

Office of Information and Technology

Product Line Management Transformation Playbook

Version 3.1

August 2023 | Agile Center of Excellence

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VA



U.S. Department of Veterans Affairs
Office of Information and Technology


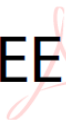
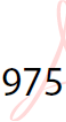
Executive Summary and Approval

The Product Line Management (PLM) Transformation Playbook details how the Office of Information and Technology (OIT) leadership expects Product Lines (PL) to implement Lean-Agile and DevOps (a combination of the words development and operations) practices while moving from a project-centric to a product-centric focus.

As the Department of Veterans Affairs (VA) continually strives to improve project and product management effectiveness and efficiency, VA welcomes any insight that users can provide. Users should send their comments and suggestions for improvement of the PLM Transformation Playbook to the Agile Center of Excellence (ACOE) [Enablement and Methodology Team](#) for review and consideration.

The PLM Transformation Playbook applies to all Information Technology (IT) products aligned to PLs in the Software Product Management, Infrastructure Operations, and Product Engineering groups within the OIT organization. Others outside of these groups may use the Playbook for situational awareness as needed.

The PLM Transformation Playbook 3.0* is approved by:

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*Due to the limited number of revisions in this updated document (see the [Revision History](#)), PLM Transformation Playbook 3.1 did not necessitate re-approval from the approvers listed above; however, the revisions in Version 3.1 were communicated to the approvers prior to release.

Revision History

| Version | Date | Revision Description |
|---------|-------------|--|
| 3.1 | August 2023 | Updated references from PLM "Big 6" to PLM "Big 8" roles in Sections 3, 3.1.2, 3.1.3, and Appendix A-PLM Big 8 Role Descriptions. Updated role descriptions and added new roles in Appendix A. Role names were updated throughout the document, where applicable, according to the updated roles listed in Appendix A. Changed references from the "Account Management Office (AMO)" to "Business Integration and Outcomes Services (BIOS)" in Sections 3.2.2, 4.3.1, 4.3.2, 5.3.3, and Appendix A. Updated metric names in Table 2: Better, Safer, Faster (BSF) Metrics. Changed the metric name, "system availability" to "availability" in Sections 5.3.1 and 5.3.2. Changed references from "DevOps PLM Training Catalog" to "ACOE Training Catalog". Updated document to 2023 OIT template. |
| 3.0 | August 2022 | Added PLM Maturity Level 3. Document title changed to Product Line Management Transformation Playbook. |
| 2.0 | May 2021 | Added PLM Maturity Level 2 |
| 1.0 | July 2020 | First issuance |

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1 PLM Transformation Playbook

1.1 Introduction

Product Line Management (PLM) is a framework that focuses on delivering functional products that provide the highest priority work to customers while delivering simplified, reliable, and practical solutions to the business, medical staff, and our Veterans. PLM focuses on grouping products into PLs, modernizing software delivery, and releasing software products faster, safer, and more efficiently through DevOps technical practices and a focus on alignment with our customer.

Faster releases allow Product Teams to quickly learn, adjust, and adapt to customer feedback. Product releases are accelerated through automation, using Agile practices, and adopting “buy before build” solutions. Safety increases assurance that Product Teams are releasing features the user wants, are reliable and secure in production, and avoid additional technical debt. Safety comes from automation, frequent feedback loops from the customer and operations, and solution architectures that avoid or outsource technical debt, such as “buy before build” options. Efficiency means teams release and maintain more features with the same staffing and budget levels. Efficiency comes from alignment with the business and their metrics, switching from projects to products, leveraging automation and platforms, and implementing “buy before build” solutions.

Product Managers use metrics to relentlessly improve their cycle and release times, guarantee product availability, and stay laser-focused on business-centric product delivery that satisfies the customer. Metrics, along with budget performance, are captured in a Product Status Dashboard that provide insight into not only cost and schedule health, but also industry standard DevOps metrics. The metrics are reviewed with product stakeholders to offer a comprehensive, transparent view of the PL’s health.

In PLM, Product Line Managers are focused on delivering business value by building functional products where the maximum amount of time is spent providing the capabilities needed most by the customer. This enables the organization to move from an environment of missed deadlines to one that reflects iterative delivery and short feedback loops. The OIT organization will use PLM to integrate development, testing, sustainment, and shared services resources to create self-sufficient, persistent, and autonomous Product Teams that own the lifecycle of a product and are capable of consistently delivering value to the customer.

1.2 Purpose

The PLM Transformation Playbook is a companion guide to the Veteran-focused Integration Process (VIP) Guide. The Playbook details how OIT leadership expects PLs to implement PLM, DevOps, and Lean-Agile principles, methods, practices, and techniques

through levels of maturity. These maturity levels contain specific steps or “plays” and the associated acceptance criteria that each PL must work through over time. Once the acceptance criteria are met for all plays in a maturity level, the PL should begin focusing on achieving the next level of maturity.

It is important to note that the Playbook is a living document and contains multiple components that enable PLs to achieve each level of maturity.

1.3 PLM Benefits

In Matt McWha’s article, [Product Line Management is Fundamental to the New IT Operating Model](#), published February 2017 on Digital Insights, he describes the benefits of PLM over a project-centric approach. A summary of Mr. McWha’s thoughts on adopting a product versus project approach are captured below:

A product-centric approach differs from the typical project-centric approach to delivering work in a Product Line. Product Lines represent ongoing streams of work that are... supported by dedicated delivery and management resources and are measured based on product outcomes (e.g., cost, volume, value delivery).

The shift in the OIT operating model to PLM and toward products over projects promises several potential benefits:

- Improved coordination between Product Teams and customer
- Improved coordination of product delivery by including systems that are integrated in the same PL
- Enhanced communication through cross-functional team collaboration Product Teams committed to value delivery of Lean-Agile and DevOps practices

1.4 OIT PLM Evolution

In the past, OIT development teams designed and developed software products which were then handed over to sustainment teams to maintain. Both development and sustainment functioned as individual, siloed teams. The separation influenced multiple forms of undesired behaviors:

1. Development sacrificed quality because they did not own the final product
2. Sustainment teams were resistant to accept a product they did not understand
3. Sustainment teams encountered budget shortfalls in subsequent years because development teams neglected to include sustainment funding in the Multi-Year Programming (MYP) plan
4. Sustainment teams did not design or develop the product, nor were they involved in requirements gathering, so they did not have a good understanding of the product, resulting in a lack of knowledge retention in teams

5. Team maturity was never achieved because staff was moved from one project to another
6. There was no clear evidence of flow or progress due to a lack of customer feedback loops and operational metrics

In 2018, OIT embarked on a digital transformation journey and introduced PLM which focused on the principle of “You build it, you own it”. This concept gave PLs ownership of their products and created one persistent team responsible for both development and sustainment.

Implementation of PLM will be an evolution conducted across multiple maturity levels, each consisting of several “plays” to give PL staff bite-sized chunks to execute.

2 ACOE Support

ACOE Enablement and Methodology Team

ACOE is dedicated to helping PLs through their PLM maturation. ACOE’s Enablement and Methodology team is comprised of PLM subject matter experts (SME), Agile and Scaled Lean-Agile experts, and VA PLM pioneers to serve as stewards for VA’s PLM transformation.

The Enablement and Methodology team collaborates with the PLs by assigning a primary and backup analyst to provide feedback and coaching to close any performance gaps. The analysts assigned to a PL are composed of only federal employees, so the PL can share sensitive information (e.g., budget and acquisition plans, etc.), where applicable, without the concern of a contractor’s organizational conflict of interest.

Enablement and Methodology will collaborate with the PL, using best practices and lessons learned, to support PLs and Product Teams in achieving each PLM Maturity Level. Enablement and Methodology will contact the PLs individually to initiate the PLM Maturity Level engagements.

Enablement and Methodology also provides coaching support on Agile, Scaled Lean-Agile, and DevOps roles and responsibilities and best practices.

Contact the [Enablement and Methodology Team](#) with any questions on PLM implementation strategies.

3 PLM Maturity Level 1–You Build It, You Own It

PLM Maturity Level 1 enables PLs and Product Teams to establish a foundation for future advancement of PLM, Scaled Lean-Agile, and DevOps practices and capabilities by switching from a project to product approach and grouping products into PLs. Maturity Level 1 consists of plays focused on the following areas:

- Product Mapping
- Assign the Big 8
- Functional Organizational Charts
- Customer Messaging
- Business Metrics
- Common Backlog PL Toolset
- Acquisition Mapping
- Budget Mapping
- Product Coordination

PLM will not impact the Product Teams' day-to-day activities but will impact how they support their products. There needs to be a shift in the mindset from supporting disjointed projects, to one that supports the greater need of having a functional product. Product Teams should begin thinking about how they will help the product they are working on become or remain a functional product, how they can maximize up-time, and how best to deliver value to the customer.

