ORACLE

Blueprint for an AI-First Intelligent Bank

Embracing Ubiquitous Intelligence Across the Banking Enterprise

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Executive Summary

The financial services industry stands at an inflection point, where artificial intelligence (AI) is transforming from a novel tool into the foundational operating system for modern enterprises, building on decades of technological evolution from monolithic mainframes to service-oriented architectures (SOA), cloud-native systems, and now generative and agentic AI.

This business brief outlines a blueprint for an "AI-first Intelligent Bank." At its core is an agentic ecosystem, where intelligent agents automate, enhance, and orchestrate business processes, delivering personalized experiences and unparallel intelligent automation while ensuring security and compliance.

Oracle's approach leverages its rich legacy in banking solutions to evolve into a composable, AI-infused architecture. Key components include experience and domain agents, an AI fabric for orchestration, a control tower for governance, and capabilities like the Cloud Native Fabric (CNF) and Financial Services Studio.

This blueprint enables banks to "run the bank" with efficiency while driving innovation to "change and grow the bank." By connecting historical patterns to future possibilities, financial institutions can achieve ubiquitous intelligence, outpace disruptors, and build trust in an era of rapid change.

Introduction: Navigating Technological Inflection Points

In an era being redefined by AI, the banking and financial services sector must evolve to remain competitive. Today's challenges are multifaceted: fierce competition from fintechs, retailers, tech giants, and even non-traditional players like healthcare and gaming companies; legacy systems that power the bulk of global banking but stifle innovation; and the need for seamless, omnichannel customer experiences amid regulatory scrutiny. The solution lies in an agentic ecosystem that infuses AI into every layer of the bank, enabling adaptive intelligence without replacing human oversight.
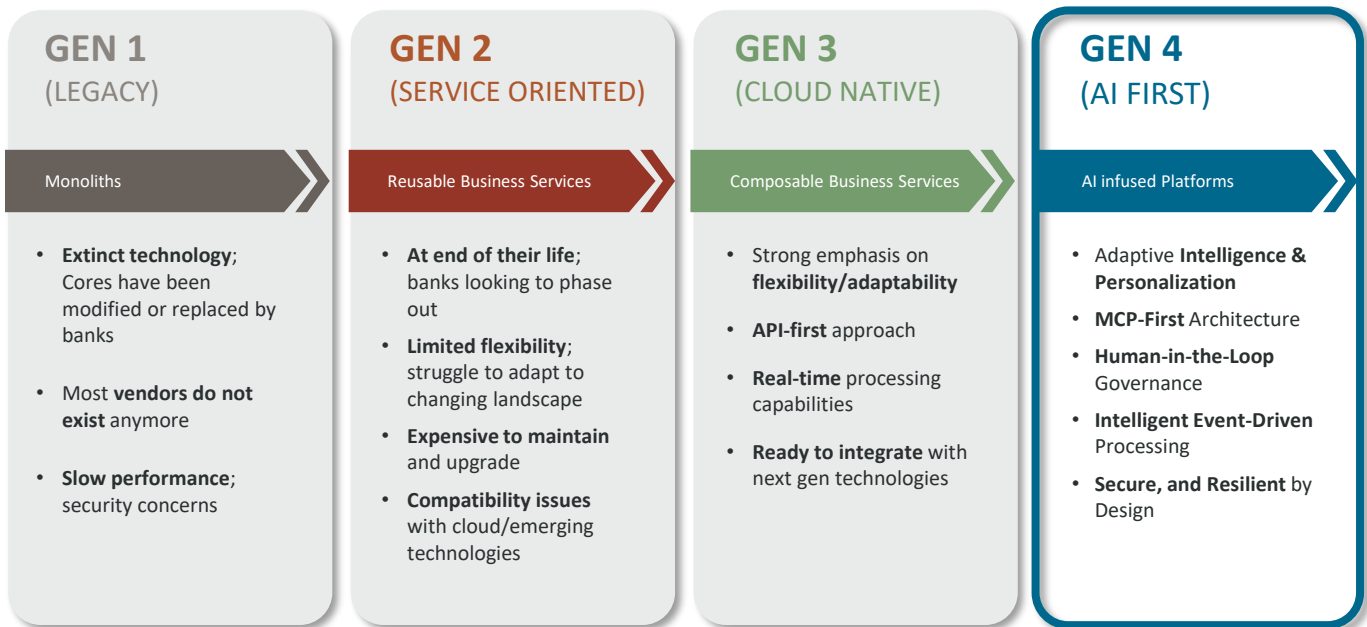
The Evolution of Banking Technology

