Dynamic Theme Manager for GNUstep

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Agenda

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2. Current Architecture
3. Proposed Dynamic Theme Manager
4. Two Approaches (SAAM Overview)
5. Sequence Diagram (Use Case)
6. Impact & Testing
7. Limitations & Lessons Learned
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Motivation & Rationale

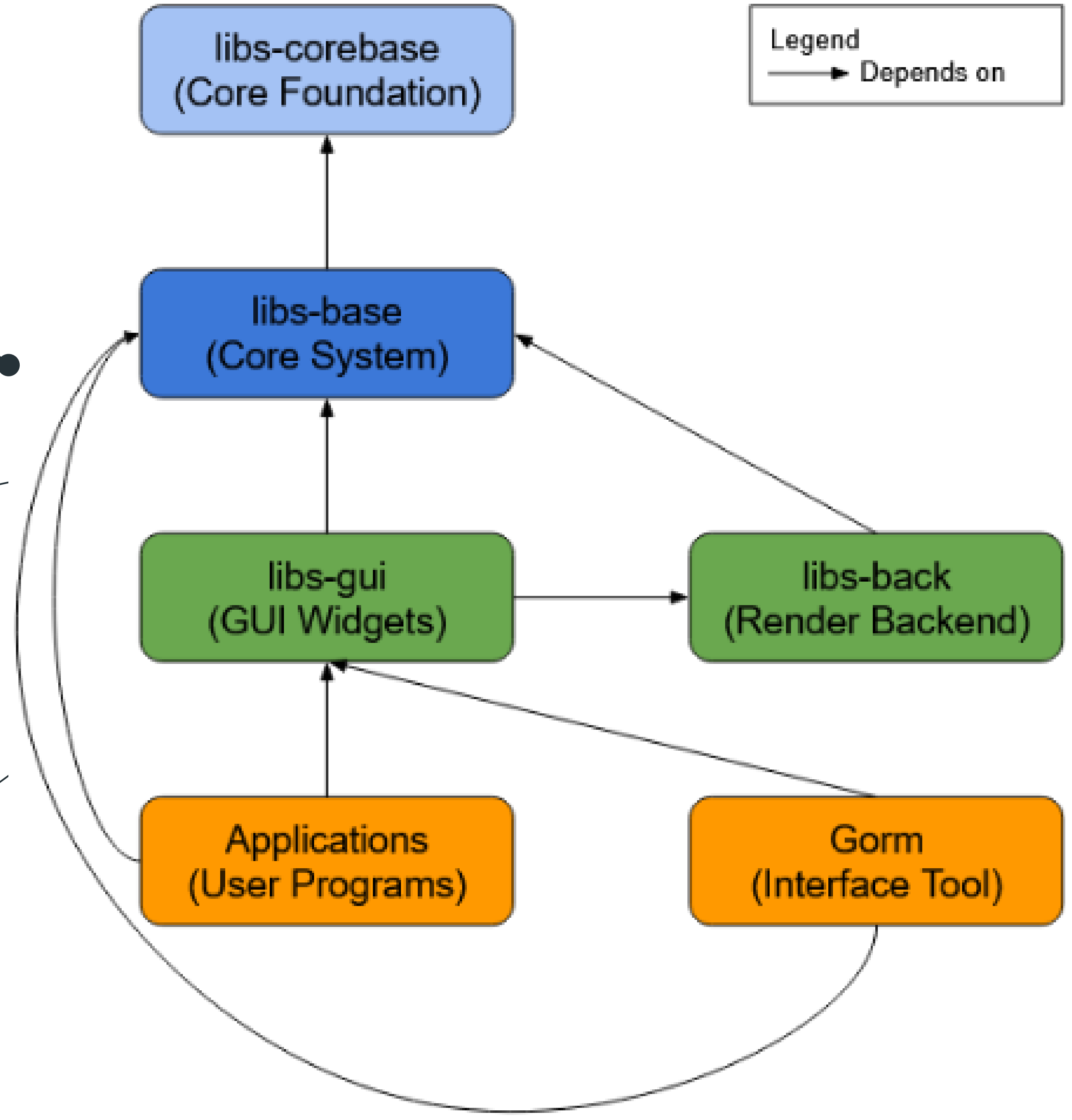
Core Need	Stakeholders	Driver
• Modern User Expectations for Runtime Theming	• Developers, end-users, managers	• Accessilibity + UI Consistency