Leadership must understand how PLM changes their responsibilities. This is especially true for the PLM Big 8 roles. Product Line Managers must ensure that new or junior Product Managers are clear on what their responsibilities are and have a plan to develop the required skills if needed.

3.1 Product Line Plays

3.1.1 Product Mapping

"Responsibility is a unique concept... You may share it with others, but your portion is not diminished. You may delegate it, but it is still with you... If responsibility is rightfully yours, no evasion, or ignorance or passing the blame can shift the burden to someone else. Unless you can point your finger at the man who is responsible when something goes wrong, then you have never had anyone really responsible." - Admiral Hyman G. Rickover

The Product Line Managers and Product Managers must completely own the lifecycle of the products they are responsible for to meet the first PLM principle, "you build it, you own it." As we move from a project focus to a product focus, a foundational element of

PLM is to identify all products supporting the business services agreed upon as in scope for the PL. This is a key exercise that may involve some discussions for products that may have historically had more than one customer. Reach out to other Product Line Managers to discuss these within the framework of the PLM vision and find consensus on where a product belongs. A product/system should only exist in one PL.

Acceptance Criteria:

To achieve PLM Maturity Level 1, PLs must demonstrate a clear process mapping of products that includes the following:

- List the products in scope for the PL
- If a product belongs in another PL, both the gaining and losing Product Line Managers must agree to the change and update VA Systems Inventory (VASI). Both Product Line Managers must follow the Product Line Change Request process when moving a product from one PL to another

3.1.2 Assign the Big 8

Each PL needs a core leadership team to provide full lifecycle support. The following roles are referred to as the Big 8 roles¹ for a PL because they provide this core leadership. A PL may wish to identify additional roles to support the products in their PL. See [Appendix A](#) for a description of each Big 8 role.

- Product Line Manager
- Technical Lead/Solution Architect
- Product Manager (there will be more than one per PL)
- Systems Reliability Engineer (SRE)
- Business Owner (Ideally one per PL. Note this is a different role than the business Product Owner for each product who are not part of the core leadership of a PL.)
- Business Relationship Manager (formerly Account Manager)
- Program Manager
- User Experience Designer

Acceptance Criteria:

To achieve PLM Maturity Level 1, PLs must:

- Identify the federal employees who will fill the Big 8 roles for the PL

¹ If a PL has completed PLM Maturity Level 1, ACOE will not ask the PL to re-submit confirmation of their Big 8 roles; rather the PL should seek Service Line and Portfolio guidance to iteratively identify and document the new roles in authoritative sources, as they are incorporated for their products and PLs.

3.1.3 Functional Organizational Chart

A Functional Organizational Chart gives staff clear directions on how and where they fit into the organization and from whom to take day-to-day direction. Provide the names of OIT staff (VA federal employees) working on the products within the PL and their role. Names of additional resources are optional for PLM Maturity Level 1.

To develop the Functional Organizational Chart, consider the following items:

- This is a Functional Organizational Chart. Do not confuse this with a Human Resources Organizational Chart
- The Functional Organizational Chart may change in subsequent PLM Maturity Levels
- Employees dedicated to a product or Product Team may be identified by role

Acceptance Criteria:

To achieve PLM Maturity Level 1, PLs must complete the following items:

- Functional Organizational Chart shows the names of all federal OIT employees functionally aligned to a PL and their role
- OIT employees including former Transition Release and Support staff assigned to a product do not show as matrixed employees on the Functional Organizational Chart
- VA employees filling Big 8 roles are identified by name

3.1.4 Customer Messaging

The customer should know what is coming and what the shift to PLM means to them. Improving VA's end-to-end product value delivery to Veterans depends upon the health of the partnership between the business and OIT. Customers should be made aware we are adopting PLM as part of our continuous improvement of the value, cost, speed, and quality of our services to Veterans. They need to know what aspects of PLM will directly impact them.

To continue improving that partnership, the PL should meet with the customer represented by the PL's Business Owner and the business Product Owners to establish:

- Cadenced communication going forward
- Shared definitions of value and success
- Alignment on objectives and outcomes
- Continuous improvement practices
- Metrics that matter to the Customer and to Veterans

Acceptance Criteria:

To achieve PLM Maturity Level 1, PLs must:

- Show the strategy for communicating to the customer that validates achievement of the requirements above

3.1.5 Business Metric

The PL business metric is the measure(s) of the key business objective(s) related to the products within the PL. They should be derived with agreement between the PL Business Owner and Product Line Manager. The metric should be measurable and (ideally) automated.

Acceptance Criteria:

To achieve PLM Maturity Level 1, PLs must:

- Show the business metric(s) for the PL

3.1.6 Common Product Line Backlog Toolset

The Product Line Manager and the PL Business Owner should have visibility into the backlogs of all the product's epics using a single tool. If more than one tool is in use for this PL view of the backlog, identify what tool will be the common tool for the entire PL backlog in the future.

Acceptance Criteria:

To achieve PLM Maturity Level 1, PLs/Product Teams must:

- Name the tool holding the consolidated PL backlog of work yet to be done, or in progress, across all products in the PL
- If more than one tool is in use for the PL, identify what tool will be the common tool for the entire PL's backlog and the schedule for consolidation/integration

3.2 Product Plays**3.2.1 Acquisition Mapping**

As VA transitions to PLM, the ability to trace acquisitions from the "old" projects to the "new" products is vital. The PLs should show the plan for obligating any unobligated funds. Additionally, consolidating contracts is a goal of PLM; ensure there are a limited number of contracts supporting the products such that the product's primary contract support is clear.

Acceptance Criteria:

To achieve PLM Maturity Level 1, PLs/Product Teams must:

- Provide a list of the acquisitions that will obligate the product's unobligated funds
- Provide a list of all contracts yet to be awarded, and their planned placement/start date
- List all Enterprise Project Structure (EPS) numbers that align to each product in the PL
- Document current contracts affecting each product in the PL and have an Acquisition Plan for the remainder of the fiscal year. Indicate the vendor for each contract

3.2.2 Budget Mapping

The PL, in coordination with Business Integration and Outcomes Service (BIOS), must have a clear understanding of their funding status to include a Multi-Year Programming (MYP) plan and Unfunded Requests (UFRs) covering all products in the PL. They should have a funding strategy for the remainder of the fiscal year and indicate whether customer priorities are funded or unfunded. If there are unfunded requirements, identify UFRs.

Acceptance Criteria:

To achieve PLM Maturity Level 1, PLs/Product Teams must (for the current fiscal year):

- Show the total budget for the product
- Show how much of the total budget is obligated
- Show how much of the total budget is unobligated

3.2.3 Product Coordination and Planning

3.2.3.1 Quarterly Planning

A key element of PLM is quarterly planning. Each product within the PL will have a quarterly planning meeting to determine the roadmap for the product for the upcoming quarter. Setting a standard cadence for each product across the PL, allows the Product Teams to have a predictable rhythm and velocity. The fixed cadence allows meetings and events (including quarterly events) to be planned and scheduled ahead of time on people's calendars. Advance notice reduces travel and facility costs, and helps assure that most, if not all, of the stakeholders will be able to participate.

Acceptance Criteria:

To achieve PLM Maturity Level 1, PLs/Product Teams must:

- Describe the quarterly product planning meetings that are used to coordinate and discuss priorities and the product roadmap for the coming quarter with the customer and Product Team
- Include the dates for a recent planning meeting and the first/next scheduled meeting

3.2.3.2 Sprint Cycles and Increments Cadence

Cadence is the use of a regular, predictive development cycle, e.g., the same Sprint length, repeated over and over by a scrum team. When multiple scrum teams are supporting a product, synchronizing the start and stop dates for the various team's Sprint cycles causes multiple, potentially dependent events to happen at the same time.

Acceptance Criteria:

To achieve PLM Maturity Level 1, PLs/Product Teams must:

- Describe how Product Teams in the PL ensure a product focus by synchronizing the Increment and Sprint cadence for all Product Teams that support a product

3.2.3.3 Product Backlog Tool

PLM requires the use of a single backlog management tool for a product; this will provide a view of the product's priorities (functional and non-functional requirements) in a PL.

Acceptance Criteria:

To achieve PLM Maturity Level 1, PLs/Product Teams must:

- Identify the tool(s) holding the backlog for each product
- Ensure that all epics in a product's backlog are in the PL backlog

3.2.3.4 Product Handoffs

PLM uses the concept of "you build it, you own it." This concept eliminates the need for handoffs between individual system teams and promotes cross-functional Product Teams. Cross-functional teams are a hybrid of development, testing, sustainment, system, and shared services.

Acceptance Criteria:

To achieve PLM Maturity Level 1, PLs/Product Teams must:

- Describe any handoffs of the product to another Product Team such that the Product Manager does not have complete control of the product code
- If the Product Manager does not feel they have complete control of the product code describe the plan to resolve

4 PLM Maturity Level 2—One Team, One Heartbeat

4.1 Background

PLM Maturity Level 1 focused on organizing PLs in a way that would enable them to provide business value by delivering functional products to VA customers. The products supported by the PL were evaluated for appropriate alignment to the PL, and budget and acquisitions were reviewed.

