Nemoclaw: Building a Business Intelligence Platform

Adam Sokacz

April 5th, 2026

Executive Summary

The introduction of Nemoclaw provides organizations with a platform similar to the proprietary systems that AI service providers like Claude and OpenAI charge access to.

The technology benefits are:

- Nemoclaw can be configured to an organization's needs, such as security requirements, tool use, industry data policies, and custom features
- Nemoclaw has the backing of NVIDIA, a multinational organization with a good reputation and global influence

The technology drawbacks are:

- Nemoclaw requires technical expertise to set up and manage
- There is not currently a lot of available documentation on how to build enterprise grade systems using Nemoclaw

Nemoclaw can integrate into an organization's overall AI strategy by:

a) Mitigating the risk of employees uploading company data to ChatGPT free tier, to be used for training
b) Being able to provide curated industry-relevant responses to increase efficiency
c) Reducing the impact of employee turnover, because even if the employee leaves, their agent (expertise) stays in the organization

This document outlines:

1) How to install and set up Nemoclaw to begin using the technology
2) Instructions to implement a simple Nemoclaw business intelligence platform

Background

Service Providers

Major AI service providers, such as Claude and ChatGPT, differ from locally run models by providing high-level reasoning capability at-scale. Open-source LLM platforms like vLLM, Ollama, or HuggingFace libraries, cannot provide that same level of reasoning capability without this sophisticated orchestration layer.

To do this, they structured their platform infrastructure to produce the following capabilities:

- Persistent memory across chats
- Enterprise-level authentication and privacy layers
- Agent orchestration, being able to route prompts to specific expert agents and aggregate the output
- Tool use, such as crawling websites, parsing images, working in specific file formats such as word and excel, or producing linted code

These proprietary orchestration systems provide users a cohesive user experience that hides all of this complicated technology under the hood. However, this forces organizations to pay per token to access this high-level reasoning capability and established an unrealistic hurdle to developing similar capabilities internally.

Openclaw

Similar to how GNU-Linux open-sourced operating systems, where individuals and organizations could contribute to a project that anyone can install, modify, and enhance free-of-charge, Openclaw open-sourced an LLM infrastructure for creating dynamic agents through community generated plugins, scripts, and configurations. This got individuals and professionals alike, excited and tinkering with the technology at a scale not seen before.

Nemoclaw

The existing Openclaw project lacked two main requirements to be introduced into an enterprise setting:

1. Enterprise-level security & access policies
2. An organization, like NVIDIA, to provide credibility that the project will be maintained into the foreseeable future

Nemoclaw resolves these two barriers to adoption by providing strict security settings through Openshell, a part of NVIDIA's AI Agent toolkit.

Openshell

Openshell fills the security gap by providing the following features:

a) Kernel-level egress flagging and approval
b) Credential injection layer, so the agent never actually sees your password or API key
c) Strict policy configurations, requiring a specific binary inside the sandbox to be approved for a specific communication protocol to a specific destination address
d) The ability to integrate easily with local LLM inference platforms, like vLLM and NIM-local
e) Strict filesystem access controls where the agent cannot itself modify its own configuration

Business Case

For organizations, Nemoclaw may enhance operations through the following opportunities:

Managing Risk; Your employees are using AI anyways, and they are probably uploading all of your confidential information to it on a daily basis. By providing them with a controlled alternative, as an organization, you may be able to mitigate this data leakage.

Context-Driven Responses; By providing a Nemoclaw agent access to internal process documentation, the responses that you receive will be more contextually specific to your industry and business.

