Semantic Switch Whitepaper

Financial Network Intelligence

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May 2025
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Abstract

As AI automates financial services, agentic platforms will handle more of the workflow. Human staff will have less of a role as institutional AI agents connect with their counterparts at corporate borrowers to originate and process transactions. The networks that connect those agents will grow smarter, generating business intelligence from transactional data.

Semantic Switch connects banks with corporate ERP systems to automate financial analysis and loan management. AI agents will use those connections to execute workflow in a network setting.

Semantic Switch will run as a decentralized application on the Sui blockchain. Its SDN (software-defined networking) component will manage transaction-specific connections for agentic communication.

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Overview

In a recent statement about Cisco's transition to an AI-driven business model, chief product officer Jeetu Patel portrayed Cisco infrastructure as "that common, neutral-party security substrate across every model, every application, every cloud, every agent."

Cisco supports the Internet of Agents, a collaboration layer "across the ecosystem of agentic applications of various kinds." Its recent investment in Anthropic, originator of the Model Context Protocol (MCP) standard for AI connections to data sources, highlights the agentic portion of its AI-driven strategy.

Collaborative communication between agents will drive network intelligence. As transactions between financial institutions and corporate customers become more automated, AI agents will make the network connections smarter.

Introduction

Every business generates a series of events that signify its creation, growth and economic interaction with other entities. Those events form a narrative that depicts the business lifecycle.

Semantic Switch generates network intelligence by extracting data from business systems and transforming it into events that populate stories. Those stories are part of a narrative framework that identifies relationships between the events and the connected entities that produce them. A narrative stack manages the framework, creating tokenized knowledge graphs on the Sui blockchain.

Narrative Stack

The narrative stack includes Smart Narrative, Semantic Switch, AI agents, the Sui blockchain, and an SDN controller that connects to ERP sysrems.

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│ Semantic Switch │
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┌──────────┐  ┌────────────────┐
│ AI Agents│  │ SUI Blockchain │
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│ SDN Controller │
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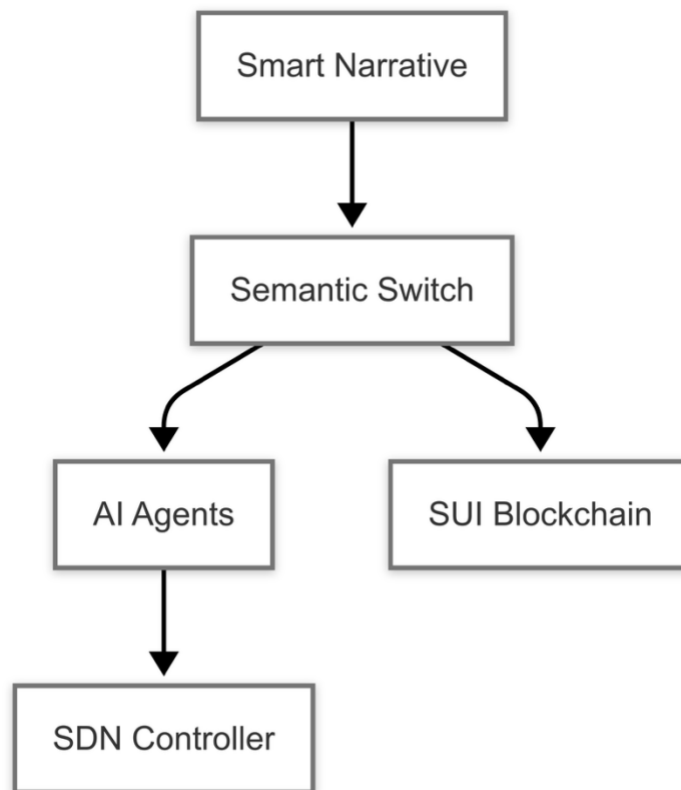
Smart Narrative

Smart Narrative presents an interface to entities defined by layers of ontologies. Those entities provide the framework for knowledge graphs used by AI agents.