PLM leadership roles were designated for each PL through the establishment of the Big 8 roles. Product Team members were functionally aligned to the PL and briefed on the organizational shift to PLM. Team members were made aware that while PLM would not necessarily impact their day-to-day activities, staff would shift their focus to maintaining products rather than individual projects.

After communicating the PLM vision to the customer, the PL developed key business metrics to measure the expected value the PL would bring to the business. Product coordination was established with quarterly planning, a single backlog tool, and synchronized Sprint cadences.

4.2 Purpose

PLM Maturity Level 2 is the first significant step in building the foundation for a cross-functional Product Team that includes integrated resources from across the organization capable of implementing PLM, DevOps, Agile, and Scaled Lean-Agile practices. PLM Maturity Level 2 moves PLs and Product Teams to a customer-oriented collaborative approach. PL and Product Team visions and plans are articulated through outcome roadmaps. Product Teams identify and build business value propositions and associated business metrics that are captured and reported in the Product Scorecard.

Matrixed resources are integrated into Product Teams, resulting in increased cross-functional collaboration. Development of DevOps capabilities enable Product Teams to support Continuous Integration/Continuous Delivery (CI/CD) and automation. Based on the PL and Product Team outcome roadmaps, training needs will be assessed, and training plans developed.

PLM Maturity Level 2 consists of plays focused on the following areas:

- Develop a Product Business Value Proposition and Metric
- Develop a PL and Product Outcome Roadmap
- Integrate Matrixed Resources into Product Teams

- Implement DevOps Capabilities – Priority: Application Performance Monitoring (APM)
- Capture Product Scorecard Metrics
- Develop and Train Product Team Staff

4.3 Product Line and Product Plays

4.3.1 Develop a Product Business Value Proposition and Metric

“A value proposition is a “promise of value to be delivered, communicated, and acknowledged.” It requires both the party delivering that value and the stakeholders to have the same understanding.” – Gartner

“Metrics provide the data that teams use to continuously improve and to empirically test whether new functionality and processes provide value.” – Gartner

Product Managers must develop a business value proposition that defines both the purpose of their product and the value it brings to the customer. The value proposition should be clear and concise and should speak to a customer’s challenge and make the case for their product as the problem-solver. The details of the customers’ needs should be just as familiar to the Product Manager as the features of their product or the details of the service the product provides and should always focus on how customers define value.

Product Teams depend on the business understanding and quantifying their value proposition. Once identified and quantified, Product Teams should create metrics to measure success based on business outcome value (whether the product met the business need). The metrics should be clear and traceable and directly correlate to the needs of the customer. They should also demonstrate the value delivered by the product. These metrics should be reported in VA Product (Line) Accountability and Reporting System (VA PARS).

To improve VA OIT’s performance regarding this play, consider the following items:

- Product Teams should create product business metrics based on the business outcome value
- Each Product Team should create a business metric for large or impactful products that is related to the product’s business value proposition
- The business metric definition and actuals should be stored under the applicable investment in VA PARS by the Investment Manager
- The metric data owner is the responsible individual for delivering the metric’s monthly actual result to the Investment Manager

- The business metrics should fall into one of the following categories/sub-categories:
 - Strategic and business results
 - Business process improvement
 - Action, time, or burden reduction in activities
 - Customer satisfaction (results)
 - Technology functionality or usability
 - *Technology performance subcategory will not be accepted as a business metric*
 - Business metrics **should** be ***customer/business focused***, not technical in nature (e.g., NOT availability, uptime, defect processing, etc.)
- Business metrics should be measurable and automated
- Reference the [ACOE Product Scorecards Business Metric](#) Microsoft Teams channel for business metric definitions and process guidance
 - [Product Line Business Metrics Dashboard](#)
 - [Business Metric Process](#)
 - [Business Metric Dashboard/Examples](#)

Acceptance Criteria:

To achieve PLM Maturity Level 2, Product Teams must:

- Develop a business value proposition for the product that states the value and benefit it provides to the customer
- Develop product business metric(s) to measure success in achieving the business value proposition
- Ensure product business metrics (final definition and actuals) are tracked in VA PARS
- Collaborate with the customer, Business Integration and Outcomes Services (BIOS), Portfolio, Product Line Manager, ACOE Metrics and Analytics, and others as needed to develop the business value proposition and product business metric

4.3.2 Develop a Product Line and Product Outcome Roadmap

PL and Product Managers should develop an outcome roadmap that focuses on establishing their PL and product direction. An outcome roadmap visualizes the plan for how the PL is going to meet the organization's key business objectives, how it will benefit Veterans, and details the direction of the products in the PL and the work required to get there. It serves to communicate key product priorities with internal and external stakeholders.

PL and Product Managers should have a vision and plan for the software products depicted in a MYP plan showing a roadmap of outcomes that are traceable to a named

customer or group of customers. The outcome roadmap should include features and major enhancements that improve business outcomes.

The PL and Product Manager should collaborate with the BIOS, Business Owners, and others as needed, to develop their outcome roadmap. The outcome roadmap should plan for the next four years of the product lifecycle and should provide a detailed visualization for near term outcomes and a high-level visualization for future outcomes. PL and Product Managers should discuss their resource strategy to prioritize the work across products, dedicate resources appropriately, and eliminate any imbalanced situations.

Quarterly Planning events provide excellent opportunities to validate and strengthen outcome roadmaps.

Acceptance Criteria:

To achieve PLM Maturity Level 2, PLs/Product Teams must:

- Develop an outcome roadmap for the PL *and* product
- Identify the products included in the *PL* roadmap and provide a rationale for those that are not included (e.g., products without OIT funding, resources, or being decommissioned, etc.)
- List the capabilities, features, major enhancements, and initiatives that improve overall business outcomes for both the *PL* and *Product* outcome roadmaps
- Identify the customer or group of customers each outcome/capability is traced to
- Track the progress of activities and measures and communicate the progress and value of results to stakeholders quarterly
- Ensure the *PL* and *Product* outcome roadmaps support the *PL* and *product* vision and has been communicated to the Portfolio Director, PL, and Product staff, BIOS, Business Owners and Product Owners
- Ensure the *PL* and *product* backlogs align with the outcome roadmap for near term work
- Demonstrate the work is prioritized within the *PL* and *product* backlogs and resources are allocated to the highest priority work

4.3.3 Implement DevOps Capabilities (Priority – APM)

Product Teams should begin deploying more secure applications into production, delivering fewer vulnerabilities, and have the ability to quickly fix security issues before they can be exploited. This can be achieved through the implementation of DevOps principles and practices. DevOps provides a culture and set of processes that bring development, security, and operations teams together to complete software development and allows products to create and improve products at a faster pace than traditional software and application development methods.

The benefits of implementing DevOps include, but are not limited to, the following:

- Shorter development cycles
- Faster innovation
- Reduced deployment failures, rollbacks, and time to recover
- Improved communication and collaboration
- Increased efficiencies
- Increased customer satisfaction
- Innovation

To achieve PLM Maturity Level 2, teams should improve their DevOps capability by implementing APM. APM gives teams early detection of problems and supports fast triaging during incident management. APM data must be integrated with the [Enterprise Command Center \(ECC\)](#) so that OIT has a “single pane of glass” view of applications and a standard process for event and incident management. All active products should track and measure the stability of the system using the [Monitoring Service Registry \(MSR\)](#) and achieve MSR Level 3 by the end of PLM Maturity Level 2.²

Applicable MSR levels are listed in [Table 1](#).

Table 1: Monitoring Service Registry (MSR) Levels

| Monitoring Level | Applications/Middleware Description | Network and Network Device Description |
|------------------|---|---|
| EUX | End User Experience Monitoring | N/A |
| Level 1 | Signs of Life Monitoring (Up/Down Status) | Heartbeat/Up-Down |
| Level 2 | Infrastructure Monitoring (CPU, thread pools, response times, etc.) | Capacity Monitoring (Bandwidth, CPU, Network Interface Card) |
| Level 3 | APM (Application, Middleware, Databases) | Capacity Monitoring – Advanced (Activity Logging, Transaction Routing) |
| Level 4 | Full Business Transaction Monitoring | Full Business Transaction Monitoring |

Teams should strive to continually improve instrumentation to support deeper insights into the behavior and performance of the application. If a team has already implemented APM, they should implement another DevOps capability. Reference [Appendix C](#) for a list of DevOps capabilities.

² Work with the ECC team to understand requirements needed to achieve this level.

To improve VA OIT performance regarding this play, consider the following items:

- ACOE can provide coaching to assist in the development of the APM capability or other DevOps capabilities upon request. Coaching requests will be triaged and added to the prioritized ACOE backlog.
- DevOps advancement will grow in future PLM maturity levels.