Banking technology has progressed through distinct generations, each addressing the limitations of its predecessor while laying groundwork for the next. In the Banking 4.0 paradigm, AI serves as the core engine of transformation—powering intelligent, conversational interfaces for adaptive, hyper-personalized experiences and autonomous agents that continuously learn, reshaping how banks interact, decide, and operate in real time.

Generation 1: Monolithic Architectures

Early systems, such as mainframes, AS/400s, and COBOL-based platforms, were vault-like monoliths optimized for high-volume transactions (e.g., 99.9% uptime) and core functions like reconciliation and settlement. However, they were account-centric, focusing on back-office processing rather than customer or product innovation.

Generation 2: Service-Oriented Architectures

The rise of SOA and three-tier architectures (web, application, database) introduced reusable business services. Concepts like caching decoupled reads from commits, enabling efficiency without constant access to systems of record. This era emphasized "build once, use everywhere"—e.g., a single customer lookup service shared across applications, reducing redundancy.

GEN 1 (LEGACY)	GEN 2 (SERVICE ORIENTED)	GEN 3 (CLOUD NATIVE)	GEN 4 (AI FIRST)
Monoliths	Reusable Business Services	Composable Business Services	AI infused Platforms
• **Extinct technology**; Cores have been modified or replaced by banks • Most **vendors do not exist** anymore • **Slow performance**; security concerns	• **At end of their life**; banks looking to phase out • **Limited flexibility**; struggle to adapt to changing landscape • **Expensive to maintain** and upgrade • **Compatibility issues** with cloud/emerging technologies	• Strong emphasis on **flexibility/adaptability** • **API-first** approach • **Real-time** processing capabilities • **Ready to integrate** with next gen technologies	• Adaptive **Intelligence & Personalization** • **MCP-First** Architecture • **Human-in-the-Loop** Governance • **Intelligent Event-Driven** Processing • **Secure, and Resilient** by Design

Generation 3: Cloud-Native Architectures

The popularization of "cloud" in the mid-2000s shifted focus from infrastructure management to core competencies. Banks offloaded non-essential workloads to prioritize omnichannel experiences and interactions.

Cloud-native tenets include:

• Microservices: Atomic services (one level below APIs) forming fabrics for experience, process, and atomic layers.

• Pub/Sub, Self-Healing, and Elasticity: Enabling scalability, security (shift-left), and composability.

• SaaS Models: Driving innovation, with reusable services evolving into composable ones.

Oracle Banking Cloud Services exemplifies this discrete, componentized set of products that enables progressive core modernization—hollowing out legacy vaults into thin ledgers while maintaining 24/7 operations.

Generation 4: AI-First Ecosystems

Generative AI's 2022 debut accelerated the capabilities of AI, building on 30+ years of AI research (machine learning, NLP). Large language models (LLMs) like GPT pre-trained on vast data enable "data mining on steroids." Key innovations include:

- Model Context Protocol (MCP): Analogous to DNS/HTTP in the internet era, MCP decomposes and routes data for agent-to-agent interactions.

- Agents as the New APIs: AI becomes the OS, agents the interfaces, enabling ecosystem-wide collaboration beyond walled gardens.

- Ubiquitous Intelligence: From personal assistants to enterprise processes, AI infuses every interaction.