Layer	Ontology	Context
Foundation	Basic Formal Ontology (BFO)	Fundamental entity types and relationships.

| Layer	Ontology	Context
Middle	Common Core Ontologies (CCO)	Extends BFO with general-purpose concepts.
Domain	Financial Network Ontology (FNO)	Custom financial narrative ontology.

Smart Narrative connects human and agentic input:
1. To configure narrative domain entities and the SDN controller.
2. To display the narrative domain and related blockchain activity.
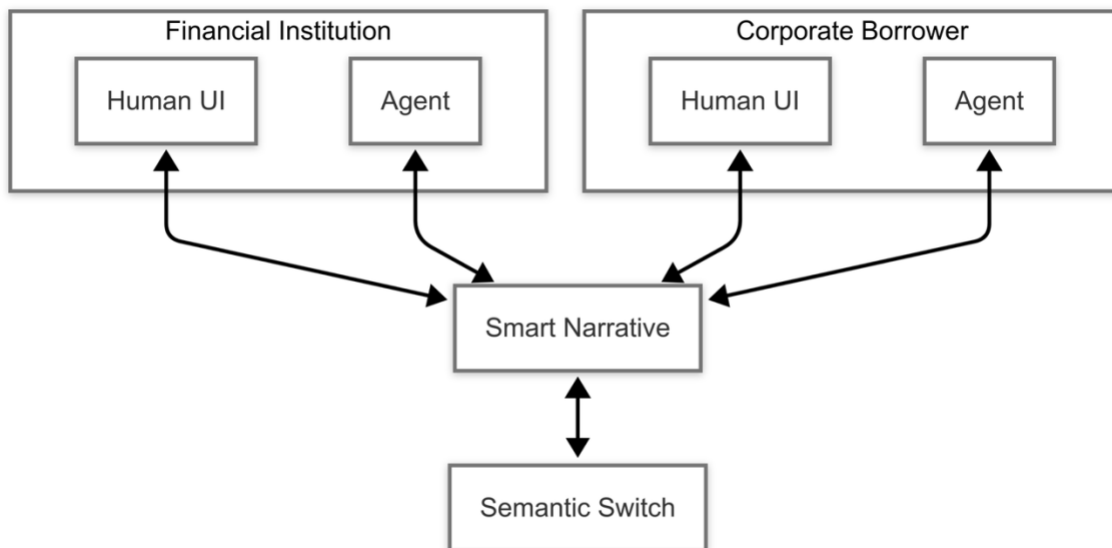
Semantic Switch

Semantic Switch contains the hierarchical framework that transforms data from different channels into sequences of events that form stories. Those stories populate one of five topic-driven epics.

Channel types and epic topics are configurable. In the following example, the channels represent connections to corporate ERP systems, and the epics represent different categories of activity within the company.
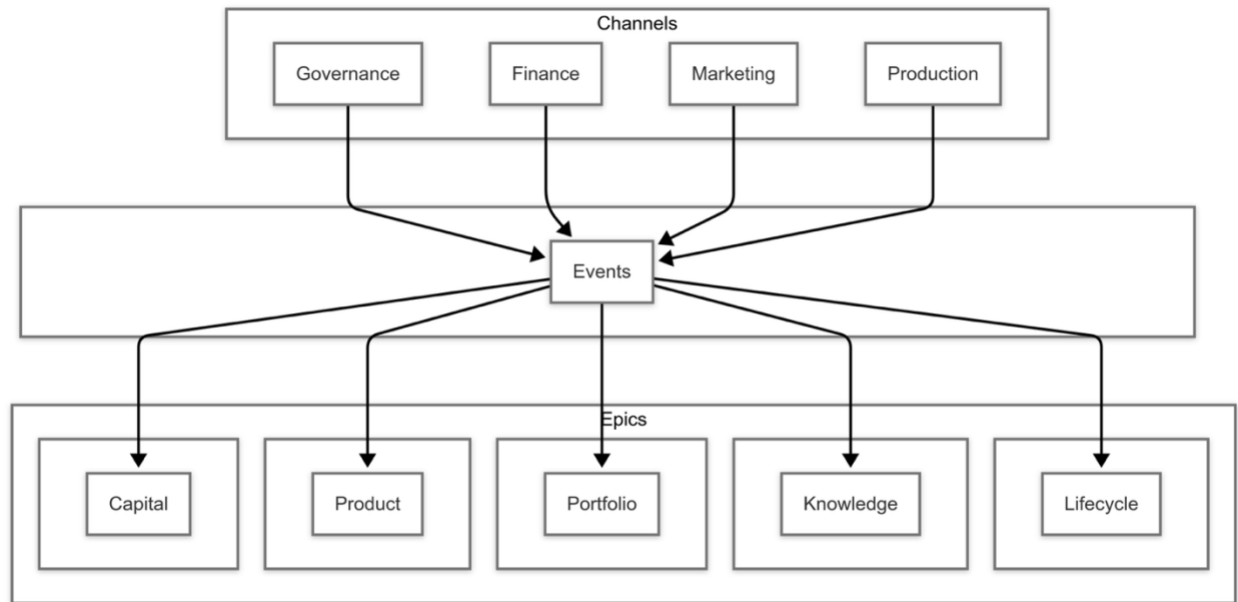
Channel	Data type
Governance	Legalities, policy decisions, regulatory compliance.
Finance	Performance, transactions and accounting.
Marketing	Customer acquisition, competitive position and market dynamics.
Production	Operations and supply chain.