Acceptance Criteria:

To achieve PLM Maturity Level 2, Product Teams must:

- Implement APM for the product if it does not already exist
- Show that the product has reached Level 3 monitoring with the ECC and is recorded in the MSR system
- If APM is already implemented on the product, further advance DevOps growth by implementing at least one new DevOps capability
- If Level 3 Monitoring has been achieved, communicate the plan to implement the new DevOps capability to the Portfolio Director, Product Line Manager, Business Owner, Product Owner, Security, Architecture Engineering, and Infrastructure Operations, as needed

4.3.4 Integrate Matrixed Resources into Product Teams

In PLM Maturity Level 1, PLs identified and mapped all products in the PL, and assigned employees, by role, to each product in the PL. Former *project teams* were reorganized into *Product Teams*.

A Product Team is a cross-functional group of individuals that contain the skills and tools that allow them to build, deploy, monitor, and operate a product from its inception until the time the product is decommissioned. Team members have no individual or siloed responsibility for components. Instead, they pull work from the backlog in priority sequence. The team is not constrained by any outside dependencies, either technical, informational, or process, to deploy their product. A Product Team structure demands that the team communicate, collaborate, and share responsibility for their product.

The ideal Product Team is persistent, self-sufficient, fast, and flexible at solving problems and delivering quality products. Building teams capable of self-sufficiency requires resources from multiple pillars within the OIT organization. The preferred model is to matrix, or embed, resources on the Product Teams, which accomplishes two objectives:

1. Maintains a specialty group trained and held accountable to standards specific to that competency
2. All resources needed to deliver a product work closely together to facilitate quick communication, problem solving, and decision-making

For PLM Maturity Level 2, Product Teams should advance collaboration and teamwork by embracing and integrating matrixed resources into their Agile ceremonies and processes. Matrixed resources should be included in the planning and implementation of product delivery activities, when applicable.

To assist with integrating matrixed resources into Product Teams, consider the following items:

- Teams should set clear expectations by including matrixed resources in the product Responsible, Accountable, Consulted, Informed (RACI) chart
- Involve matrixed resources in product events as needed
- Reference the [Matrixed Resources Report](#) on the ACOE PLM SharePoint site for available matrixed resources by pillar

Acceptance Criteria:

To achieve PLM Maturity Level 2, Product Teams must:

- Integrate matrixed resources into Product Team functions as appropriate
- Orient the matrixed resources on product operations to enable productive contributions

4.3.5 Capture Product Scorecard Metrics

As OIT implements DevOps, PLM, Agile, and Scaled Lean-Agile practices, it is important for Product Teams to aggregate, report, and communicate standard product operational and quality metrics to measure product maturity and health. Product Teams should measure and track their performance to ensure they are continually improving. Operational metrics/data should be aggregated and reported in an authoritative system or tool. The ACOE Metrics and Analytics team collects the data and produces a Product Scorecard for the product.

A Product Scorecard is a formalized metric system that is used to gauge a product's performance based on key performance indicators (KPI). The Product Scorecard is also a tool for periodically reviewing progress of a product's health. By using information in the Product Scorecard, Product Managers can stay on top of any problems that arise and make adjustments that help to keep a Product Team on course.

The ACOE Metrics and Analytics team currently captures performance metrics at the DevOps level in the Product Scorecard. The goal of the Product Scorecard is to:

- Measure product quality
- Report product quality performance
- Indicate areas where improvement is needed
- Drive standardization of integration, automation, and transparency

Product Teams should understand both their business and operational metrics, review and validate the data, and make appropriate adjustments as needed. The team should make the data available to the ACOE Metrics and Analytics team.

For this play, Product Teams should ensure data is available in the Product Team's systems of authority/record to calculate Product Scorecard metrics³. This allows the ACOE Metrics and Analytics team to regularly collect the data directly without impacting Product Teams. If the Product Team is not using a system of authority/record or if the ACOE Metrics and Analytics team cannot be given access to the system, the Product Team should provide the data to the ACOE Metrics and Analytics team.

The following is a list of essential metrics:

1. Automated Test Cases Percentage
2. Mean Time to Repair (MTTR)
3. Current Open Incidents by Tier Level (1,2,3,4) and Priority
4. Total Current Open Defects by Severity and Prod/Non-Prod
5. Current Open High Exposure (Red Zone) Product Technical Risks Count
6. Percentage of Test Executions that Passed
7. Average Story Lead Time
8. Average Defect Lead Time
9. Average Release Cadence to Production/Deployment Frequency
10. Release Failure Percentage
11. Authority to Operate (ATO)
12. 508 Conformance

To improve VA OIT's performance regarding this play, consider the following items:

- The ACOE Metrics and Analytics team will work with each assigned Product Team that has a Product Scorecard to:
 - Collect metrics
 - Standardize metrics
 - Improve accuracy of Product Scorecard metrics
- The goal is that 100% of the required data for the metric calculation is available
- The metrics captured are not meant to be punitive in nature but instead are intended to provide a depiction of the current state of a products performance and indicators for areas of improvement
- The following may be exclusionary factors for a Product Scorecard:
 - Product metrics covered by another related product (e.g., parent/child, etc.)

³ Includes the four DevSecOps metrics similar to those referenced in the book: *Accelerate: The Science of Lean Software and DevOps: Building and Scaling High Performing Technology Organizations* by Gene Kim, Jez Humble, and Nicole Forsgren

- Products managed by organizations outside of OIT (e.g., Veterans Health Administration, Veterans Benefits Administration, etc.)
- Products targeted for decommissioning within the next six months
- True Software-as-a-Service (SaaS) (e.g., licenses only, no interfaces, vendor hosted, no configurations, etc.)
- Reference the ACOE [Product Scorecards Metrics Definitions Microsoft Teams channel](#) for more details and the complete list of required data for Product Scorecard metrics

Acceptance Criteria:

To achieve PLM Maturity Level 2, Product Teams must:

- For the products that have a Product Scorecard:
 - Ensure product data is available in the product data authoritative source (e.g., Jira, GitHub, VASI, MSR, VA PARS, Service Now [SNOW], etc.) to calculate, aggregate and report on operational metrics
 - Validate the data is accurate and current
 - Provide the missing data (“unknowns” or blank data fields) or the data location so ACOE analysts can collect the data in the future
 - Select two Product Scorecard metrics to target for improvement
- For Product Scorecard candidate products that currently do not have a Product Scorecard:
 - Demonstrate the data is available in the product data authoritative sources (e.g., Jira, GitHub, VASI, MSR, VA PARS, SNOW, etc.) to calculate, aggregate and report on key Product Scorecard operational metrics

4.3.6 Develop and Train Product Team Staff

Training is an effective means of improving a PL and Product Teams performance by teaching the basic concepts of PLM, Agile, Scaled Lean-Agile, and DevOps disciplines. Additionally, it is a way to level-set Product Teams on the foundations of each discipline and their associated implementation methodologies. By providing these courses to their staff, PL and Product Managers can advance staff knowledge and understanding so successful implementation can occur.

PL and Product Managers should determine the short and long-term training needs of their staff to enable them to implement the plays in PLM Maturity Level 2 and beyond. Product Managers need to assess immediate training needs required for PLM Maturity Level 2 and develop a staff training plan.

Reference the [ACOE Training Catalog](#) for a list of available training offerings from the VA Talent Management System, Scaled Agile Framework® (SAFe®)⁴, LinkedIn Learning, VA IT Campus, Weekly Agile Meetings, 24/7 eLearning, and IT Workforce Development.

Acceptance Criteria:

To achieve PLM Maturity Level 2, PLs/Product Teams must:

- Assess staff training needs and identify gaps based on PLM Maturity Level 2 acceptance criteria
- Develop a staff training plan for PLM Level 2 based on available training in the Training Catalog or other sources
- Execute the portion of the training plan that will enable the Product Team to implement PLM Maturity Level 2 plays

⁴ SAFe and Scaled Agile Framework are registered trademarks of Scaled Agile, Inc.

5 PLM Maturity Level 3–Decisions at the Speed of Trust

5.1 Background

PLM Maturity Level 2 focused on building cross-functional, self-sufficient, autonomous Product Teams and integrating matrixed resource support personnel. Teams articulated visions through outcome roadmaps, developed business value propositions, and improved business metrics to measure business outcomes. DevOps capabilities and APM monitoring were advanced, and Product Scorecards were developed. Product Managers assessed training needs and developed training plans to upskill staff.

The PLM Level 2 plays laid the foundation for Product Teams to take the next steps in their evolution to full PLM and DevOps maturity. As PLs advance through their maturation journey, they must have the ability to control, predict, and take ownership of changes impacting their systems to the extent possible.

5.2 Purpose

PLM Maturity Level 3 builds on the foundation to reposition ownership decisions at the PL and product level. PLs and Product Teams will improve operational excellence by establishing or advancing problem management and major incident management (MIM) disciplines that address common problems and incidents by reducing the likelihood and impact of occurrence through resiliency, monitoring, and automated testing.