This generation demands reimagining banks front-to-back as AI-First Intelligent banks, with clean data as the "gene pool" and AI as the "blood in the veins."

Key Tenets of an AI First Intelligent Bank

The key tenets of an AI-first intelligent bank offer a concise blueprint for trusted, scalable value: an agentic ecosystem that augments people and systems; AI-enabled, end-to-end experiences and processes; human-in-the-loop controls aligned to risk and regulation; a data foundation extended with feature and vector stores; and a componentized, composable architecture that accelerates delivery with enterprise-grade reliability, security, and compliance.

Agentic Ecosystem

AI Enabled Experiences and Business Processes

Human in the Loop

Feature and Vector Stores for Everything

Componentized and Composable

- **Agentic Ecosystem:** Organized around specialized, cooperative agents that augment staff and systems, orchestrate real-time decisions, and integrate with existing platforms. Build on legacy reliability and cloud-native agility to boost speed, consistency, and transparency with full control and auditability.

- **AI Enabled Experiences and Business Processes:** Infused AI across front, middle, and back offices to deliver hyper-personalization, intelligent workflows, and real-time decisioning. Prioritize enablement over replacement to elevate human productivity and meet regulatory and service-level expectations.

- **Human in the Loop:** Explicit human oversight into critical decision paths, calibrated to each bank's risk tolerance and the three lines of defense, with regulators as a practical fourth. Use clear checkpoints for review, escalation, and explainability to ensure fairness, compliance, and auditability.

- **Feature and Vector Stores for Everything:** Clean, governed data as the bank's genetic code and extend it with vector, feature, and prompt stores. Standardize metadata, lineage, and access controls so every model and agent operates from a secure, compliant single source of truth.

- **Componentized and Composable:** Adopting microservices and API-first platforms—such as Oracle Banking Cloud Services—to assemble capabilities quickly, reduce integration risk, and improve resilience. Compose reusable services and controls to deliver value fast and adapt as regulations evolve.

The Agentic Ecosystem: Powering Intelligent Banking

At the heart of an AI-First Bank is an agentic architecture, classified by complexity and function. Agents are not isolated; they form an intricate web, invoking each other to execute workflows.

Agent Levels

- L1 Agents (Insight Agents): Extract, synthesize, and present information. In banking, these power virtual assistants for queries like account balances or travel rewards.

- L2 Agents (Deterministic Agents): Range-bound, action-driven tasks based on business rules. Autonomous or semi-autonomous (with human-in-the-loop), they handle processes like loan origination—accelerating KYC, income validation, and credit scoring from weeks to seconds.

- L3 Agents (Complex Decisioning Agents): Stateful, decision-making entities using if-then-else logic. They orchestrate L1/L2 agents across ecosystems for high-stakes tasks like credit decisioning, involving multiple systems and partners.

Experience vs. Domain Agents

Intersecting levels with business focus:

- Experience Agents: Human-in-the-loop, initiated by customers or bankers. Emphasize interaction, engagement, and personalization (e.g., tailored rewards). They learn from behavior.

- Domain Agents: Data- and system-focused, executing complex processes (e.g., payments, collections, trade finance). They interplay with experience agents for seamless workflows.

Both types span L1–L3, transforming products into symphonies of agents. Oracle is agentifying domains like origination, payments, lending, and treasury.

The Blueprint for an AI-First Intelligent Bank

Oracle's blueprint for an AI-First Intelligent Bank modernizes without discarding what works. It applies to banks and financial enterprises and is organized into six core layers with an embedded control layer and horizontal tools for integration and design. AI is embedded at the core of every operation, delivering AI-first experiences and decisioning across all business processes, with bankers playing a pivotal human-in-the-loop role for oversight and ethical governance.

The blueprint delivers a robust agentic ecosystem in which AI agents orchestrate seamless, real-time, highly tailored customer interactions supported by human expertise. It is distinguished by deep domain-centric applications across retail, corporate, and payments—Oracle's industry-leading banking solution suites integrate natively to accelerate time-to-value for specialized needs—while ensuring responsible, ethical, and governed AI with robust controls, embedded security, and data stewardship at every layer.