Epic	Topic
Lifecycle	Company formation, governance, growth and conflict.
Knowledge	Intellectual property, innovation, knowledge and information.
Portfolio	Tangible and non-IP intangible assets.
Product	Product and brand development, communication, messaging.
Capital	Revenue, pricing, payments, financing, capital strategy.

AI Agents

Three classes of AI agents manage the extraction of transactional data.
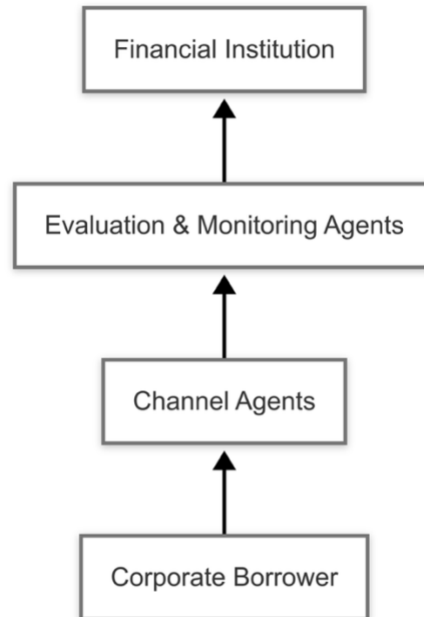

Agent	Function
Channel Agent	Transform data into narrative events.
Evaluation Agent	Identify business relationships and measure risk.
Monitoring Agent	Track performance and compliance.

Evaluation and Monitoring examples

Loan Covenant	Monitoring Source	Alert Threshold
EBITDA Margin	Finance Channel	<12%
Production Capacity	Production Channel	<80%
Customer Concentration	Marketing Channel	>30%
Regulatory Compliance	Governance Channel	Any violation