Product Teams will be equipped to make day-to-day decisions with the right set of DevOps and business value metrics to produce better, safer, faster (BSF) and more valuable products for VA customers and end users.

Each PL and Product Team will have a forward-looking vision and a plan for executing the vision, outlined in a three-year roadmap that includes clear measures of success.

PLM Maturity Level 3 consists of plays focused on the following areas:

- Formalize a Problem Management and Incident Response Discipline
- Use Data to Make Decisions
- Build an Integrated Roadmap Aligned with the Vision

5.3 Product Line and Product Plays

5.3.1 Formalize a Problem Management and Incident Response Discipline

The IT Infrastructure Library (ITIL®)⁵ defines a problem as a cause, or potential cause, of one or more incidents. A known error is a problem that has been analyzed but not resolved. The purpose of problem management is to proactively prevent incidents from occurring and minimize the impact of those that cannot be avoided. Problem management supervises the lifecycle of problems within the IT infrastructure, minimizes the impact of those problems on the business, and proactively prevents their recurrence. Problem management seeks to apply solutions thereby proactively preventing incidents from occurring.

There are two types of problem management—reactive and proactive. Reactive problem management is the process of addressing a problem that has already occurred and focusing effort on eliminating its root cause and reoccurrence. Teams use root cause analysis (RCA) to investigate the underlying cause of the problem and work to deliver a permanent solution or a workaround to mitigate the impact. Proactive problem management focuses on anticipating potential problems and preventing them from occurring in the first place. It entails looking at data and incident reports to identify trends and patterns, then putting changes into place to prevent incidents from occurring. Another element of proactive problem management is understanding the customer's mission and future business plans. Usage patterns can change dramatically due to planned hiring, policy changes, and internal changes to business processes/practices. It is important to discuss these topics with the customer for capacity planning and to help them understand the value of the technology efforts being prioritized along with their requests for new features.

An incident is an unplanned interruption to a service or reduction in the quality of a service. Incident management is the process used to respond to an unplanned event or service interruption and restore the service to its operational state. The response to an incident is based on the priority assigned (i.e., priority 1, 2, 3, or 4). Determining the priority is based on a number of factors, including, but not limited to, the impact and urgency of the incident. To accurately reflect the severity of the incident, it is important to assign the appropriate priority. The priority not only determines the order in which the incident is addressed, but also determines how and when notifications are generated regarding issues that impact the business of VA (major incident).

VA OIT follows the [OIT MIM Process](#) to respond to major incidents (priority 1-critical priority incident [CPI] or priority 2-high priority incident [HPI]). As defined in the process, a major incident is "...a high-impact, high-urgency incident that affects many users,

⁵ITIL® is a registered trademark of AXELOS Limited.

depriving the business of one or more crucial services, such as patient care, benefits processing, and cemetery operations. An incident becomes major when it results in a significant disruption to the business and demands a response beyond the routine incident management process.”

Incident management and problem management are tightly coupled and complement each other. Incident management ensures continuity in business operations, while problem management addresses the underlying issues and problems. Most incidents and problems are ideally identified by monitoring and alerting. If there are gaps in monitoring, incidents and problems are identified by system administrators and user notifications (e.g., calls to the helpdesk, etc.). Product Teams should be available to support incident responses (e.g., triage, etc.) and problem management activities (e.g., RCA and solutioning, etc.). These activities are facilitated by VA’s Enterprise Command Operations (ECO). Teams should also take proactive steps to prevent problems and prioritize work to address critical defects. Product Teams should transition to a problem management and incident management discipline that actively seeks to address the common underlying causes of problems or incidents and reduce the number of incidents through resiliency, monitoring, and automated testing.

For PLM Maturity Level 3, a Product Team should establish or enhance its problem management and MIM processes to increase rigor, accountability, and resiliency as well as a commitment to continuous improvement. Teams should ensure the *right people*, with the *right skills*, are available at the *right time* to respond to and resolve incidents. Product Teams should ensure they have personnel who:

- Have the authority to direct team resources during a major incident
- Are skilled in identifying measures or indicators of system performance and can influence improvement of operational performance associated with major incidents, availability, and MTTR
- Support investigations and analyze factors and conditions to determine the nature and scope of problems and incidents
- Engage PL, product, and other resources as needed for the operational stability of the system during incident and problem management processes
- Monitor the early-warning detection capability, reliability, scalability, performance, availability, and resiliency of systems and recommend improvements, where needed

To improve VA OIT's performance regarding this play, consider the following items:

- Proactively establish repeatable processes to better support incident response and problem management functions, such as, but not limited to:
 - Take action to reduce the probability or likelihood of the occurrence of problems and incidents, and maximize the availability of products by implementing DevOps capabilities, such as end-to-end system integration testing, failover testing, regression testing, performance and load testing, build failover capability, redundancy, and blue/green releases
 - Reduce monitoring blind spots by adding thresholds and alerts for all infrastructure and application components to monitoring so the ECO is automatically notified of severe issues
 - Collaborate with [ECO Problem Management](#) and [ECO MIM](#) to understand the requirements for managing problems and major incidents
 - Document the application's architecture, databases, infrastructure, integrations, environments, etc. to assist appropriate technical SMEs as needed and the Problem Management and MIM groups with triaging and resolving incidents and for restoring product performance
 - Identify and document product SMEs and their responsibilities by application, service, database, and other software system components
 - Clarify and standardize communication protocols teams should use when interacting with the Problem Management and MIM groups and technical support, during and after an incident
 - Use data to identify trends and subtle shifts in product performance and work with the Problem Management group to perform appropriate analysis
 - Use operational best practices to maximize availability (e.g., monitoring, redundancy, etc.)
 - Use metrics to identify performance problems and to indicate where actions may be needed for improvements (major incidents, availability, and MTTR)
 - Implement redundancy/failover actions (complete failover system exists, complete successfully tested failover system) to improve the resiliency metrics listed above
 - Upskill staff on effective reporting and tracking of incidents in SNOW
 - Contact the [Enterprise Service Desk Knowledge Management](#) organization for upskilling on the Known Error Database (KEDB) and how to create knowledge articles

- When an incident and/or problem occurs, the Product Team should:
 - Know and follow the incident response and communication protocols defined in the [OIT Problem Management Practice](#), [OIT MIM Process](#), and [OIT Incident Management Directive](#) documents
 - Aid in resolving issues and restoring service in minimal time (e.g., investigate and respond to incidents, help diagnose, suggest workarounds, resolve incidents, perform risk management, etc.)
 - Make recommendations on courses of action to the Problem Management and/or MIM groups and participate in RCA and problem resolution
 - Follow through until completion of all action items identified during the RCA
 - Ensure technical SMEs (including vendors) attend the daily Morning Operations Meeting and provide updates on incidents, as needed
 - Engage and enable vendors and technical resources to take a larger role in facilitating troubleshooting of incidents

Acceptance Criteria:

To achieve PLM Maturity Level 3, PLs/Product Teams must:

- Confirm the Product Team has reviewed the [OIT Problem Management Practice](#), [OIT MIM Process](#), and [OIT Incident Management Directive](#)
- Identify key resources and define the functional roles and responsibilities for personnel responsible for managing and supporting problem and incident management activities for the PL
- Identify key resources and define the functional roles and responsibilities for personnel responsible for managing and supporting problem and incident management activities for the product
- Consistent with the [Use Data to Make Decisions](#) play, Product Teams must develop a plan to improve in operational resiliency metrics requiring improvement (major incidents, availability, and MTTR)
- Show evidence that problems and incidents are identified, categorized, logged, and tracked in an incident tracking system (e.g., SNOW, Remedy, Salesforce, etc.)
- If the product information is captured in SNOW, ensure the Affected Service, Affected CI, and Was the Incident Caused by a change? fields are populated for all incident occurrences

5.3.2 Use Data to Make Decisions

PLM Maturity Level 2 included developing business value propositions and identifying business metrics to measure success in achieving that business outcome value. Level 2 also included identifying key product metrics and tracking them using Product Scorecards.

For PLM Maturity Level 3, teams must use metrics to make better data-driven decisions regarding performance and the overall health and resiliency of the product. Using metrics to inform decision-making enables teams to identify positive trends as well as areas needing improvement, quickly diagnose and resolve problems, track improvements over time, improve resiliency, and achieve better product outcomes. By using metrics to drive decisions, teams can assess what they are doing well and where they have opportunities to improve. Using quantitative metrics to represent product outcomes makes the team's progress more noticeable and gives them an accurate picture on the health of the product.

By using better, safer, faster (BSF) metrics, teams can determine the correlation between business and product metrics to make data-driven decisions. Data-driven decision-making is the process of making decisions based on actual data rather than intuition or observation alone. It's a practice where data is collected, analyzed, and insights are derived from the analysis. These insights are then used to make informed strategic business decisions that align with the product's vision, goals, objectives, and priorities.