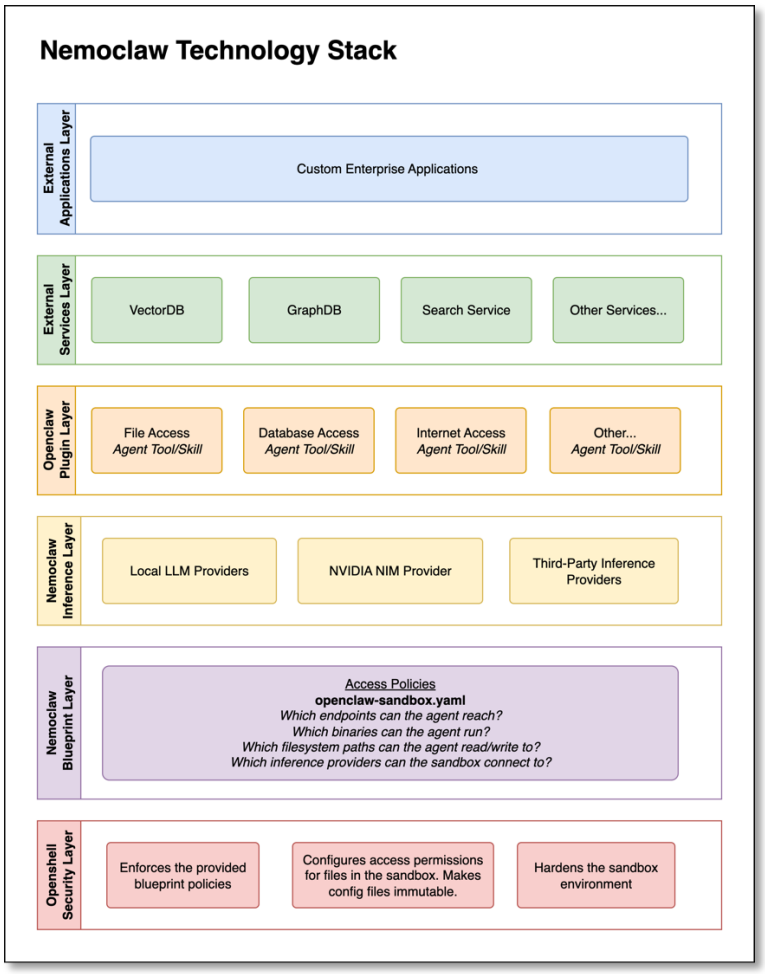
Reduced Impact of Employee Turnover; Currently, an employee's email account will be deactivated and documents erased. Anyways, these documents would have been organized in such a way where you would require a deep understanding of the role and project to follow along. By tying a personalized agent to that role, even if the human leaves the role, the "tribal knowledge" built over time from historical data and "battle-tested" context remains with the organization.

Overall, since Openclaw is an emerging project, we haven't seen this play out yet at an enterprise scale. This makes it difficult to quantify the impact of these opportunities to the organization. Instead, these strategic considerations should be a part of an organization's complete AI strategy and tied to specific key performance indicators of value for that specific industry, such as time-to-market, turnover rate, or project risk level.

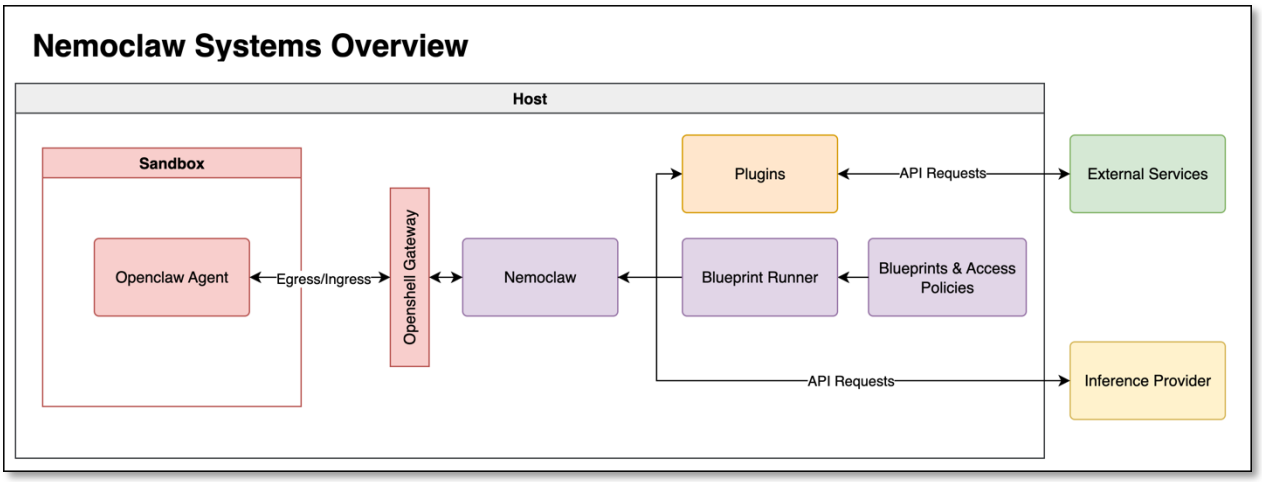
Nemoclaw Concepts

Overview

Nemoclaw coordinates the communication and security policy enforcement across multiple systems on the host machine and on connected services.