SDN Controller

AI agents communicate with MCP servers connected to corporate ERP systems through SDN tunnels. Using technology such as Cisco ACI (Application Centric Infrastructure), the SDN controller provisions read-only connections. If policy permits, state changes for each connection may be stored in objects on the Sui blockchain.
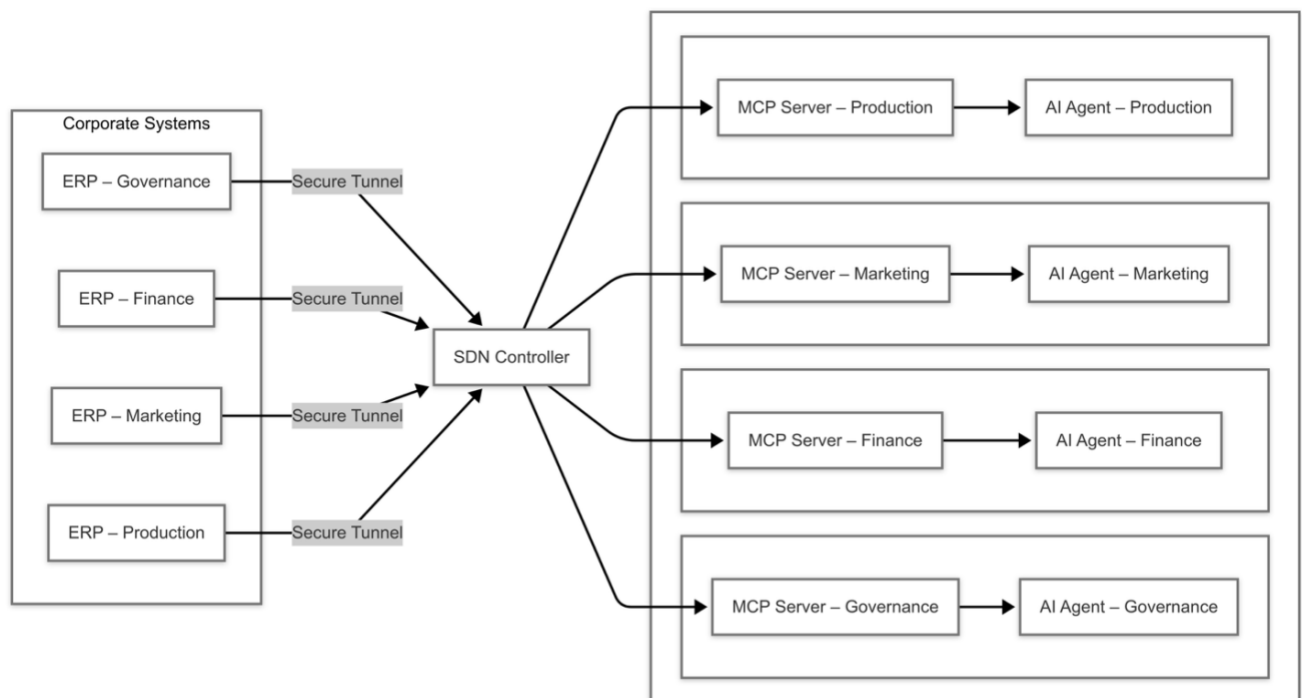

SUI Blockchain

Sui is a fast, scalable Layer 1 blockchain created by Mysten Labs, a team of former Meta engineers. Its object-centric architecture is well-suited to represent a hierarchy of narrative entities, as well as state changes in those entities.

Parallel processing enables Sui to handle up to 125,000 transactions per second. In conjunction with Walrus, its decentralized storage platform, Sui can create and manage the serialized data objects that populate narrative graphs.

Feature	Use case
Object-centric architecture	Financial entities as SUI objects
Smart contracts	Automated covenant verification
Immutable history	Permanent record of all financial events
Programmable assets	Tokenized financial instruments

