Accelerating Legacy Code Modernization with DELTΔ ΔI

ALPHA OMEGA

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Legacy No More

Every federal agency leader knows the pain: aging legacy systems that are expensive to maintain, slow to adapt, and vulnerable to security risks. **With over $300 billion in technical debt tied to outdated systems**, the cost of inaction is rising. But what if modernization didn't have to be a drawn-out, high-risk ordeal? What if you could modernize at scale—with confidence, speed, and cost-efficiency?

DELTA AI makes that possible. It delivers **secure, auditable legacy code modernization 4x faster and at half the cost of generative AI**. Built on mathematically provable deterministic AI, it's purpose-built for mission-critical systems—eliminating technical debt, resolving vulnerabilities, and future-proofing your infrastructure. Available now with expedited procurement via the Tradewinds Solutions Marketplace, DELTA AI is the smarter, safer path forward.

Up to 70% of tech leaders see technical debt as the #1 cause of productivity and innovation loss.

– Deloitte Insights, <u>From Technical Debt to Technical Wellness</u>


01

Approaches to
Modernization —
and How They
Stack Up

Not All Modernization Paths Are Created Equal

Modernizing legacy code isn't one-size-fits-all. From generative AI to deterministic systems, each approach offers trade-offs in speed, risk, and control.

This section breaks down the most common methods—so you can choose the path that best fits your technical, security, and mission needs.

Your Options

Gen AI

Deterministic AI
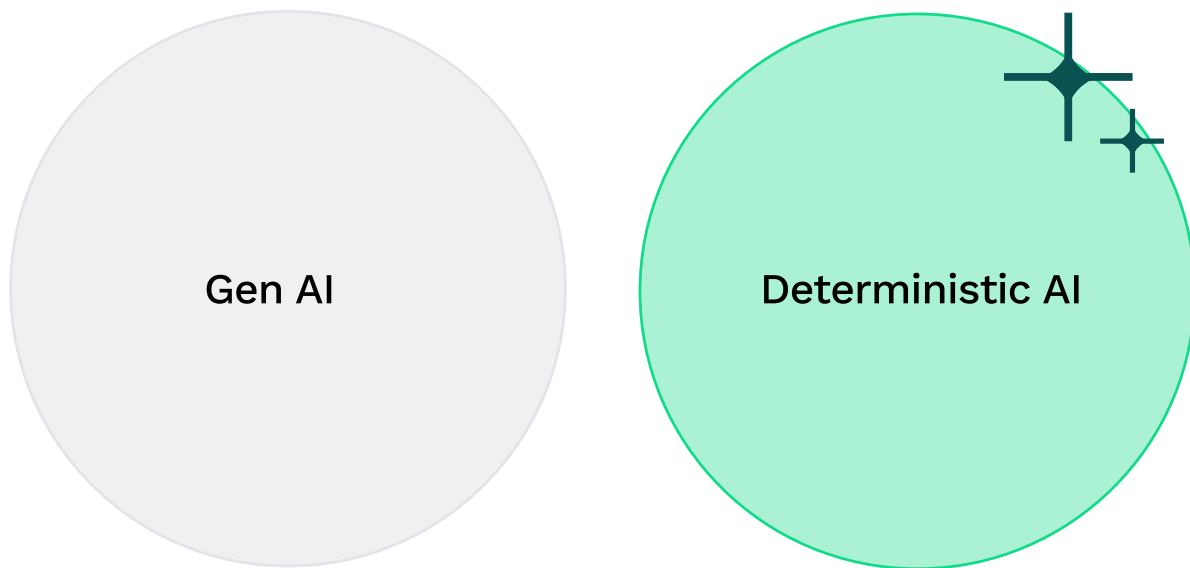
01 Generative AI-Assisted Code Modernization

Faster than manual (3–5 years)   Probabilistic — guesses rather than understands

Not auditable, risky for mission-critical environments

Carries over bugs, vulnerabilities, and constraints

Generative AI-assisted code modernization is probabilistic. It syntactically translates code without fully understanding its context or meaning, which can lead to carryover of errors and vulnerabilities. This approach is less reliable and not auditable.

