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Introduction and Objectives

Introduction

Docupal Demo, LLC proposes this plan to update and upgrade your application's Ember.js framework. Our goal is to modernize the application and improve its overall performance. The upgrade will also enable you to take advantage of the latest Ember.js features.

Project Context

This upgrade is driven by the need to maintain compatibility with current web browsers and libraries. Modernizing the framework improves application security. It will also boost developer productivity. The update reduces technical debt.

Objectives

The primary objectives of this Ember.js upgrade are:

- Improve application performance.
- Enhance application security.
- Reduce existing technical debt.
- Ensure compatibility with modern browsers.
- Enable access to modern Ember.js features.
- Improve developer productivity.

Current System Overview

Our current application is built using Ember.js version 3.28. This version, while stable, is now several major versions behind the latest releases. This creates challenges in maintaining the application and leveraging newer features and performance improvements offered by more recent Ember.js versions.

Key Dependencies and Integrations

The application relies heavily on several key dependencies:

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- **Ember Data:** Used for managing the application's data layer and interacting with backend APIs.
- **Ember Simple Auth:** Handles user authentication and authorization.
- **DocuPal API:** The application integrates directly with the DocuPal API to provide core functionality.

Pain Points and Technical Debt

The current system has several pain points that impact developer productivity and application performance:

- **Outdated Dependencies:** Many dependencies are outdated, leading to potential security vulnerabilities and compatibility issues.
- **Slow Build Times:** The older Ember.js version contributes to slow build times, increasing development iteration cycles.
- **Complex Workarounds:** Due to the limitations of Ember.js 3.28, we've implemented complex workarounds to achieve functionality that is now natively supported in newer versions. This adds to the codebase's complexity and makes maintenance more difficult. These workarounds are specific to the older version and may not be compatible with future upgrades without significant rework. The current architecture requires refactoring and simplification to align with modern Ember.js practices.

Upgrade Impact Analysis

This section outlines the potential impacts of upgrading our Ember.js application. We will cover compatibility, deprecated features, and performance considerations.

Compatibility

The upgrade might introduce compatibility issues. Older versions of Ember Data could cause problems. Some third-party Ember addons may also be incompatible. We will carefully test all dependencies. This testing will identify and address any conflicts. We will update or replace incompatible addons as needed.

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Deprecated Features

This upgrade will remove support for older browsers. Certain deprecated APIs related to computed properties and observers will also be removed. We will migrate away from these deprecated features. Our code will be updated to use the recommended replacements. This ensures a smooth transition and avoids future issues.

The following chart shows the deprecated features across Ember.js versions:

Performance

We expect an overall performance improvement. The optimized rendering engine should provide gains. However, initial performance regressions are possible. We will actively monitor performance after the upgrade. We will address any regressions through optimization efforts. This includes code profiling and targeted improvements.

Upgrade Strategy and Roadmap

Our upgrade strategy focuses on an incremental, phased approach to ensure a smooth transition and minimize disruption to your current application. We will migrate individual components and routes step-by-step. This allows for continuous testing and validation throughout the process.

Phased Upgrade Plan

The upgrade will be executed in three distinct phases:

Phase 1: Ember.js Core Upgrade to 4.0

- **Objective:** Upgrade the core Ember.js framework to version 4.0.
- **Activities:** Update Ember CLI, resolve any deprecation warnings, and conduct thorough testing of core functionalities.
- **Deliverables:** A stable Ember.js 4.0 application with all existing features fully functional.

Phase 2: Ember Data and Ember Simple Auth Updates

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- **Objective:** Update Ember Data and Ember Simple Auth to versions compatible with Ember.js 4.0.
- **Activities:** Upgrade Ember Data and Ember Simple Auth, adjust configurations, and update any related code.
- **Deliverables:** Fully functional data layer and authentication system.

Phase 3: Modern Component Migration

- **Objective:** Migrate existing components to leverage modern Ember.js features and best practices.
- **Activities:** Refactor components to use Ember Octane features, improve performance, and enhance maintainability.
- **Deliverables:** Optimized and modernized components that take full advantage of the Ember.js ecosystem.