Smart contract transitions between states can emit on-chain events.
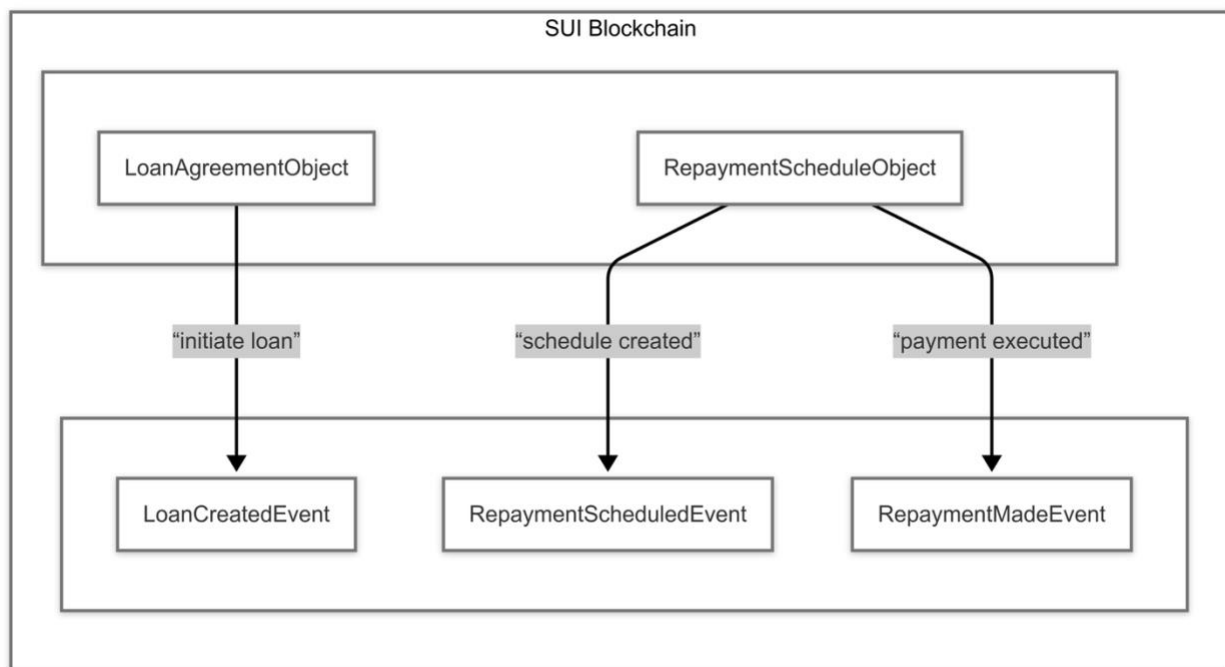
State	Event Emitted
Pending	ContractCreated
Approved	ContractApproved
Active	ContractActivated
Covenant Alert	ThresholdCrossed

Corporate Loan Use Case

Alpha Corp. borrows $10 million from StableBank.

Loan creation:

1. StableBank uses human and agentic input to create the loan record.
2. Semantic Switch creates loan objects (e.g.- LoanAgreement) on Sui.
3. Alpha Corp. provides SDN entry points to its ERP systems.
4. SDN controller maps MCP servers to entry points.
5. Semantic Switch connects AI channel agents to MCP servers.
6. Channel agents extract initial data from Alpha Corp. systems.
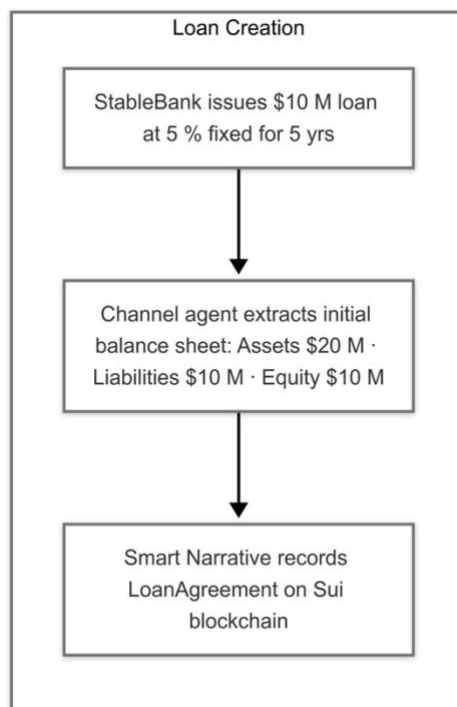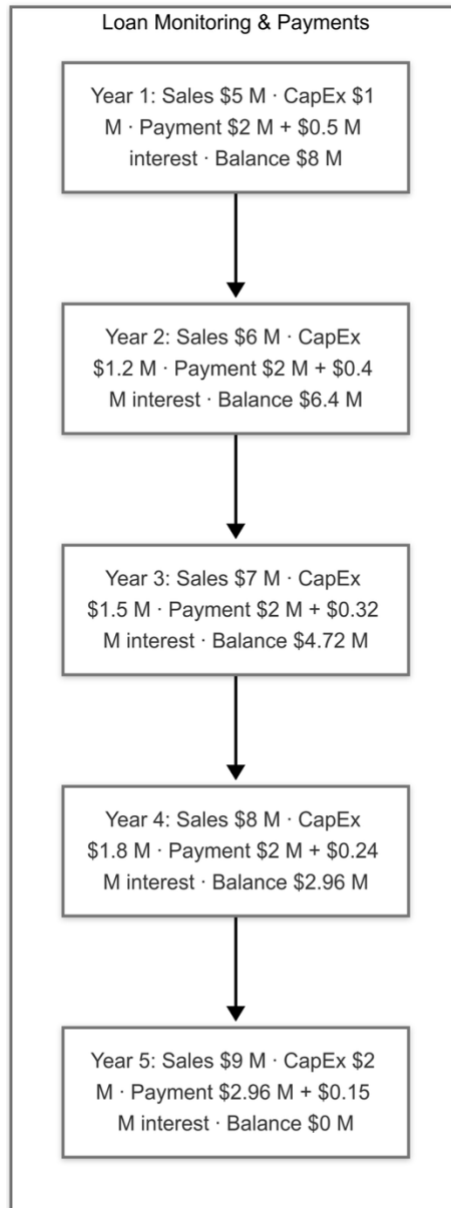
Loan monitoring:

1. Channel agents extract recurring data from Alpha Corp. systems.
2. Semantic Switch creates or updates loan objects on Sui.
3. Evaluation agents scan the resulting stories.
4. Sui blockchain objects reflect state changes.
5. StableBank receives messages and alerts in Smart Narrative interface.

Loan payment:

1. Semantic Switch maps Alpha Corp. data to stablecoin interest and principal payments.
2. AI agents confirm payments status and update records on Sui.

High Level Event Stream

Loan Monitoring & Payments

Year 1: Sales $5 M · CapEx $1 M · Payment $2 M + $0.5 M interest · Balance $8 M

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Year 2: Sales $6 M · CapEx $1.2 M · Payment $2 M + $0.4 M interest · Balance $6.4 M

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Year 3: Sales $7 M · CapEx $1.5 M · Payment $2 M + $0.32 M interest · Balance $4.72 M

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Year 4: Sales $8 M · CapEx $1.8 M · Payment $2 M + $0.24 M interest · Balance $2.96 M

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Year 5: Sales $9 M · CapEx $2 M · Payment $2.96 M + $0.15 M interest · Balance $0 M

Business Model

Semantic Switch is a Network as a Service (NaaS), defined by Cisco as " a cloud model that enables users to easily operate the network and achieve the outcomes they expect from it without owning, building, or maintaining their own infrastructure."

Along with the NaaS model, Semantic Switch offers agentic AI as a service that creates and manages narrative graphs, tokenizing them on blockchain. Semantic Switch connects multiple domains to create a narrative network, with institutional and corporate members paying transactional fees.

Operating expenses include:
1. AI agentic infrastructure – APIs and LLM usage.
2. SDN controller – provisioning SDN infrastructure and endpoints.
3. Sui blockchain - smart contracts and tokenization.
4. Semantic Switch application servers deployed in cloud.

The scope of initial deployment will determine pricing to meet these expenses.

Challenges

Financial institutions need to view Semantic Switch as an additional resource, not meant to replace legacy loan systems. To remain competitive in an AI-driven market in which network intelligence grows more important, every institution will need to adopt a collaborative network model.

Companies that open their ERP systems to business partners may hesitate to add SDN-level access. Despite growing adoption of agentic network collaboration frameworks, ERP systems may require custom network integrations.

Financial institutions have adopted permissioned blockchain solutions to create private decentralized ledgers for digital asset transactions. Semantic Switch can co-exist and even connect with these platforms, provided there is consensus on the use case.

Timeline

Proof of Concept - Q2 2025

- Narrative ontology – beta version
- End-to-end mockup

Prototype – Q3 2025

- Narrative ontology – production version
- Smart Narrative interface – alpha version
- Semantic Switch application server – alpha version
- Finalize agentic AI framework
- Finalize SDN controller
- SUI components running on testnet.
- Test with synthetic data

MVP – Q4 2025

- Smart Narrative interface – production version
- Semantic Switch application server - production version
- Deploy an instance of the narrative stack
  - Real data from a corporate partner
  - Test transactions with a financial institution

Launch - Q1 2026