Some of the many benefits of data-driven decision-making include:

- Improved transparency, accountability, teamwork, and staff engagement
- Continuous product improvement in the areas of quality, operations, resiliency, and satisfaction; based on actionable key insights gleaned from data analysis
- Faster and more confident decision-making process
- Improved understanding of product's overall performance, leading to reduced risk, faster time to market, and higher productivity
- Repeatable decision-making
- Moving decision making closer to where the work is being performed

The VA OIT organization uses the following categories to capture BSF metrics:

- Satisfaction
- Quality
- Reliability
- Security
- Velocity
- Budget
- Data completeness in authoritative data repositories

[Table 2](#) outlines the BSF metrics associated with each of the categories listed above. Reference the [Product Scorecard Dashboard](#) for BSF metrics at the PL and Product level. For BSF metrics at the Portfolio and PL level, refer to the [PLM Summary Dashboard](#).

For definitions of the metrics in [Table 2](#), reference the [PLM Summary Metric Definitions](#) list in [ACOE's Metrics Definitions Microsoft Teams channel](#). Refer to the "Suggested Action Items for Improvement" column for recommended actions to improve product performance data.

Table 2: Better, Safer, Faster (BSF) Metrics

| Area | Category | Metric |
|-------------------|--------------|---|
| Better | Satisfaction | Business Metrics (% Met) |
| | Quality | Severity 1-Critical and/or 2-High Production Defects (Total Open) |
| | | Major Incident (Count) |
| Safer | Reliability | Availability |
| | | Mean Time to Repair (MTTR) (Mins) |
| | Security | ATO |
| | | Monitoring - Level 3 APM |
| Faster | Velocity | Cycle Time (Overall Average) (Days) |
| | | Release Cadence (Average) (Days) |
| Data Completeness | N/A | Product Data (% Complete) |

Teams must develop a plan and take action in areas requiring improvement by analyzing metrics data to identify trends and improve product outcomes. To achieve this, teams must ensure data is complete in authoritative data repositories (e.g., VASI, VA PARS, MSR, SNOW, ALM tools, such as Jira, GitHub, etc.).

Data-driven decision-making enables teams to find patterns of adverse events and use that information to determine where they need to focus product improvement efforts and resources, then track the results of those efforts over time. It also provides the opportunity for teams to identify positive events and trends and determine how that

knowledge can be applied to repeat positive results. Examples of how teams can use data in their decision-making include:

- Review the BSF metrics during Agile events
- Set goals targeting quantifiable improvements

Operational resilience is of high importance to the VA OIT Chief Information Officer. Within the BSF metrics are some key resiliency metrics that require attention to drive decisions that maximize product availability to the customer. As such, Product Teams should focus improvement actions on:

- Major incidents
- Availability
- MTTR

Implement redundancy/failover actions (complete failover system exists, complete successfully tested failover system) to improve the resiliency metrics listed above.

To improve VA OIT's performance regarding this play, consider the following items:

- Products requiring BSF metrics should include custom developed, commercial-off-the-shelf (COTS), and non-defect fix sustainment products
- Monitor and update authoritative data repositories (e.g., VASI, VA PARS, MSR, SNOW, ALM tools, such as Jira, GitHub, etc.) to ensure they contain complete and accurate data for the product
- Product Teams should:
 - Analyze the business and product metrics during Agile events to:
 - Understand a correlation of product development and sustainment activities and outcome data
 - Identify priority areas of improvement
 - Implement corrective actions
 - Begin analyzing business and product metrics in the [Product Scorecard Dashboard](#) to influence product improvements around BSF metrics
 - Use the suggested improvement actions on the [PLM Summary Metric Definitions](#) page to determine the appropriate corrective actions
 - Make resiliency metrics a priority, particularly metrics needing improvement (e.g., red, yellow, etc.) or metrics not currently met or tracked
 - Visualize and share best practices with leadership and key stakeholders on how the Product Team is using data to make better decisions and improve product outcomes

Acceptance Criteria:

To achieve PLM Maturity Level 3, PLs/Product Teams must:

- For each product, show how BSF metrics are used to analyze and evaluate the data to make decisions and improve product outcomes
- Identify those products that need improvement for the following product-level operational resiliency metrics:
 - Major incidents
 - Availability
 - MTTR
- For those products that need operational resiliency improvement, show the product's plan for improving the above operational resiliency metric(s)

5.3.3 Build an Integrated Roadmap Aligned with the Vision

Legacy systems are built on outdated architectures with high maintenance costs, inherent inflexibility, redundant features, lack of connectivity, and low efficiency. Complex application and process logic is often hard-coded and undocumented. - Gartner

PLs and Product Teams must adopt smarter technology practices by using IT industry standards to support decisions on application modernization and identifying new technology to optimize future product development. PLs must focus on modernizing the infrastructure, technology, aging software, and legacy systems built on outdated code bases. Legacy systems are typically incompatible with new technologies, which results in increased maintenance costs and operational inefficiencies. When legacy systems become outdated, Product Teams should implement application modernization strategies to improve technology, speed, reliability, resiliency, functionality, and integration capabilities.

Improvements in the technology industry have solved many of the problems associated with outdated legacy systems and now offer SaaS or Platform-as-a-Service (PaaS) solutions that incorporate best practice workflows. Teams need to look to industry best practices for "buy" solutions and configure a solution when one does not exist. They also need to move away from costly, custom-code solutions except in cases where an established platform exists, like VA.gov, or the rare cases where VA has a highly differentiated problem.

Modernization aims to accomplish the following business objectives:

- Reduce operations and maintenance (O&M) costs
- Reduce lead time for new features
- Improve application performance and scalability
- Increase availability

- Improve resiliency
- Reduce technical debt
- Improve compliance and security

As PLs and Product Teams plan for improving the technical capabilities of their products through modernization, they should keep in mind that their solutions should align with PL and product visions, align with OIT's modernization priorities, and leverage modernization initiatives (e.g., COTS, low code/no code, SaaS, cloud, etc.) to the maximum extent possible to align with [VA's Digital Transformation Strategy](#).

In PLM Maturity Level 2, Product Line Managers and Product Managers developed an outcome roadmap that outlines the plan for how the PL is going to meet the organization's key business objectives, how it will benefit Veterans, and details the direction of the products in the PL and the work required to get there. It serves to communicate key product priorities with internal and external stakeholders. To achieve PLM Maturity Level 3, PLs and Product Teams must develop an integrated roadmap, inclusive of modernization priorities, that aligns with the PL's and product's vision and includes product outcomes. The roadmap must depict a minimum of a three-year plan focused on improving resiliency, reducing O&M costs, and demonstrating the vision for application modernization.

The vision is a critical aspect of a PL and product's ability to deliver valuable outcomes. A vision conveys purpose. It explains the PL/product's intentions in a concise manner and helps the team focus on what is important. The vision also helps teams develop a more inspired roadmap, improves strategic decision-making throughout the lifecycle of the PL/product, and ensures teams and stakeholders are aligned across the PL/product. The PL vision statement should be developed before the product vision can be drafted. Teams should draft a product vision that describes the future state of the product and the problems it is trying to resolve. Drafting the product vision should always come before beginning work on the integrated product roadmap.

Similar to vision statements, roadmaps enhance operational efficiencies and drive business value. Roadmaps translate the vision into a strategic guide and action plan. They document the PL/product's current business and technology environment and depict the transformative initiatives that will enable the PL/product to achieve its future environment. They also provide an integrated view of PL/product milestones supporting IT planning, prioritization, decision making, and technology solutions that deliver the PL/product vision.

The roadmap must include technology modifications to the corresponding PL/product and depict the synchronization and integration with VA modernization initiatives, such as [VA Platform One \(VAPO\)](#). VAPO is an enterprise-class hosting service that

containerizes applications and creates an experience that liberates customers and Product Teams from traditional provisioning practices, allowing them to focus on faster delivery of capabilities and innovations.

Prior to developing an integrated roadmap, teams should perform an initial analysis to help identify where modernization prioritization efforts should be concentrated. Analysis should consider business impact and focus on the product's ability to achieve the following OIT modernization priorities:

- Prevent applications from running on end-of-life systems (e.g., SQL Server 2012, Windows Server 2012, Adobe Flash, etc.)
- Achieve 99% uptime (e.g., add/improve monitoring, synthetic transactions, alerts, etc.)
- Reduce MIMs from change (unforced errors) by 25% (e.g., increase automation [especially automated testing], standardize processes and tools, etc.)
- Reduce O&M costs (e.g., move to SaaS, migrate to the cloud, decommission, consolidate capabilities, re-architect on a modern platform, etc.)
- Decrease Mean Time to Repair (MTTR) by 25% (e.g., eliminate blind spots by decommissioning or replacing systems that cannot be monitored or have limited monitoring capabilities, add/improve monitoring, synthetic transactions, and alerts, etc.)
- Improve scalability and resiliency of production and lower environments (e.g., containerize and migrate to the cloud, etc.)
- Improve cyber posture (e.g., migrate to the cloud, implement two-factor authentication (2FA), role-based permissions, auditing access, trusted internet connection (TIC) 3.0, and other cybersecurity work, etc.)
- Provide a disaster recovery (DR) solution
- Provide blue/green (A/B) environments to eliminate downtime for maintenance and other operational activities
- Use approved Application Programming Interfaces (API) (e.g., replace remote procedure calls [RPC] with APIs from the Lighthouse catalog, etc.)
- Reduce requirements lead time (e.g., migrate to modern development platforms and software factories, etc.)
- Improve compliance (e.g., improve Section 508 compliance, etc.)