Experience Layer

- Human-like, personalized interactions at 1:1 scale via Digital Experience Agents, omnichannel sales and service agents, and approved third-party agents.

- L1/L2/L3 agents across the Experience plane: L1 insight agents (assist/explain), L2 deterministic agents (straight-through execution), L3 complex decisioning agents (multi-step reasoning), interoperating via MCP for ecosystem scale.

- Builds on modern digital banking to unify journeys and maximize customer lifetime value.
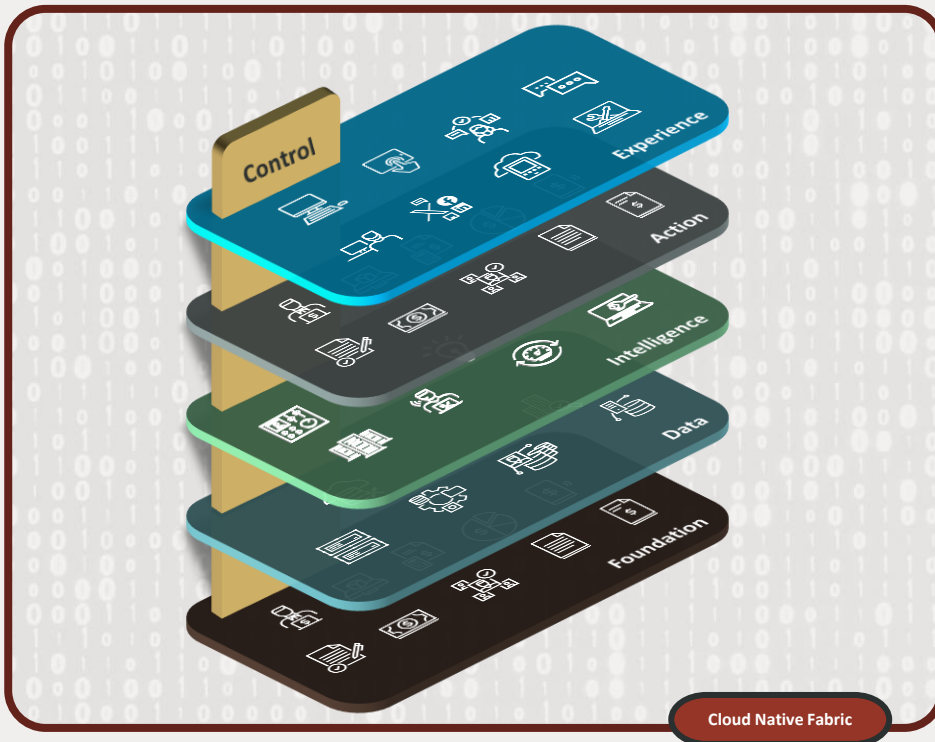
1. **Experience** — Experiences:- Channels, Devices & Things

2. **Action** — Domain Agents

3. **Intelligence** — Runtime, Autonomous Orchestration and Model Hub

4. **Data** — Events, Vector Stores and Feature stores

5. **Foundation** — Systems of Record

6. **Control** — Entitlements, Trust, Governance & Compliance

Cloud Native Fabric

Action Layer (Domain)

- Automated, orchestrated domain workflows delivered by extensive domain-specific agents for origination, cash management, trade and supply chain finance, corporate banking back-office, and more.

- L1/L2/L3 domain agents coordinate end-to-end journeys; agents become the "new APIs," enabling modular assembly of business capabilities.

- Optimized decisions and autonomous operations wherever permitted by policy.

Intelligence Layer (The Pervasive AI Fabric)

- The brain layer powering creation, operations, governance, and alignment with a common runtime and orchestration.

- Model hub and risk management, hallucination controls, RAG and tool use, evaluation, and observability; build once, reuse everywhere across lines of business.