Current Architecture

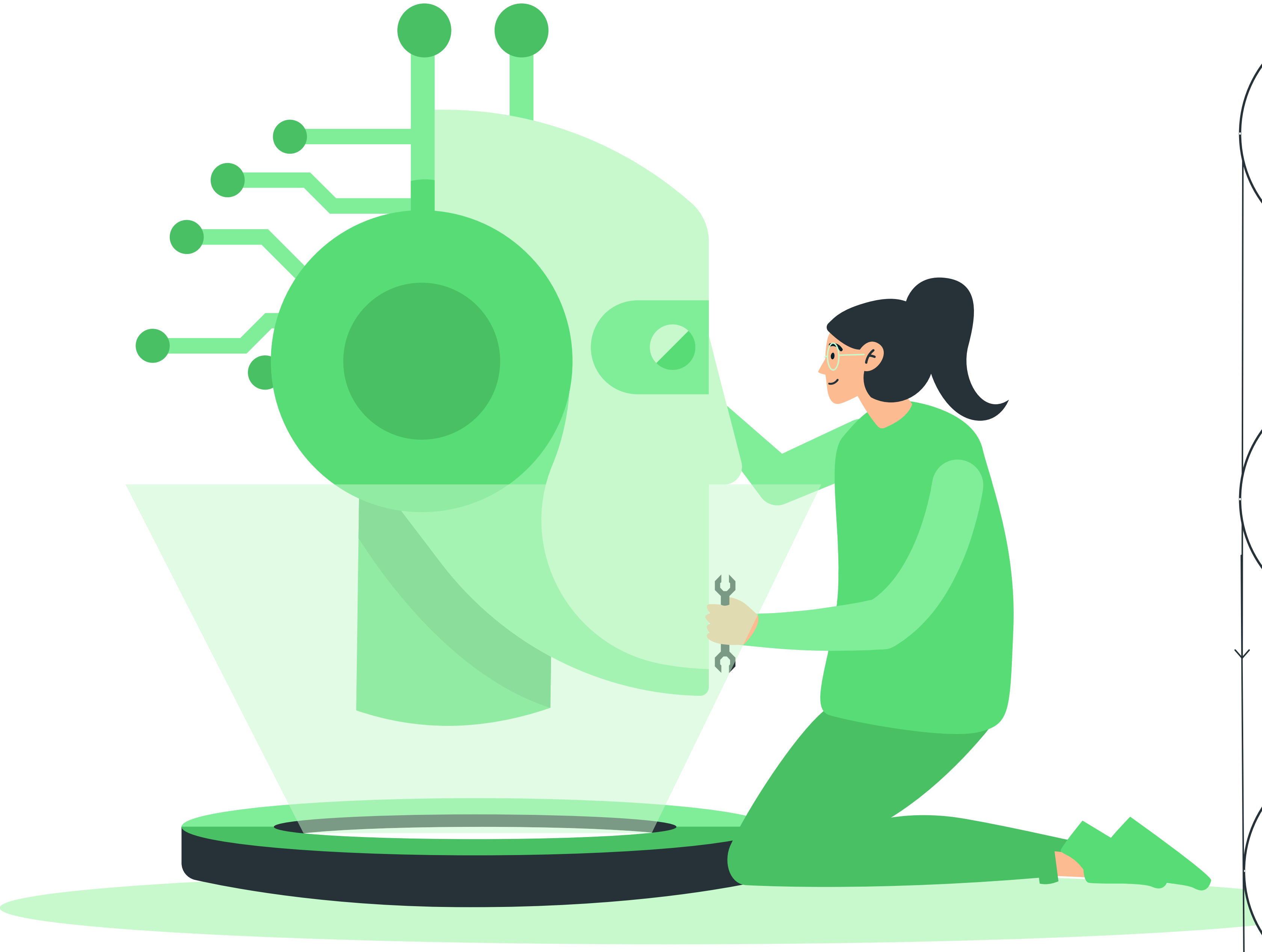
GNUstep is an open-source implementation of Apple’s OpenStep/Cocoa

Key conceptual layers: libs-corebase, libs-base, libs-gui, libs-back, libobjc2.