No two product modernization approaches will be the same and the decisions for modernization will vary. PLs/Product Teams should use metrics to drive decisions on what the scope of the modernization effort will be. When developing the integrated roadmap, PLs/Product Teams should consider business and operational metrics to determine what should be included.

To improve VA OIT's performance regarding this play, consider the following items:

- Visions and roadmaps should be developed in this order:
 1. The PL vision statement should be developed first.
 2. The product vision statement is drafted based on the PL vision statement.
 3. The product integrated roadmap is drafted in alignment with the product vision and outcome roadmap.
 4. Individual product roadmaps are rolled up into a single PL integrated roadmap, which should align with the PL vision and outcome roadmap.
- Ensure the product backlog aligns with the product's vision and integrated roadmap
- Leverage resources in the Portfolio for modernization (e.g., SaaS, platforms, etc.), where possible
- Collaborate with matrixed resources (support teams/organizations) to identify redundancies and interdependencies (e.g., AES, AMO, etc.)
- Forecast funding and staffing resources
- Identify opportunities to use the [VA Lighthouse](#) team to optimize APIs
- Review and update the SAM (Software Application Modernization) View tab in VASI with the product's current disposition statuses
 - Reference the [Architecture and Engineering Services \(AES\) Data Dictionary](#) for the terms to use in the SAM View tab
- Identify and plan decommissioning of legacy systems to include:
 - Tracking decommissioning efforts to improve reporting to Congress and the Office of Management and Budget (OMB)
 - Defining clear and deliberate actions to accelerate decommissioning of legacy software/systems
 - Summarizing and visualizing cost savings from legacy system decommissioning in VASI
- Ensure information security requirements are addressed (confidentiality, integrity, and availability)
- The roadmap should be a living document and be re-assessed quarterly (at a minimum); the goal is to close the gap between legacy systems and new technology
 - Quarterly planning events provide excellent opportunities to validate and improve modernization roadmaps
- Perform monthly reviews of metrics to determine the impacts of the modernization efforts, then use the metrics as an indicator of what should be modernized
- Communicate the progress of technology modernization activities and the value of results to stakeholders (e.g., AES, BIOS, Office of Information Security, Enterprise Cloud Services, business customers, etc.) on a quarterly basis

- Product Managers should understand all costs, cost drivers, and the lifecycle cost of a software product, which include more than the traditional development and sustainment contracts (e.g., costs associated with shared services and platforms, etc.)
- Products without OIT funding or resources do not require a roadmap
- Reference the [ACOE Training Catalog](#) for training courses specific to modernization concepts (e.g., platforms, software factories, refactoring, automation, etc.)

Acceptance Criteria:

To achieve PLM Maturity Level 3, PLs/Product Teams must:

- Provide a PL vision statement approved by stakeholders
- Provide a product vision statement approved by stakeholders that aligns with the PL vision statement
- Develop an integrated product roadmap using the approved template, inclusive of modernization priorities, that is aligned with the product's vision and includes product outcomes
- Develop a PL integrated roadmap using the approved template, inclusive of modernization efforts, that includes PL outcomes, and represents all products from the PL
- Confirm the approval of the PL integrated roadmap with stakeholders
- Confirm the approval of the product integrated roadmap with stakeholders
- The roadmap must cover a minimum of three years into the future

Appendix A–PLM Big 8 Role Descriptions

The Big 8 roles⁶ for a PL are especially important to provide key leadership for PLM. A PL may wish to identify additional roles to support the products in their PL. Refer to definitions provided in other OIT guidance for any references to roles not defined in this section.

Product Line Manager

- Leads multiple Product Teams
- Accountable for a suite of products and all their associated team functions
- Maintains relationships with Business Owner
- Ensures complete understanding of business objectives and priorities
- Accountable as the IT System Owner for products in their PL
- Oversees IT Lifecycle activities for all IT products within their PL from the identification of need through retirement and decommissioning

Technical Lead/Solution Architect

- Sets and leads the implementation of the Portfolio's technical strategy within the PLs and Product Teams
- Guides the technical implementation of the roadmap, to reduce technical debt, address technology end-of-life, and achieve PL maturity
- Assists the PL and Product Teams with the implementation of CI/CD processes and automated tools to promote efficient operations and delivery
- Provides support for resolution of technical issues

Product Manager

- Manages every aspect of delivering, operating, and maintaining an IT product, from formulating and prioritizing requirements with the business Product Owner to the design, development, and delivery of capabilities, change management, and ultimate retirement of obsolete functions
- Perform as the IT System Steward and is responsible for system owner deliverables to the IT System Owner
- Accountable for the lifecycle of a product
- Works with the Business Owner and Technical Lead to maintain a product backlog (1-to-N priority list)

⁶ If a PL has completed PLM Maturity Level 1, ACOE will not ask the PL to re-submit confirmation of their Big 8 roles; rather the PL should seek Service Line and Portfolio guidance to iteratively identify and document the new roles in authoritative sources, as they are incorporated for their products and PLs.

Systems Reliability Engineer (SRE)

- Accountable for continuous improvement of product availability, reliability, performance, and resilience
- Manages day-to-day technical support for IT products, including operations processes, planning, design, and operations strategy
- Assists the Product Team to drive down technical debt by injecting new requirements to drive down sustainment costs, executing preventative work to reduce production support issues, and responding to and quickly resolving production support issues

Business Owner

- VA business representative
- Responsible for providing business requirements for IT capabilities to the PL and/or Product Teams
- Prioritizes backlog of capability requirements for the PL/Product Team to support the process flow for delivery of IT capabilities
- Validates suitability of IT capabilities for end use

Business Relationship Manager (formerly Account Manager)

- Serves as the Business Integration and Outcomes Services (BIOS) representative
- Liaison between the business owner's agency and the Portfolio/PL/Product Team organization
- Assists with visions, roadmaps, 1-to-N prioritization, and resourcing for the portfolio
- Helps ensure synchronization between the business and IT teams

Program Manager

- Leads the PL/product operating staff
- Supports and manages the resources necessary to support execution of PL operations
- Enables Product Manager and PL leadership to achieve the vision and mission of the product

User Experience Designer

- Uses human-centered design practices to understand user needs
- Designs and guides implementation of product changes to improve the user experience
- Conducts user research and testing to assess user behavior
- Ensures products deliver a delightful user experience
- Understands product specifications and user psychology to predict the best user experience

Appendix B—Recommended Reading

To learn more about best practices for PLM and DevOps beyond what is included in the Playbook, explore some of the recommended reading provided here. These resources will provide the ability to learn more about what is needed to successfully implement PLM and DevOps. Links to most of the books listed below can be found in the [ACOE Training Catalog](#).

- *Accelerate: The Science of Lean Software and DevOps* – Nicole Forsgren, Jez Humble, and Gene Kim (2018)
- *The DevOps Handbook* – Gene Kim, Jez Humble, Patrick Debois, John Willis, and John Allspaw (2016)
- *Accelerate: Building Strategic Agility for a Faster-Moving World* – John Kotter (2014)
- *The Phoenix Project* – Gene Kim, Kevin Behr, George Spafford (2013)
- “Moving from Project to Product: Modernizing Traditional Enterprise Operating Models” – IT Revolution/DevOps Enterprise Forum (2018)
- “The Project to Product Transformation: Practical Guidance from Fourteen Enterprise Journeys” – IT Revolution/DevOps Enterprise Forum (2019)
- *The Unicorn Project: A Novel about Developers, Digital Disruption, and Thriving in the Age of Data* – Gene Kim (2019)
- *Gen P: New Generation of Product Owners Who Care About Customers* – Peter Monkhouse, and Joanna Tivig (2019)
- *Project to Product: How to Survive and Thrive in the Age of Digital Disruption with the Flow Framework* – Mik Kersten (2018)

Appendix C–OIT DevOps Capabilities

The list below includes, but is not limited to, the DevOps capabilities being implemented at VA.