These systems coordinate with each other to provide an extensible orchestration layer.



Plugins

Plugins enable the agent to perform operations and access external services in a structured way. They are written using the Openclaw plugin standard, specified in the official Openclaw documentation. They are written in typescript, configured with a specific schema, and registered with the model provider to authorize its use.

Openclaw Plugin Documentation

Community plugins are published to Clawhub, which are less thoroughly audited.

Community Plugins & Skills

Plugin Config Files	
Sandbox name & inference provider	*user@host: ~/.nemoclaw/config.yaml*
API keys	*user@host: ~/.nemoclaw/credentials.json*

Inference Providers

Inference providers can be classified as local providers and remote services that charge a fee per-token. There are benefits and drawbacks to each and a combination can be used to leverage the cost-effectiveness of local inference with the higher-level reasoning and multimodal features of service-based solutions.

Inference Providers	
Local Inference	*vLLM, NIM-Local, HuggingFace, Ollama*
Remote Inference	*Claude, OpenAI, Gemini, other's*

Inference Commands	
Inference model status	*user@host: openshell inference status*
Registered credentials	*user@host: openshell provider list*
Switch model command	*user@host: openshell inference set --provider <p> --model <m>*

Blueprints

Blueprints enable the user to configure:

a) How the sandbox environment is set up at creation
b) Access policies for egress/ingress and filesystem access, that can be hot-reloaded at runtime

Blueprints	
Blueprint configuration	*user@host: $(npm root -g)/nemoclaw/nemoclaw-blueprint/blueprint.yaml*
Blueprint engine	*user@host: $(npm root -g)/nemoclaw/src/blueprint/runner.ts*
Main policy configuration	*user@host: $(npm root -g)/nemoclaw/nemoclaw-blueprint/policies/openclaw-sandbox.yaml*
Example policies	*user@host: $(npm root -g)/nemoclaw/nemoclaw-blueprint/policies/presets/*

Sandbox Management

Once created, the user can manage active sandboxes, reload policies, view egress/ingress requests, and upload files. For example, because of the Openshell security layer, if an inference model requires physical files for analysis, these will need to either be configured one of two ways:

1) A database, with an appropriate egress policy, a registered plugin, and agent instructions of where/when/how to use the tool
2) Manually uploading the files to the ~/.openclaw-data/workspace/memory directory within the sandbox using the nemoclaw <sandbox-name> upload command

Sandbox Commands	
View sandboxes	*user@host: openshell sandbox list*
View active policy	*user@host: openshell policy get <sandbox> --full*

View logs	*user@host: openshell logs <sandbox> --tail --source sandbox*
Open terminal UI	*user@host: openshell term*

Test Environment Setup

The procedure below provides you with instructions to install a minimal Nemoclaw environment on your Windows PC through WSL. It will be expanded on in subsequent sections of this report.

1) Set up the environment
    a. Enable WSL2 in Windows Features and reboot
    b. Install Ubuntu 22.04 LTS or later
    c. Install Docker Desktop on host
    d. Install npm, nodejs, and add to $PATH
    e. Generate an NVIDIA API key and add it as an environment variable
2) Install NemoClaw
    a. Open Ubuntu WSL2 in Terminal
    b. curl -fsSL https://nvidia.com/nemoclaw.sh | bash
    c. Run command: nemoclaw onboard
    d. Run command: nemoclaw sandbox list
    e. Run command: openshell policy get <sandbox-name> --full
    f. Run command: nemoclaw <sandbox-name> connect
    g. Run command: exit → You will return to host
3) Inspect Setup
    a. Run command: openshell logs <sandbox-name> --tail --source sandbox
    b. Run command: openshell term
    c. Inspect files from the configuration table above

A Proposed Business Intelligence Platform

Overview

In the *Business Case* section of this report, an opportunity was identified to leverage Nemoclaw in mitigating organizational risk, enhance productivity through context-driven responses provided by company procedures, quality standards, and any other functional documents, and lastly, the long-run strategy of reducing employee turnover impact on operations by consolidating the "tribal knowledge" of an organization into a series of agents that can be passed down from employee to employee.