02 Deterministic AI-Driven Code Modernization

Fast (6–18 months)   Repairs errors, resolves vulnerabilities   Costs just $8–15 per line of code

Auditable and reliable   Semantic understanding — translates code with full context

Deterministic AI-driven code modernization consistently produces the same output for a given input. This ensures accurate and semantic translation similar to what a developer would produce. It repairs software errors, resolves security vulnerabilities, and is auditable.

Comparing Modernization Approaches

	Gen AI	Deterministic AI
Lift-and-shift capability	—	✓
System documentation	✓	✓
Ease of upkeep and improvement	✕	✓
Cybersecurity risk reduction	—	✓
Technical debt reduction	✕	✓
Rapid delivery	✕	✓
100% automated conversion	✕	✓
Cost efficient	—	✓

✓ Meets need   — Partially meets need   ✕ Does not meet need

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Why Deterministic
AI Works

Think of deterministic AI like a vending machine: press the same button, get the same snack every time — no surprises. You ask for Twix®, you get Twix®. No surprise Snickers®. It follows strict, rule-based logic and produces consistent, predictable results. Here's why that matters:

Predictable: No random outputs, just proven, repeatable translations.

Secure: Errors and vulnerabilities are identified and resolved, not copied over.

Auditable: Every change is trackable and documented — perfect for compliance-driven agencies.

Scalable: Any language, any stack, any system.

In plain English, Deterministic AI is mathematically accurate, like a calculator.
You enter 2 + 2, and it will always give you 4 — not 3.99 or 4.01.

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Deterministic AI is 4x faster and half the cost compared to generative AI solutions.

How Generative AI and Deterministic AI Differ

Generative AI	Deterministic AI
✕ Suggestive/probabilistic	✓ Mathematically accurate and provable
✕ Syntactically translates without understanding context or meaning	✓ Semantic understanding and understanding of code
✕ Translates errors, bugs, constraint violations from source to target	✓ Repairs errors, bugs, constraint violations
✕ Perpetuates security vulnerabilities	✓ Resolves security vulnerabilities, FedRAMP/NIST aligned
✕ Not auditable	✓ Auditable
✕ Works line by line	✓ Comprehensive - any language, any stack
✕ Not confidential (public LLM)	✓ Confidential

Real Numbers:
3M Lines of Legacy C++ Code

Modernization approach	Generative AI	Deterministic AI
$/Line of code	$20–30	$8–15
Duration	3–5 yrs	6–18 mos
Cost	$60M–$90M	$24M–$45M
Annual O&M costs	$12M-$18M	$1.2M-$2M
Annual O&M percent of development cost	20%	4.6%

89%

Lower annual O&M costs than generative AI

CIOs spend 10% to 20% of their budgets on fixing issues related to outdated systems.

– Deloitte Insights, _From Technical Debt to Technical Wellness_

02

Addressing the Administration's Agenda

Meeting the Modernization Mandate

Modernization isn't just a best practice — it's a federal priority.

The U.S. government is pushing agencies to overhaul outdated systems, with billions earmarked for IT investments. In fact, as of June 2022, the federal government planned over $679 billion for operations and maintenance, with additional major investments in development, modernization, and enhancement.
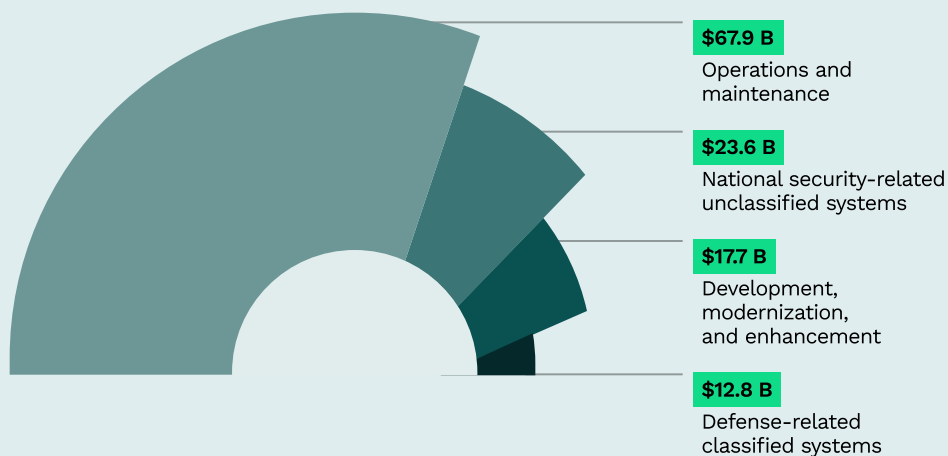
This push comes at a time when developers already spend a third of their time dealing with technical debt — slowing innovation and increasing costs.

