
CCRE: Enterprise-Ready Core & Common Rule Engine

Modernizing Rule Evaluation

Date: January 21, 2026

Summary Statement

CCRE (Core & Common Rule Engine) replaced a legacy AWS Neptune + Gremlin based rule engine with a high-performance, Java-native evaluator that enables secure, real-time decisioning across multiple data sources. The prior engine translated rule JSON into Gremlin queries executed against Neptune, creating recurring issues with brittle parsing, limited expressiveness, and tight coupling to a single datastore. CCRE removed that translation layer, introduced smart short-circuiting, rule definition caching, and rich evaluation logging, and unlocked personalization use cases requiring real-time domain API data and strong security controls. The team completed end-to-end migration in under 3 months with no disruption to dependent services. CCRE delivers measurable outcomes including ~1M in cloud cost savings and the ability to evaluate thousands of rules in under ~30 ms.

Details

The legacy Neptune solution converted rule JSON to Gremlin and pushed logic into graph queries. Over time, the translation layer became a persistent burden: correctness of a full JSON-to-Gremlin parser was hard, troubleshooting was opaque across layers, and many rule patterns were difficult to express naturally. Execution was constrained to what could run efficiently in a graph database, limiting secure integration with real-time signals such as session context and domain APIs. CCRE redesigned evaluation as an in-application capability: rules are evaluated directly in Java while securely fetching only the minimum required attributes from approved sources. Smart short-circuiting and caching drive consistent low-latency decisions at scale, while auditable logs explain what was evaluated and why.

Outcomes

- **Financial impact:** ~1M reduction in cloud costs by reducing graph database execution and related overhead.
- **Performance at scale:** Thousands of rules evaluated in under ~30 ms, enabling real-time personalization and decisioning.
- **User experience latency:** Average rule evaluation latency per context reduced by ~50-60%. Flagship Mobile App Home p95 end-to-end latency improved from ~260 ms to ~120 ms.
- **Delivery excellence:** Migration from the Neptune based engine to CCRE completed in less than 3 months with no disruption to dependent services.
- **Business enablement:** Unlocked high-profile journeys including Crypto / Alternative Investments, Workplace Investments use cases, and Beneficiary Missing.
- **Enterprise readiness:** Proven in the Enterprise Personalization Platform and designed as a Core & Common Rule Engine for migrating any enterprise rule use case. Standardized evaluation, secure multi-source integration (domain APIs + session), caching, short-circuiting, and audit-ready logging reduce duplication and speed onboarding.