Resource Allocation

The following teams will be involved in the upgrade process:

- **Frontend Team:** Responsible for the actual upgrade, code migration, and component refactoring.
- **DevOps Team:** Responsible for setting up the necessary environments, managing deployments, and ensuring infrastructure stability.
- **QA Team:** Responsible for testing all phases of the upgrade to ensure quality and stability.

The teams will use the following tools:

- **Ember CLI:** For managing the Ember.js project and running commands.
- **Ember Inspector:** For debugging and inspecting the Ember.js application.
- **Testem:** For running automated tests.
- **GitHub:** For version control and collaboration.

Timeline

Phase	Estimated Duration	Start Date	End Date
Phase 1: Ember.js Core Upgrade	4 weeks	2025-09-02	2025-09-26
Phase 2: Data/Auth Updates	3 weeks	2025-09-29	2025-10-17
Phase 3: Component Migration	6 weeks	2025-10-20	2025-11-28

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Note: These dates are estimates and may be adjusted based on the project's progress.

Our final deliverable will be a fully upgraded and tested application that leverages the latest Ember.js features.

Testing and Validation Plan

Our testing strategy ensures a smooth and reliable Ember.js update/upgrade. We will use a combination of automated and manual testing techniques to identify and resolve potential issues.

Testing Methodologies

We will employ the following testing methodologies:

- **Unit Tests:** These tests will verify the functionality of individual components and functions in isolation.
- **Integration Tests:** These tests will confirm the interaction between different parts of the application.
- **End-to-End Tests:** These tests will simulate user workflows to ensure the application functions correctly from start to finish. We'll use Cypress for end-to-end testing.

Ember CLI's built-in testing framework will be utilized for unit and integration tests.

Quality Assurance Processes

We will maintain code quality and prevent regressions. GitHub Issues will track regressions and new issues. Labels will help categorize issues. A project board will help monitor progress and keep things organized.

Validation Criteria

Before deployment, the following acceptance criteria must be met:

- **All Tests Pass:** All unit, integration, and end-to-end tests must pass successfully.

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- **Performance Benchmarks:** Performance benchmarks must meet or exceed current levels. This will ensure the update does not negatively impact application speed.
- **Key User Workflows:** Key user workflows must function correctly. We will manually test these workflows to confirm a positive user experience.

Testing Timeline

Risk Assessment and Mitigation

This section identifies potential risks associated with the Ember.js update/upgrade and outlines mitigation strategies to minimize their impact. We have considered both technical and operational risks during this assessment.

Technical Risks

The primary technical risks involve unexpected compatibility issues with existing code and potential performance regressions after the upgrade. To mitigate these risks, we will conduct thorough testing in a staging environment that mirrors the production environment. This testing will include regression testing, integration testing, and user acceptance testing. We will also closely examine deprecation warnings and follow Ember.js's recommended upgrade path to address potential compatibility issues proactively.

Operational Risks

Operational risks include potential downtime during deployment and challenges with user adoption of the updated application. To minimize downtime, we will use a phased deployment approach with feature flags. This allows us to gradually roll out changes to users, monitor performance, and quickly revert if necessary. Deployments will be scheduled during off-peak hours to reduce the impact on users.

We will also provide user support and training materials to facilitate user adoption. This includes updated documentation, tutorials, and FAQs. A dedicated support team will be available to address user questions and issues during the transition period.

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Contingency Plans

We have established contingency plans to address unforeseen issues. These plans include the ability to quickly roll back to the previous version of the application if critical issues arise. We can also temporarily disable new features to isolate problems and minimize disruption. User support will be readily available to assist with any issues that arise during and after the upgrade.

Performance Benchmarking

We will carefully track key performance indicators (KPIs) to measure the success of the Ember.js update/upgrade. These KPIs include application load time, time to first interaction, error rate, and user satisfaction. Improvements will be measured by comparing performance metrics before and after the upgrade. We will also track the number of resolved bugs and monitor user feedback.

