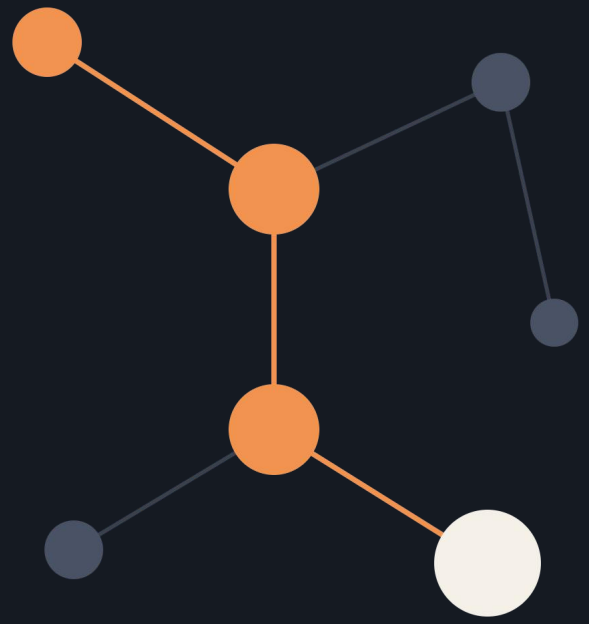
MCP DEV SUMMIT · NAIROBI

Cross-Agent Decision Memory

Giving MCP agents a queryable graph of why



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THE PROBLEM

Agents make judgment calls all day — then the reasoning evaporates

Route · Price · Approve · Escalate

An illustrative week

MONDAY

An approval agent grants a Gold member 15% off.

TUESDAY

Another instance rejects the same request.

WEDNESDAY

Audit asks why. Nobody can reconstruct it.

THREE MISSING ABILITIES

Without memory, agents drift



Can't recall

"How did we handle cases like this?"

Every case is decided from scratch.



Can't explain

"Why did you do that?"

The record shows the outcome, not the path.



Can't stay consistent

"Do our agents agree?"

Two agents, same case, different answers.

The result is drift: unauditable agents that are hard to trust.

THE GAP IN THE STACK

MCP standardized how agents call tools. Not yet how they remember why.

Tool access MCP	Tools, resources and prompts over one protocol	Standardized
Telemetry OpenTelemetry	Spans for every MCP request: what ran, when, how long	Emerging (draft)
Decision memory no standard yet	What was decided, why, and which precedent it followed	Missing

This talk: an open, vendor-neutral pattern for that third layer.

THE IDEA

Decision memory in one loop

01

Recall

Before acting, fetch semantically similar precedents.

→

02

Decide

Reason with how past cases were handled.

→

03

Record

Write the decision back. It becomes precedent.

