

Retirement Planner v81 → v117

CIO Executive Summary

From Financial Calculator to Governed Planning Platform

Between v81 and v117, the Retirement Planner underwent a significant architectural and operational maturity program. While the application remains a single self-contained HTML file for deployment simplicity and privacy, the underlying platform evolved from a powerful retirement calculator into a governed planning system with enterprise-style validation, lifecycle management, accessibility controls, automated testing, and engineering safeguards.

The focus of this release cycle was not adding complexity for its own sake. It was reducing operational risk, increasing confidence in calculations, improving maintainability, and creating a framework that can support future growth without sacrificing the application's core strengths of privacy, portability, and zero infrastructure cost.

Executive Highlights

Area	Outcome
User Capability	Multi-plan management, comparison, sign-off workflows
Reliability	20-fixture automated calculation validation suite
Governance	Draft → Review → Signed Off lifecycle
Accessibility	WCAG-AA colour system and accessibility audit improvements
Engineering Quality	Modular source architecture and automated build process
Risk Reduction	Headless regression testing and calculation self-validation
Deployment Model	Remains a single self-contained HTML file
Infrastructure Cost	No backend, servers, databases, or cloud dependencies

Strategic Impact

The planner now behaves less like a spreadsheet-style modelling tool and more like a governed planning platform.

Users can:

- Save and compare multiple retirement strategies
- Formally sign off a chosen plan
- Detect drift from an approved baseline
- Track review cycles
- Validate calculations automatically

- Recover from errors more safely
- Work within an accessibility-compliant interface

For stakeholders, this significantly increases trustworthiness and reduces the risk of planning decisions being based on stale, modified, or unverified assumptions.

1. Governance & Planning Lifecycle

Before

The planner generated projections but had no concept of approval, review, ownership, or plan lifecycle.

After

A complete planning governance framework was introduced:

Plan Status Workflow

Draft → Under Review → Signed Off

New Capabilities

- Formal plan sign-off
- Baseline snapshot capture
- Review-date management
- Annual review reminders
- Drift detection
- Status persistence across saves and exports

Why It Matters

This introduces accountability and governance into retirement planning.

Users can now distinguish between:

- exploratory scenarios
- plans under consideration
- approved plans being actively followed

This reduces ambiguity and supports periodic review processes similar to those used in financial advisory environments.

2. Multi-Scenario Planning

Before

Users could only work with a single active plan.

Comparing scenarios required memory, screenshots, or manual exports.

After

Saved Plans

- Save up to 3 plans
- Name and organize scenarios
- Reload instantly
- Delete and manage versions

Side-by-Side Comparison

Compare:

- income
- balances
- withdrawals
- outcomes

phase-by-phase.

Why It Matters

Decision-making becomes evidence-based rather than memory-based.

Questions such as:

- Retire at 62 vs 65?
- More equity growth vs higher cash reserves?
- Higher withdrawals now vs later?

can now be answered directly within the application.

3. Reliability & Data Integrity

A major objective of the program was eliminating silent failure modes.

Improvements

Export Accuracy

Previously, rapid edits could occasionally be exported one keystroke behind.

Now:

- calculations are flushed before export
- exports always reflect the latest user state

Autosave Protection

Previously:

- storage failures could occur silently

Now:

- failures generate persistent warnings
- users are prompted to export backups

Runtime Error Visibility

Previously:

- certain runtime failures could be hidden

Now:

- errors are surfaced to users
- failure states become visible and actionable

Why It Matters

Silent failures are among the highest-risk defects in financial software because users often remain unaware that information has been lost or altered.

These changes significantly reduce that risk.

4. Calculation Assurance & Validation

One of the most important engineering investments was the creation of an automated validation framework.

Self-Test Framework

The planner now contains a built-in calculation validation system.

Coverage Expansion

Before:

- 4 regression fixtures

After:

- 20 validation fixtures
- 12 tracked financial metrics
- multiple tax jurisdictions
- edge-case scenarios

Coverage now includes:

- Social Security timing
- RMD calculations
- ACA scenarios
- IRMAA cases
- Roth conversions
- survivor planning
- UK residents
- Canadian scenarios
- Australian scenarios
- high-net-worth cases
- depletion scenarios

Headless Validation

A fully automated validation runner was added.

Every build can now:

1. Execute self-tests
2. Compare outputs against known-good results
3. Fail automatically if calculations drift

Why It Matters

This dramatically reduces the risk of introducing unnoticed calculation errors during future enhancements.

For a financial planning application, this is one of the highest-value quality improvements possible.

5. Accessibility & Inclusion

Accessibility moved from an implicit goal to a measurable capability.

Amount Colour System

A new appearance framework provides:

- 13 validated colour presets
- WCAG-AA contrast verification
- Custom colour themes
- Coordinated palettes

Benefits

- Improved readability
- Better differentiation of financial values
- More inclusive user experience

Accessibility Audit Enhancements

Additional improvements include:

- keyboard focus management
- focus trapping for dialogs
- screen-reader support
- chart data alternatives
- improved navigation cues

Why It Matters

Accessibility improvements benefit all users, not only those using assistive technologies.

6. Engineering Architecture Improvements

Modular Development Model

The application remains distributed as a single HTML file.

However, internally it now uses:

- modular source files
- structured build process

- automated assembly workflow

Benefits

- safer development
- easier maintenance
- lower regression risk
- improved change management

Key Achievement

The build process includes verification that generated output remains faithful to the source structure.

This preserves deployment simplicity while improving engineering discipline.

7. Technical Debt Reduction

Several long-standing quality issues were addressed.

Examples

- duplicated save paths consolidated
- state loading hardened
- duplicate UI options removed
- date display issues corrected
- inaccurate messaging corrected
- colour collisions eliminated

Why It Matters

These changes reduce future maintenance effort and lower the probability of hidden defects.

8. Performance Improvements

Calculation Memoization

The calculation engine now avoids redundant recalculation of identical scenarios.

Benefits include:

- faster rendering
- improved responsiveness
- reduced browser workload

without changing calculation results.

Smarter Rendering

Heavy analytical views are rendered only when required.

Benefits include:

- lower startup overhead
- improved responsiveness
- better scalability for future enhancements

9. User Productivity Enhancements

Goal Solver

The planner can now identify the specific action required to achieve an income goal.

Example:

Rather than stating that a target is missed, the planner can recommend:

Increase Phase 3 withdrawal from approximately \$X to \$Y.

Why It Matters

This transforms the planner from a passive reporting tool into an active decision-support system.

Undo / Redo

Added:

- toolbar controls
- keyboard shortcuts
- state history management

Why It Matters

Reduces user error and increases confidence when exploring alternatives.

Security & Privacy Position

The platform continues to maintain its strongest differentiator:

Data Stays With The User

- No backend
- No central database

- No cloud storage
- No PII repository

Additional improvements include:

- Content Security Policy controls
- Session-only AI key options
- Local-first storage model

This preserves the application's privacy-first architecture while improving usability and governance.

CIO Assessment

The v81–v117 program represents a significant maturity step.

The planner has evolved from a capable retirement modelling tool into a governed planning platform with:

- formal lifecycle management
- automated validation
- stronger accessibility
- improved reliability
- safer engineering processes
- enhanced maintainability
- decision-support capabilities

Most importantly, these gains were achieved without compromising the application's defining advantages:

zero infrastructure cost, local-first privacy, and single-file deployment.

From a CIO perspective, the release reduces operational risk, increases confidence in financial outputs, strengthens governance, and establishes a scalable foundation for future enhancements while preserving the simplicity that makes the platform uniquely easy to deploy and use.