- MCP-based agent interoperability enables safe, scalable composition across internal and ecosystem agents.

Data Layer (Unified, Real-Time Foundation)

- Lakehouse plus vector stores, feature stores, prompt stores, relational stores, and governed PII; event streams and semantic layers enable high-quality retrieval and learning.

- Clean-data emphasis and explainability support trustworthy, timely decisions and LLM compatibility.

- Oracle's data heritage enables secure enterprise vectorization behind the firewall.

Foundational Systems Layer (Thin Cores)

- Stable, modular, scalable systems of record: accounts, deposits, payments hub, loan servicing, corporate banking back-office, and related cores.

- Composable, componentized banking services (Oracle Banking Cloud Services) map directly into the Domain Agent layer for faster agentification.

Cloud-Native Fabric (Build Once, Deploy Everywhere)

- Unified control, data, and orchestration planes on Oracle's cloud-native stack.

- Portability and consistency across OCI SaaS (preferred for innovation), Dedicated Region Cloud@Customer, bring-your-own-cloud, or captive data centers—with elasticity, resilience, and full-stack observability.

Embedded Control Layer (Control Tower)

- End-to-end safety, policy, security, and governance applied deterministically—akin to IAM/AAA—across vectorized enterprise data and agent actions.

- Entitlements and birthright access via three lines of defense (IT, risk management, audit) plus regulators; model risk, compliance, and privacy-by-design ensure responsible innovation and regulatory adherence.

Tools for Extension, Integration, and Design

In addition, the blueprint offers the following tools:

- Interconnect Mesh: Seamless interoperability across legacy and modern estates; simplifies extraction, transformation, transport, and insertion (e.g., mainframe EBCDIC to open formats) for multi-year, phased transformations, and coexistence.

- Financial Services Studio: Unified, low-code/guard-railed tooling to build, test, and deploy extensions and agentic solutions without core changes.

Technology and Operating Model Benefits of The Blueprint

Oracle's blueprint delivers measurable, enterprise-grade benefits by standardizing how AI-driven capabilities are designed, deployed, and governed. It accelerates time to value, reduces integration and operating complexity, and ensures security, compliance, and portability across environments.

- Agentic architecture end-to-end: L1/L2/L3 agents span Experience and Domain planes; agents operate as the "new APIs," enabling modular, reusable business capabilities and faster change velocity.

- Unified AI fabric: Common runtime, orchestration, tools (e.g., RAG), evaluation, and model risk/hallucination management—build once, reuse everywhere across lines of business.

- Strong control tower: Cross-cutting security, policy, entitlements, and governance over agent actions and data, with deterministic enforcement and auditability.

- Data foundation ready for AI: Clean-data practices; vector/feature/prompt stores; eventing and semantic layers for high-quality retrieval, learning, and explainability.

- Cloud-native Fabric (CNF): Unified control/data/orchestration planes for consistent and portable deployment on OCI SaaS, Cloud@Customer/Dedicated Region, BYO cloud, or captive DC—with elasticity, resilience, and observability.

- Composable services: Oracle Banking Cloud Services map directly to Domain Agents, accelerating "agentification" of core capabilities.

- Safe extensibility with guardrails: Extend without altering core schemas; preserve upgrades and compliance while fostering rapid innovation.

- Legacy coexistence and migration: Progressive hollowing and co-existence patterns using Interconnect to reduce risk and downtime.

- Enterprise-grade non-functionals: Self-healing, pub/sub, shift-left security, elasticity, observability, and standardized governance built-in.

Enterprise-wide Organizational Benefits of The Blueprint

Oracle's blueprint establishes a shared language of agents, AI fabric, and a control tower that aligns different stakeholders around common concepts and operating patterns. Clear layering and deterministic governance simplify stakeholder onboarding, training, and adoption across lines of business, improving change management and reducing ambiguity.

A culture of learning and experimentation is built in through safe sandboxes and governed guardrails, enabling iterative pilots without big-bang risk. Modern AI practices, studios, and agentic methods help attract, upskill, and retain talent, increasing engagement while reducing churn as teams see rapid, measurable progress.