Originally assumed strict layering and single backend in A1.



Proposed Dynamic Theme Manager



Key Role: Centralizes theme data & broadcasts updates

Where It Fits: Extends libs-gui or separate module (libs-theme)

High-Level Benefit: Runtime theme switching, minimal disruption

Two Approaches (SAAM Overview)

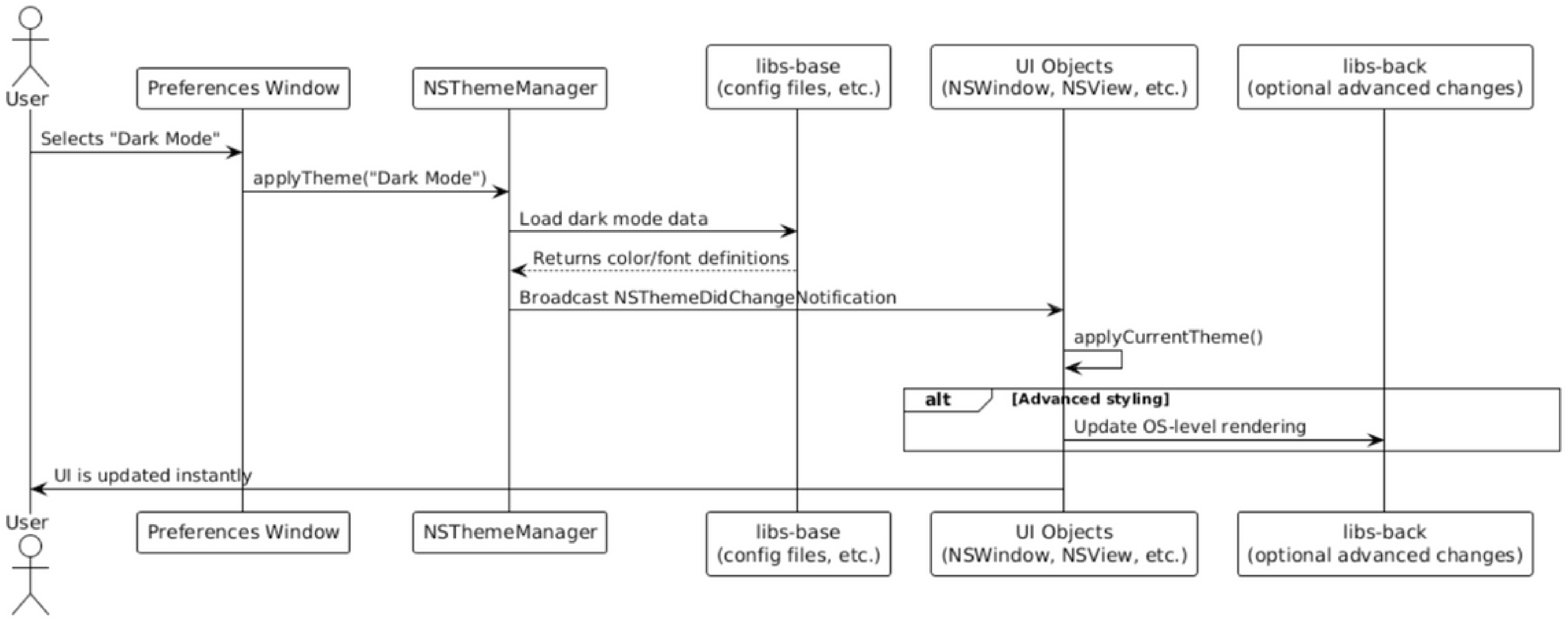
Approach A: Core Integration

Faster calls, - Invasive changes

Approach B: Plugin-Based

Modular & testable, - Slight overhead

Sequence Diagram (Use Case)