The message is clear: legacy systems aren't just inefficient — they're a barrier to progress. Addressing them is now mission-critical.

Software developers spend about 33% of their time handling technical debt.

– Deloitte Insights, From Technical Debt to Technical Wellness

Planned FY 2023 Federal Spending on Information Technology Investments, as of June 2022

$67.9 B
Operations and maintenance

$23.6 B
National security-related unclassified systems

$17.7 B
Development, modernization, and enhancement

$12.8 B
Defense-related classified systems

– US Government Accountability Office, Using Scorecards to Monitor Agencies' Implementation of Statutory Requirements

Top drivers for legacy application modernization

58% Enhanced security

54% Improved operational efficiency

49% Cost savings

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STATISTA, <u>TOP REASONS DRIVING COMPANIES' MODERNIZATION OF LEGACY APPLICATIONS AND DATA WORLDWIDE IN 2023</u>
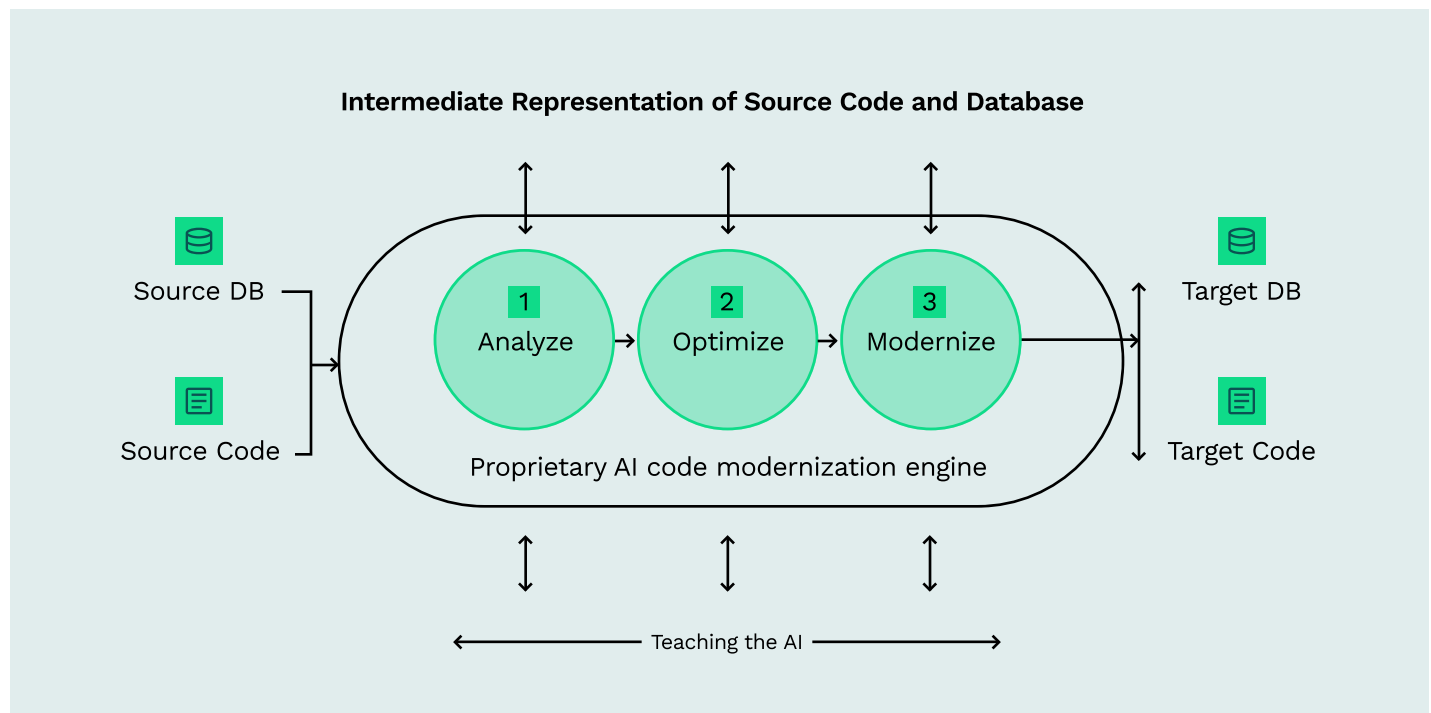
03

The Solution:
DELTA AI

What is DELTA AI?

