the outcome rather than what needs to be done to achieve a desirable result, then the wheels fall off.”

Cate Campbell
Modularized Components
Lightweight architecture supports reusability
Data Quality
Improved quality of data through quality assurance checks
Cost of Ownership

Lower Cost of Ownership
Open source software reduces cost of ownership
User Satisfaction

Improved User Experience
Improved and streamlined user experience.
Systems Integration

Seamless integration with other EV-CIS applications
Defect and Recall in Production

Data Quality

Lower Cost of Ownership

Improved User Experience

Modularized Components

Systems Integration
Product Roadmap Outcomes

- Modularized components that can be **re-used** as services
- **Better** integration with other EV-CIS applications
- **Unified** user-driven Home Page
- **Lower** the overall cost of ownership

FINISH
Bottom Line

✔ Reduces the burden on the regulated community

✔ Assists EPA in serving constituents faster

✔ Provides higher quality data for EPA to build upon for future analysis
**Release Nitrogen**

EPA nicknames releases after the elements

**22 Releases in 6 Months**

Velocity improvement over scrum

47%

**Features Planned**

9

**Features Delivered**

16

Major features in Defects and Recalls

**Three Products in Nitrogen – 3 Teams**

- Defects and Recalls
- Home Pages
- Systems Maintenance

**140 Stories**

1 week, 20 hours

Average cycle time for ticket

**Objectives**

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<th>Starting</th>
<th>Target</th>
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<tr>
<td>Streamline user roles</td>
<td>17 roles</td>
<td>4 roles</td>
</tr>
<tr>
<td>Improve data completeness</td>
<td>55%</td>
<td>100%</td>
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<tr>
<td>Streamline data collection</td>
<td>6</td>
<td>1</td>
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**Avg. Team Structure**

- Developers: 5
- Testers: 2
- ScrumMasters/Analyst: 2
- UX/UI: 1