Monitoring Tools

We will use several tools for performance monitoring:

- **Ember Inspector:** For in-depth analysis of Ember.js application performance.
- **Google PageSpeed Insights:** To identify opportunities to improve page speed and overall site performance.
- **Custom Performance Monitoring Scripts:** To collect specific performance data relevant to our application.

Baseline Metrics

Before the upgrade, we will establish a baseline for each KPI. This will involve measuring the current application load time, time to first interaction, error rate, and collecting user satisfaction data. The following represents example baseline metrics:

- **Application Load Time:** 3.5 seconds
- **Time to First Interaction:** 2.0 seconds
- **Error Rate:** 1.5%
- **User Satisfaction:** 4.0 (out of 5)

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Post-Upgrade Metrics

After the upgrade, we will measure the same KPIs to determine the impact of the changes. Our goal is to see a significant improvement in application load time, time to first interaction, and a reduction in error rate. We will also monitor user feedback to ensure that the upgrade has a positive impact on user satisfaction.

Performance Comparison

The following chart illustrates a comparison of performance before and after the upgrade.

The data will be presented in a clear and concise format to facilitate easy comparison and analysis.

Security Considerations

This Ember.js upgrade to version 5.0 addresses key security concerns. The new version incorporates security patches that mitigate potential Cross-Site Scripting (XSS) vulnerabilities. Furthermore, it includes updates to underlying dependencies, resolving known vulnerabilities within those components.

Security Testing

Following the upgrade, Docupal Demo, LLC will conduct comprehensive security testing. This will involve:

- Penetration testing to identify potential weaknesses.
- Security code reviews to ensure adherence to secure coding practices.
- Dependency vulnerability scanning using tools like npm audit to detect and address any remaining vulnerabilities.

Compliance

Post-upgrade, we will ensure the application remains compliant with all relevant data privacy and security regulations. This includes performing regular security audits and staying current with the latest security best practices. Our commitment ensures that the upgraded application meets or exceeds industry standards for data protection and user privacy.

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Community and Support Resources

Ember.js offers extensive community support and comprehensive documentation to assist with the update/upgrade process. These resources can help address challenges and ensure a smooth transition.

Official Resources

The official Ember.js Guides provide detailed instructions and best practices for updating and upgrading Ember applications. The Ember Times newsletter delivers timely updates, announcements, and community insights. Detailed API documentation is also available for in-depth technical information.

Community Support

Active community support is available through the Ember.js Discord server. This real-time chat platform allows developers to ask questions, share solutions, and collaborate with other Ember users. The Ember.js Forum provides a platform for longer-form discussions and knowledge sharing.

Third-Party Tools and Services

Several third-party tools and services can further streamline the upgrade. Ember Observer helps evaluate the compatibility and quality of Ember addons. Ember Addon Search simplifies the discovery of useful addons. Services such as Heroku and Netlify provide deployment and hosting solutions tailored for Ember applications.

Conclusion and Next Steps

This proposal outlines the recommended approach for updating or upgrading your Ember.js application. Key decisions involve selecting the target Ember.js version, addressing deprecated features, and prioritizing component migration. Successful execution will improve performance, security, and maintainability.

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Critical Decisions

Before proceeding, we need alignment on the following:

- **Target Ember.js Version:** Select the specific version for the update/upgrade.
- **Deprecation Handling:** Determine the strategy for managing deprecated features.
- **Component Prioritization:** Define the order in which components will be migrated.

Immediate Next Steps

Following approval of this proposal, the following actions will be taken next week:

1. **Detailed Upgrade Plan:** A comprehensive plan will be created, outlining the tasks, dependencies, and timelines for the upgrade process.
2. **Task Assignment:** Specific tasks will be assigned to individual team members based on their expertise and availability.
3. **Staging Environment Setup:** A dedicated staging environment will be configured to mirror the production environment, allowing for thorough testing and validation of the upgraded application.

Stakeholder Responsibilities

The Project Manager will oversee the entire upgrade process, ensuring adherence to the timeline and budget. The Lead Developer will provide technical guidance and ensure code quality. The CTO will provide executive support and resolve any strategic issues that may arise.

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