DELTA AI (Deterministic Engine for Legacy Transformation & Accuracy) is a purpose-built platform designed to modernize legacy code quickly, accurately, and securely.

Unlike generative AI, DELTA AI uses a deterministic, rule-based engine that ensures consistent, predictable results — without introducing new errors or vulnerabilities.

It analyzes legacy code, identifies the original business intent, optimizes for best practices, and modernizes by generating clean, modern code that is fully auditable and ready for the future.

With DELTA AI, enterprises can eliminate technical debt, reduce cybersecurity risks, and modernize in months — not years.

Intermediate Representation of Source Code and Database

Source DB

Source Code

1 Analyze

2 Optimize

3 Modernize

Proprietary AI code modernization engine

Target DB

Target Code

Teaching the AI

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"

DELTA AI took what would've been a two-year project and cost over $2M and turned it into a 6-month success story with over 60% cost savings. "

—

**SENIOR IT MANAGER,
U.S. AIR FORCE**

Why Choose DELTA AI for Legacy Code Modernization

❮software modernization❯

Move from years to months with secure, fully documented code.

❮efficiency❯

Align with administrative efficiency goals. Cut operational downtime and future-proof systems.

❮cost savings❯

Save millions — and continue saving with lower maintenance costs year-over-year.

Two years in, DELTA modernization beats generative AI by **$20 million** — and compounds to **$107 million** in savings by year five.

Flexible Procurement: Ready to Go

Alpha Omega's deterministic AI modernization is available on the Tradewinds Solutions Marketplace — think of it as modernization on demand. It offers flexible pathways like SBIR Phase III, OTA, or CSO — making modernization faster and easier to secure.

Awardable: Already vetted through formal selection processes.

Protest-insulated: Streamlined approvals without delays.

Flexible scope: You remain in control. No pre-set ceiling.

Expedited awards: Contracts can be executed in days/weeks.

Awardable today via the Tradewinds Solution Marketplace

Tradewinds is the premier offering of the Chief Digital & AI Office (CDAO) within the Department of Defense. This marketplace is designed to simplify and streamline the procurement of transformative AI/ML technologies like DELTA AI to strengthen mission enablement. As a pre-competed solution under Tradewinds, our solution can be awarded within days.

Visit the appropriate Tradewinds Solution Marketplace link below to accelerate your modernization today.

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Registered users login here →

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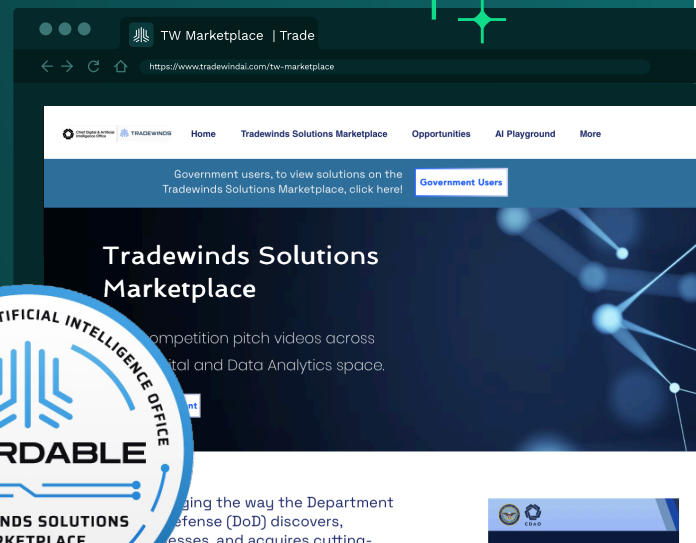
Modernize your legacy code— accurately, efficiently, and risk-free.

Explore DELTA AI →

Our mission

We partner with federal government agencies to ensure our nation's global leadership through cybersecurity, digital modernization and artificial intelligence expertise.

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