As an example, there might be a mechanical designer agent with access to material ISO documents and customer specifications. There might be an applications agent, that has access to historical quotations and engineering designs that can be used to base future designs on. Finally, there could be an executive agent that is able to audit these business procedure, identify gaps, clarify ambiguity, and learn from situations that arise

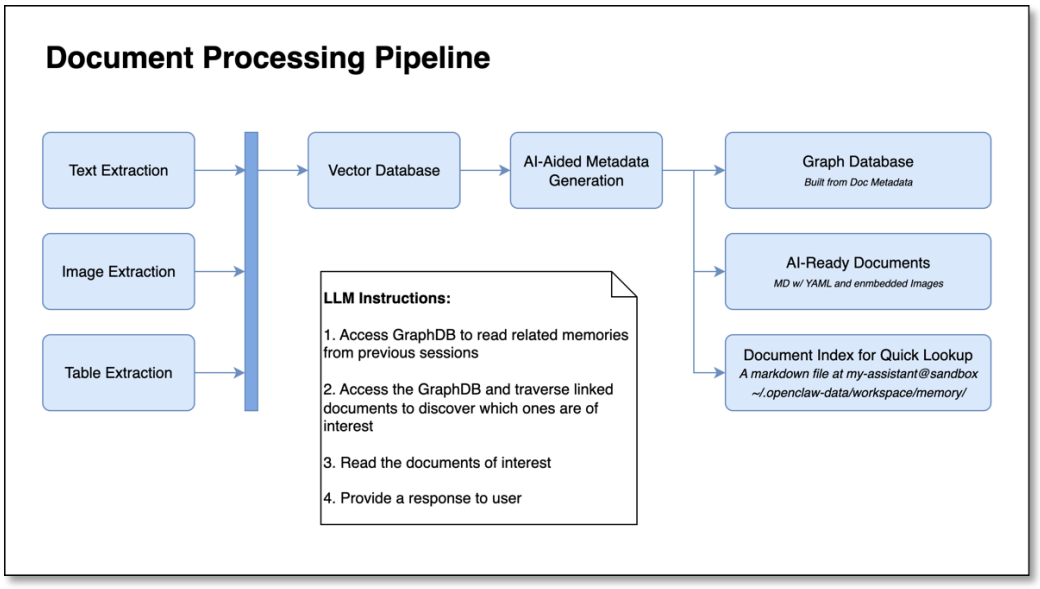
A simple but effective business intelligence system can be built with the following components:

QMS Documents	The policies and procedures that your organization operates by.
Historical Examples	Documents and files that outline how best to perform a specific task.
VectorDB	Provides the ability to quickly find the right files and procedures among thousands.
GraphDB	Enables the agent to traverse documents in a structure built on how documents relate to each other instead of which folder someone placed the document in at some point in time
Inference Provider	Either a locally-run model through vLLM, NIM-local, or HuggingFace, or alternatively a trusted AI service with a reasonable per-API-key token budget
Familiar User Interface	A chat interface that puts the power in the hands of the employee
Role Specific Features	• Tools to perform CRUD operations on a personal Kanban task board • Process flow charts to enable managers to map out gaps in their business processes • Search tools, such as Exa.AI, which can enable an agent to search the web effectively and securely