→

04

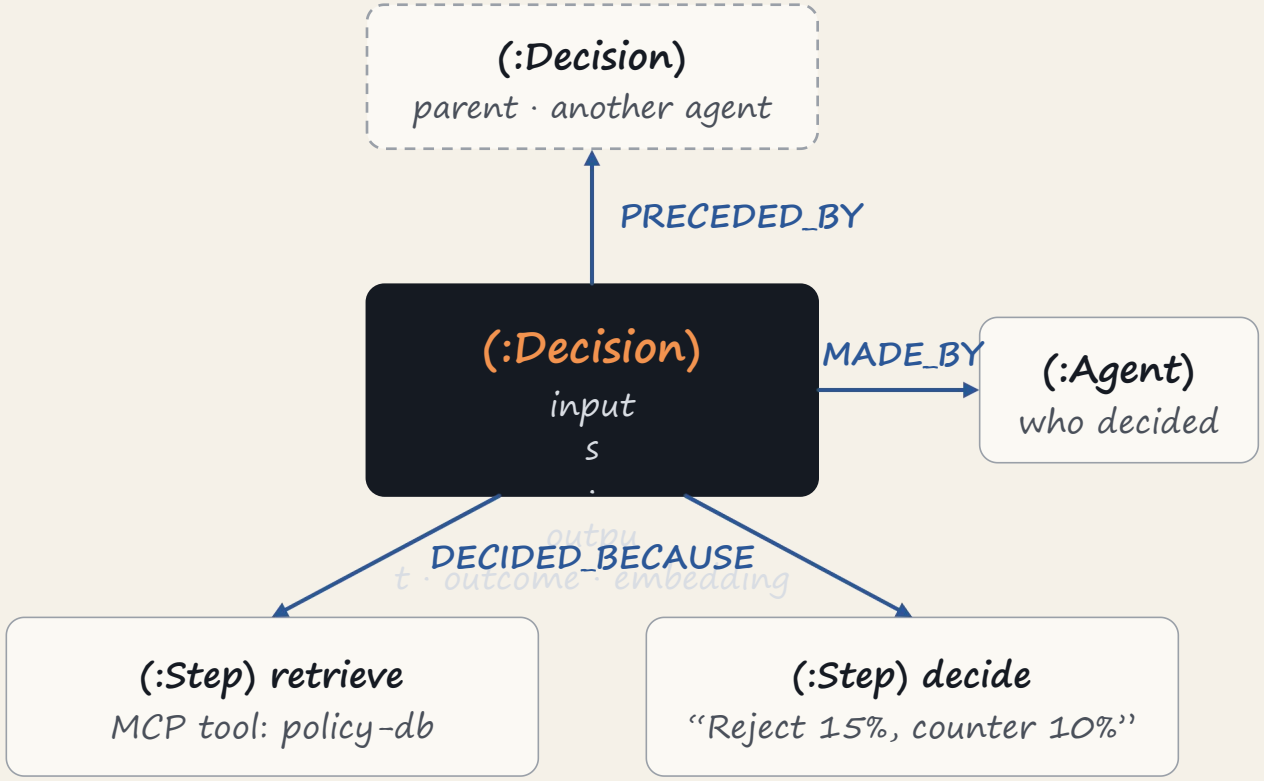
Why

Anyone can ask, and get the causal chain back.

Today's decision is tomorrow's precedent — for every agent, not just the one that made it.

THE GRAPH MODEL · NEO4J

Every decision becomes a node



What a decision holds

Inputs — what the agent saw

Steps — its reasoning, each tagged with the MCP tool it called

Output + outcome — what it decided

Embedding — so it can be found by meaning

parent_trace_id — the causal link to another agent

ACROSS AGENTS

Causal links span agents

T1 · root

Broker

Recommends an SUV, delegates pricing

delegates →

T2 · parent = T1

Pricing

15% exceeds the 10% ceiling, delegates

delegates →

T3 · parent = T2

Approval

Rejects 15%, counters 10%

```
// why did Approval decide that?
MATCH path = (d:Decision {trace_id: "T3"})
  -[:PRECEDED_BY*0..25]->(root:Decision)
WHERE NOT (root)-[:PRECEDED_BY]->()
RETURN [n IN nodes(path) | n.trace_id]
// → ["T3", "T2", "T1"]
```

One field does it: parent_trace_id

Across processes, frameworks and owners. No shared memory, no central orchestrator.

RECALL VIA EMBEDDINGS

Before acting, find similar precedent

Flatten
Inputs + reasoning + outcome + output into one text

→

Embed
At write time, stored on the Decision node

→

Rank
Cosine similarity to the query; filter by agent or outcome

→

Return
Top-k, each with how it was handled

recall "Gold member wants 15% off a ski-trip rental" →

0.72 · failure · "Rejected: 15% exceeds the 10% auto-approval ceiling; routed to manager queue"

COMPOSING WITH OPENTELEMETRY

Telemetry: what ran. Memory: why.

	OpenTelemetry · MCP conventions	Context Graph
Answers	What ran, when, how long, did it fail	What was decided, why, on what precedent
Key fields	mcp.method.name, gen_ai.tool.name, mcp.session.id	inputs, steps, output, outcome, embedding
Context travels	traceparent in params._meta	parent_trace_id between agents
Read by	Operators and dashboards	Agents before acting, and auditors

Join them: store the OTel trace_id on each Decision, and jump from a slow span to the decision it served — and back. *Proposed next step.*

Source: OpenTelemetry semantic conventions for MCP (status: Development)

TAKEAWAYS

Give your agents a memory of why

1

Record every decision

Inputs, reasoning, MCP tool calls and output — as a node in a causal graph.

2

Recall before acting

Shared precedent keeps agents consistent with each other, not just with themselves.

3

Ask why, get a path

The causal chain across agents, in one graph query.

Thank you

Why did the agent do that? Now you can ask.

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