- Application Lifecycle Management (ALM) Tools
- Application Performance Monitoring (APM)
- Architecture
- Automated Continuous Delivery
- Automated Continuous Integration
- Automated Deployment with Zero Downtime
- Automated Patch Management with Zero Downtime
- Automated Testing
- Blue/Green Releases and Testing
- Business Metrics Monitoring
- Canary Testing/Releases
- Cloud/VA Enterprise Cloud (VAEC)
- Container Orchestration
- Container Technology/VA Platform One (VAPO)
- Continuous Exploration
- Continuous/Relentless Improvement
- Dashboards
- Feature Flags
- Human-Centered Design
- Infrastructure-as-a-Service (IaaS)
- Infrastructure-as-Code (IaC)
- Integrated Security
- Metrics/KPIs
- Microservices
- Pipeline Monitoring
- Platform(s) and/or Re-Platforming
- Re-Architecting
- Refactoring Code
- SaaS or Managed Services
- Self-Service Capabilities
- Zero Downtime Deployments

Appendix D–List of Acronyms

| Term | Definition |
|-----------|--|
| 2FA | Two-Factor Authentication |
| ACOE | Agile Center of Excellence |
| AES | Architecture and Engineering Services |
| ALM | Application Lifecycle Management |
| API | Application Programming Interface |
| APM | Application Performance Monitoring |
| ATO | Authority to Operate |
| BIOS | Business Integration and Outcomes Services |
| BSF | Better, Safer, Faster |
| BTT | Budget Tracking Tool |
| CI/CD | Continuous Integration/Continuous Delivery |
| COTS | Commercial-off-the-shelf |
| CPI | Critical Priority Incident |
| DevOps | Development and Operations |
| DevSecOps | Development, Security, and Operations |
| DR | Disaster Recovery |
| ECC | Enterprise Command Center |
| ECO | Enterprise Command Operations |
| EPS | Enterprise Project Structure |
| HPI | High Priority Incident |
| IaC | Infrastructure-as-Code |
| IaaS | Infrastructure-as-a-Service |
| IOC | Initial Operating Capability |
| IT | Information Technology |
| ITIL | IT Infrastructure Library |
| KEDB | Known Error Database |
| KPI | Key Performance Indicator |
| MIM | Major Incident Management |
| MSR | Monitoring Service Registry |
| MTTR | Mean Time to Repair |

| Term | Definition |
|---------|---|
| MYP | Multi-Year Programming |
| O&M | Operations and Maintenance |
| OIT | Office of Information and Technology |
| OMB | Office of Management and Budget |
| PaaS | Platform-as-a-Service |
| PI | Program Increment |
| PL | Product Line |
| PLCR | Product Line Change Request |
| PLM | Product Line Management |
| RACI | Responsible, Accountable, Consulted, Informed |
| RCA | Root Cause Analysis |
| RPC | Remote Procedure Call |
| SaaS | Software-as-a-Service |
| SAM | Software Application Modernization |
| SAFe | Scaled Agile Framework |
| SME | Subject Matter Expert |
| SNOW | Service Now |
| TBM | Technology Business Management |
| TIC | Trusted Internet Connection |
| UFR | Unfunded Requests |
| VA | Department of Veterans Affairs |
| VAEC | VA Enterprise Cloud |
| VA PARS | VA Product (Line) Accountability and Reporting System |
| VAPO | VA Platform One |
| VASI | VA Systems Inventory |
| VIP | Veteran-focused Integration Process |

Appendix E–Glossary of Terms

| Term | Definition |
|--|---|
| Acceptance Criteria | A pre-established set of conditions or requirements a Product Line or product must meet for a play to be achieved within each PLM maturity level. |
| Agile Teams | Agile teams are cross-functional groups of 5-11 individuals who define, build, test, and deliver an increment of value in a short time box. |
| Backlog | A prioritized list of everything that is known to be needed in the product. It is the single source of requirements for any changes to be made to the product. The Product Owner is responsible for the product backlog, including its content, availability, and ordering. |
| Budget Tracking Tool (BTT) | BTT is an integrated enterprise-wide budget planning, management, and reporting system. It is used to plan the annual budget at the obligation level and to manage execution and funds resource allocation through the end of the year. |
| Cadence | The approach to achieving commitment and reliability with a system. It is a measure of balance and the rhythmic flow of the process. Sprints of regular time interval or duration establish a cadence for a development effort. |
| Development and Operations (DevOps) | DevOps is a mindset, a culture, and a set of technical practices. It provides communication, integration, automation, and close cooperation among all the people needed to plan, develop, test, deploy, release, and maintain a solution. |
| Enabler | Technical items that support the development of future business requirements bringing visibility to all the work necessary. They help to stabilize the architecture, infrastructure, and maintain customer needs. |
| Epic | A large body of work that can be broken down into several smaller stories. Epics often encompass multiple Product Teams and can even be tracked on multiple Kanban boards. Epics are almost always delivered over a set of Sprints. |
| Infrastructure-as-a-Service (IaaS) | The capability provided to the consumer to provision processing, storage, networks, and other fundamental computing resources where the consumer can deploy and run arbitrary software, which can include operating systems and |

| Term | Definition |
|---|--|
| | applications. The consumer does not manage or control the underlying cloud infrastructure but has control over operating systems, storage, and deployed applications; and possibly limited control of select networking components (e.g., host firewalls, etc.). |
| Infrastructure-as-Code (IaC) | IaC refers to the tools and processes used to track and manage infrastructure resources as code. This code is commonly stored in a version control system and the tools are most effective when applied to virtual environments. |
| Kanban | A method to visualize and manage the flow of features and capabilities from ideation to analysis, implementation, and release through the Continuous Delivery Pipeline. |
| Platform-as-a-Service (PaaS) | The capability provided to the consumer to deploy onto the cloud infrastructure consumer-created or acquired applications created using programming languages, libraries, services, and tools supported by the provider. The consumer does not manage or control the underlying cloud infrastructure including network, servers, operating systems, or storage, but has control over the deployed applications and possibly configuration settings for the application-hosting environment. |
| Product | <p>An item, system, or service offered to or provided for use by a customer. It can be in physical, virtual, or cyber form. A valuable product is:</p> <ul style="list-style-type: none"> • Relevant – Customers must view it as a way to fulfill a need • Functional – It must perform as expected • Adaptable – It must be able to change with trends, time, technology, and user segments • Communicated – Customers and potential customers must understand how they can benefit from it |
| Product Line (PL) | A VA Product Line is a group of related products that address related customer needs. |
| Product Line Change Request (PLCR) | PLCR manages VASI change requests related to re-aligning VASI product records to Product Lines. |
| Product Owner | A member of the Product Team that is accountable for maximizing the value of the product(s) that the team(s) are |

| Term | Definition |
|--|---|
| | developing. The Product Owner is responsible for creating and communicating a product vision that defines what gets built, what does not get built, and the prioritization of work in the product backlog. |
| RACI Chart | <p>A RACI chart is a simple matrix used to assign roles and responsibilities for each task, milestone, or decision on a project.</p> <p>RACI stands for Responsible, Accountable, Consulted, Informed. Each letter in the acronym represents a level of task responsibility.</p> |
| Release | Installation into production environment—including initial operating capability (IOC), full deployment, subsequent releases, maintenance releases, defect repairs, security and other patches, and any changes that are released into production; also used to refer to the package (hardware, software, middleware, documentation, other components) being deployed. |
| Shared Services/Matrixed Resource | Shared Services/Matrixed Resource represents the specialty roles, people, and services required for the success of a Product Team, but that cannot be dedicated full-time. |
| Software-as-a-Service (SaaS) | The capability provided to the consumer is to use the provider's applications running on a cloud infrastructure. The applications are accessible from various client devices through either a thin client interface, such as a web browser (e.g., web-based email, etc.), or a program interface. The consumer does not manage or control the underlying cloud infrastructure including network, servers, operating systems, storage, or even individual application capabilities, with the possible exception of limited user-specific application configuration settings. |
| Sprint | A short cycle of work (usually two weeks) during the Build and Development phase; each Sprint focuses on completing a defined subset of project deliverables. |

| Term | Definition |
|--|---|
| Stakeholder | A stakeholder is an individual, group, or organization that is impacted by the outcome of a project. They have an interest in the success of the project or product and can be within or outside the organization that is sponsoring the project/product. |
| Sustainment | The processes, procedures, people, material, and information required to support, maintain, and operate the software and/or hardware aspects of a system. |
| System Team | A specialized Agile Team that assists in building and supporting the Agile development environment, typically including development and maintenance of the toolchain that supports the Continuous Delivery Pipeline. The System Team may also support the integration of assets from Agile teams, perform end-to-end Solution testing where necessary, and assists with deployment and Release on Demand. |
| Technology Business Management (TBM) | TBM is a framework designed to communicate the value of IT to agency stakeholders. TBM focuses on cost transparency, delivering value, identifying the total cost of IT, and shaping demand for IT services. |
| Veteran-focused Integration Process (VIP) | The VA OIT software development lifecycle. The process focuses on outcomes and decentralizes decision-making to Product Line Managers on how product delivery oversight occurs. VIP mandates the use of VA Product (Line) Accountability and Reporting System (VA PARS) to collect and track OMB reportable products. |