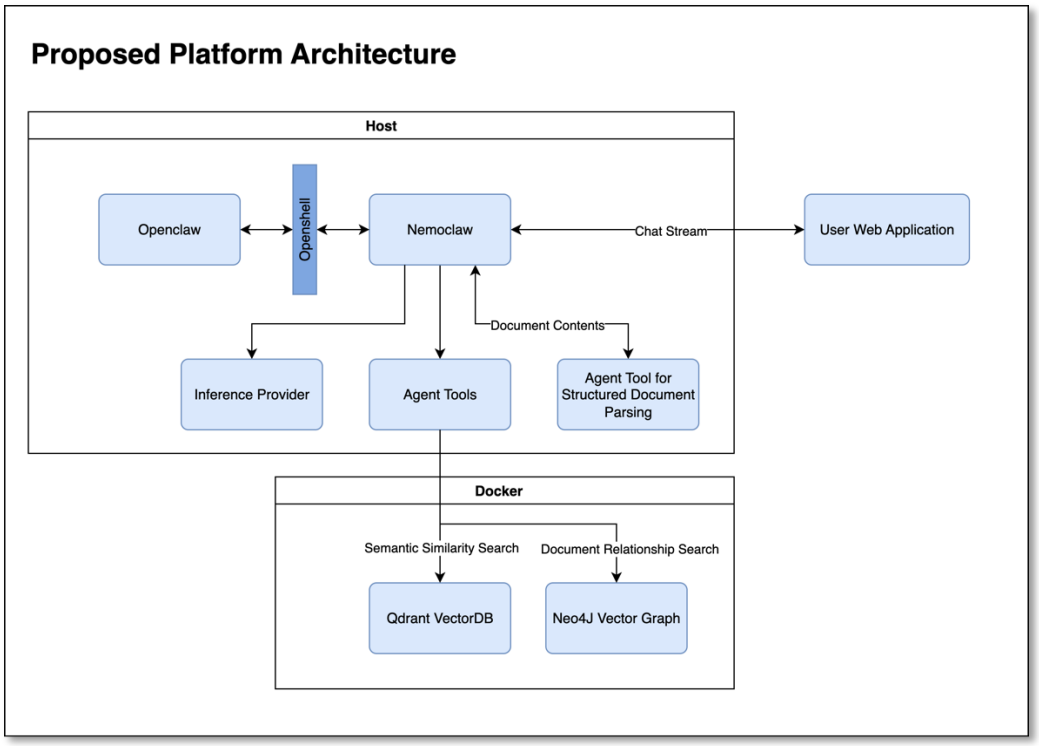
- Email integration
- MCP servers
- External services, such as GitHub CLI, to further extend functionality

Data Preparation

Software development agent platforms are very good at building out data processing pipelines. Below, is a high-level document processing pipeline that can be built in a day by an intermediate software architect. Either a local embedding model or paid one can be used.



The processing pipeline above prepares the text data to be chunked, labelled, and linked for rapid recall by the agent with the goal of point it directly to the files that need to be accessed for more specific understanding.



Deployment Procedure

1) Deploy Qdrant vector database as a Docker container
    a. *docker run -d --name qdrant -p 6333:6333 -p 6334:6334 -v qdrant_storage:/qdrant/storage qdrant/qdrant:latest*
    b. Run python script to upload chunks to Qdrant
2) Deploy Neo4j
    a. *docker run -d --name neo4j -p 7474:7474 -p 7687:7687 -v neo4j_data:/data -v neo4j_logs:/logs -e NEO4J_AUTH=neo4j/neo4j123 -e NEO4J_PLUGINS='["apoc"]' neo4j:latest*
    b. Run python script to upload all document metadata to Neo4j
3) Modify the Nemoclaw network policy to accept connections to Qdrant for text similarity search
    a. Can append directly to **openclaw-sandbox.yaml** in */root/.nemoclaw/source/nemoclaw-blueprint/policies/*
    b. Will require something similar to the example below:

```
  qdrant:
    name: qdrant
    endpoints:
      - host: 172.19.0.3
        port: 6333
      - host: 172.19.0.3
        port: 6334
      - host: qdrant
        port: 6333
      - host: qdrant
        port: 6334
      - host: host.openshell.internal
        port: 6333
      - host: host.openshell.internal
        port: 6334
    binaries:
      - { path: /usr/local/bin/node }
      - { path: /usr/local/bin/openclaw }
      - { path: /usr/bin/curl }

```

c. Hot-reload the network policy
nemoclaw <sandbox-name> policy-add

4) Modify the Nemoclaw network policy to accept connections to Neo4j for document relationship search

a. Can append directly to **openclaw-sandbox.yaml** *in /root/.nemoclaw/source/nemoclaw-blueprint/policies/*

b. Will require something similar to the example below:

```
  neo4j:
    name: neo4j
    endpoints:
      - host: "172.19.0.4"
        port: 7474
        access: full
        allowed_ips:
          - "172.19.0.4"
    binaries:
      - { path: /usr/bin/node }
      - { path: /usr/local/bin/node }
      - { path: /usr/local/bin/openclaw }