Use Case: User switches to Dark Mode

1 User → Preferences

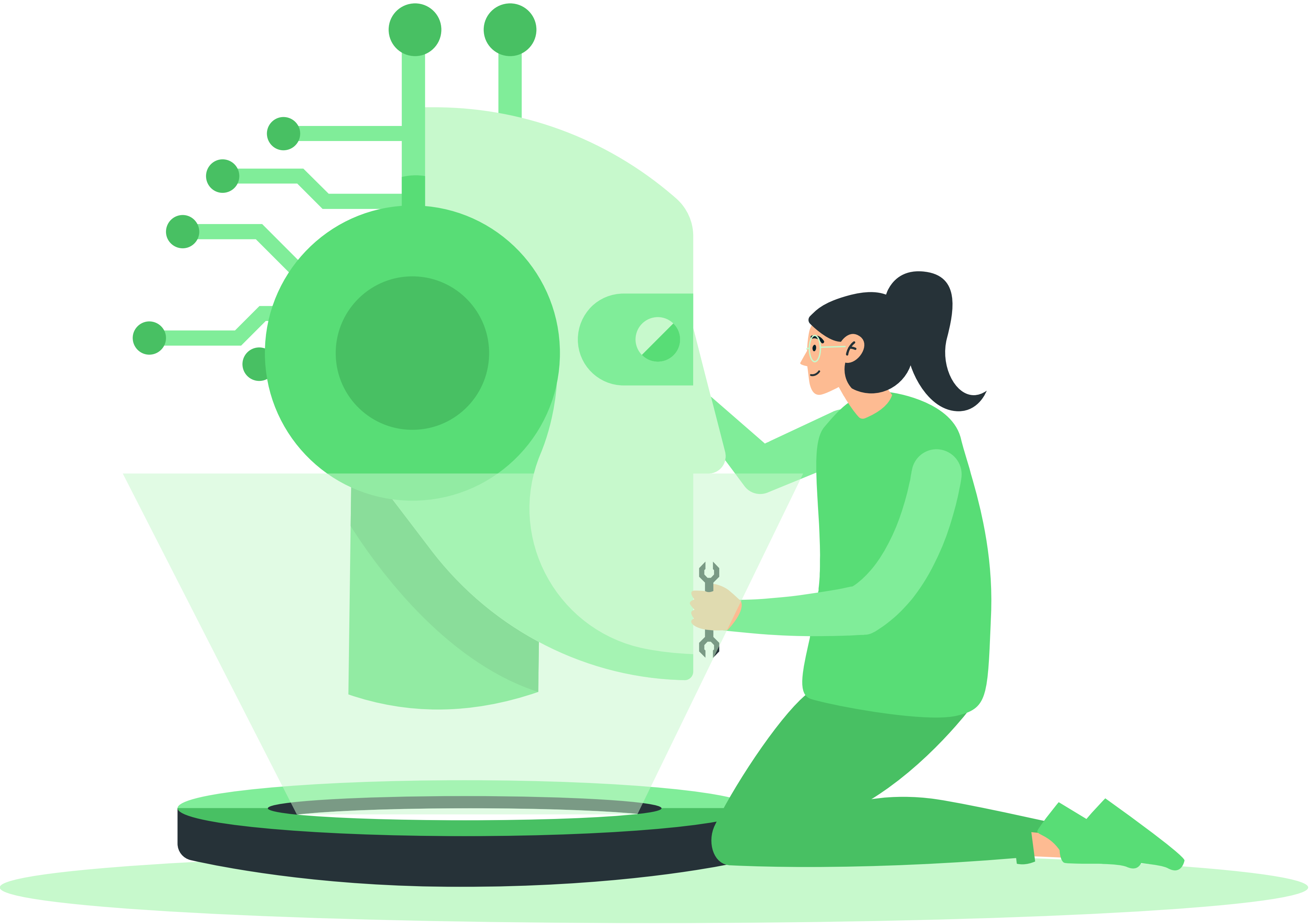
2 Theme Manager loads theme

3 Broadcast update → UI refresh

Impact & Testing

Impacted Subsystems	Concurrency	Testing Plan
• libs-base (config I/O), libs-gui (UI changes), libs-back (render tweaks)	• Main-thread UI + potential background loading	• Unit + integration + visual regression checks

Limitations & Lessons Learned



Limitations: OS mismatch, frequent switching overhead

Lesson: Notification-based updates fit well with Objective-C

Lesson: Modular design = safer, but watch for performance trade-offs

Conclusion

1

Enhances user experience with dynamic theming

2

Two possible designs with SAAM trade-offs

3

Helps future-proof GNUstep’s UI