Transparent controls, traceability, and auditability strengthen relationships with regulators and external auditors, demonstrating proactive risk stewardship. Human-in-the-loop operations and policy-driven AI reinforce responsible use, enhancing customer confidence and brand trust. Explicit governance of models, prompts, and data reduces bias, supports fairness, and aligns with emerging AI ethics frameworks. Integration of the three lines of defense, i.e. IT, risk, and audit with regulatory oversight elevates governance maturity beyond IT.

The operating model captures and reuses institutional knowledge by centralizing patterns, policies, and reusable agents, accelerating onboarding and reducing key-person risk. Standard agent interfaces such as MCP make it easier to collaborate with fintechs and third parties under consistent controls. Separation of control, intelligence, and execution layers bolsters operational resilience, crisis response, contingency planning, and scenario exercises.

Oracle's Vision: From Composability to Agentification

Oracle's blueprint advances Oracle Banking Cloud Services to Gen 4, where composable products and agentic capabilities run on a shared AI fabric with a cloud-native foundation (CNF) and are governed by a centralized control tower. Banks realize faster time-to-value and lower total cost through modular rollout. Omnichannel experience agents deliver hyper-personalized engagement to lift conversion and loyalty, while domain agents accelerate decisions in cash, liquidity, origination, and collections, thereby improving straight-through processing, reducing risk and delinquency, and optimizing balance-sheet efficiency. Centralized policy controls and human-in-the-loop oversight strengthen compliance and auditability. A land-and-expand approach lets banks remediate weak links incrementally without compromising reliability, increasing agility, resilience, and operational efficiency at enterprise scale.

The blueprint powers tangible outcomes:

- Faster innovation and time-to-market as teams compose and iterate products, offers, and journeys across retail, corporate, and transaction banking.

- Superior customer and banker experiences via context-aware experience agents and agentic assistance across front-, mid-, and back-office, boosting productivity and service quality.

- Growth with controlled risk using deterministic and advanced decisioning agents that enforce policies and escalate to humans when needed.

- Progressive modernization through componentized products and Interconnect, enabling hollow-the-core strategies while legacy systems continue to run.

- Higher operational efficiency and lower cost by automating domain processes, shortening cycle times, and eliminating duplicate tooling with a shared AI fabric and control tower.

- Trust, compliance, and governance by design: centralized entitlements, policies, and model governance provide traceable oversight of data, models, and agent actions that are vital in regulated environments.

- Competitive resilience through agile experiences, rapid product recomposition, and differentiated value to counter fintech and big-tech pressure.

- A balanced run-the-bank/change-the-bank posture: resilient lower layers for scale and reliability, agile top layers for growth and intelligence.

Banks that pair run-the-bank resilience with change-and-grow agility will capture outsized value in the decade ahead. Oracle's AI-first blueprint brings this balance to life: an AI fabric with domain and experience agents for intelligent, customer-centric execution; a secure, cloud-native data plane for speed, scale, and trust; and governance that makes innovation safe, auditable, and compliant.

By operationalizing this architecture and not just piloting it, institutions can move decisively from legacy cores to ubiquitous intelligence, compressing time-to-value while reducing risk. The payoff is tangible: lower operating cost through automation, faster product launch cycles, sharper risk and fraud controls, and differentiated experiences that drive growth and loyalty.

Built on decades of enterprise rigor, Oracle's approach enables banks to navigate disruption confidently, modernize at their pace, and translate AI into measurable, compounding business outcomes.

How Oracle can help

Lead your institution into the AI-first era with Oracle's Blueprint for an AI First Intelligent Bank and activate an agentic ecosystem that automates, personalizes, and governs at scale. Learn how Oracle's AI Fabric, control tower, and composable banking capabilities help you securely "run the bank" while you "change and grow the bank."

Connect with an Oracle representative to discuss your roadmap.

Connect with us

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