```

c. Hot-reload the network policy
nemoclaw <sandbox-name> policy-add

5) Build the tools for the agent to access these services in a structured way

a. Curl examples, Python scripts, Typescript scripts

b. Upload them to the sandbox in the ~/.openclaw-data/extensions directory

```
sandbox@my-assistant:~/.openclaw-data/extensions$ ls -la
total 16
drwxr-xr-x 4 sandbox sandbox 4096 Apr  5 02:36 .
drwxr-xr-x 4 sandbox sandbox 4096 Mar 31 03:04 ..
drwxr-xr-x 2 sandbox sandbox 4096 Apr  5 02:36 graph-neo4j
drwxr-xr-x 3 sandbox sandbox 4096 Mar 31 03:58 memory-qdrant
sandbox@my-assistant:~/.openclaw-data/extensions$ ls memory-qdrant/
index.js  node_modules  openclaw.plugin.json  package-lock.json  package.json
```

c. Inside of this tool folder, you must configure your schema:

```
sandbox@my-assistant:~/.openclaw-data/extensions/memory-qdrant$ cat openclaw.plugin.json

{
  "id": "memory-qdrant",
  "name": "Memory (Qdrant)",
  "version": "1.0.0",
  "description": "Qdrant-backed semantic memory and engineering KB search",
  "main": "index.js",
  "slot": "memory",
  "configSchema": {
    "type": "object",
    "properties": {
      "qdrantUrl": {
        "type": "string",
        "description": "Qdrant server URL"
      },
      "collectionName": {
        "type": "string",
        "description": "Qdrant collection name"
      },
      "autoCapture": {
        "type": "boolean"
      },
      "autoRecall": {
        "type": "boolean"
      },
      "persistToDisk": {
        "type": "boolean"
      },
      "maxMemorySize": {
        "type": "number"
      }
    }
  }
}
```

d. The index.js script MUST be written using the Openclaw plugin API. https://docs.openclaw.ai/tools/plugin

6) Link all tools in the TOOLS.md file in the sandbox at ~/.openclaw workspace

a. Will need to upload a new TOOLS.md from host using the following command:

user@host nemoclaw <sandbox-name> upload

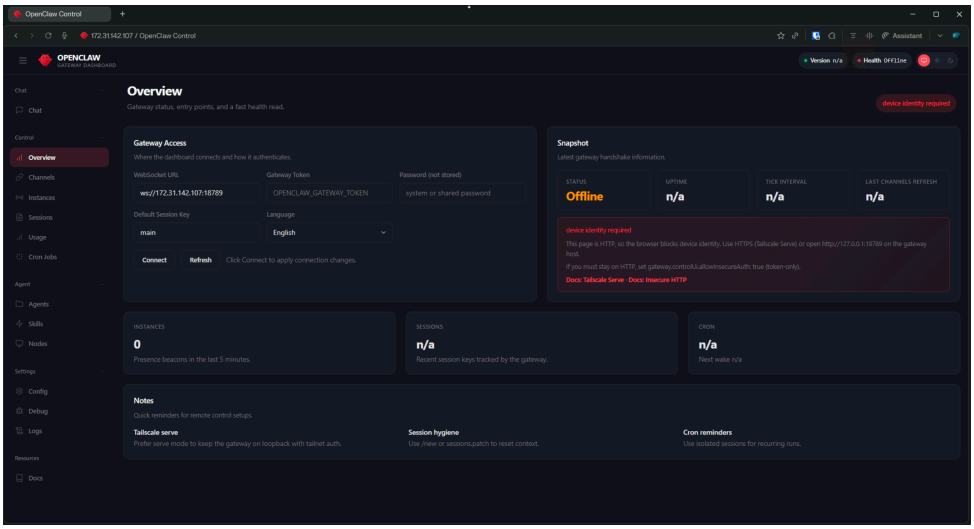
b. Entry will look something like:

```
## Graph Query (graph_query)

Query the Neo4j knowledge graph for document relationships, communities, and structural analysis. Read-only.

### Actions

| Action | When to use |
|--------|-------------|
| `find_document` | Search documents by code or title substring |
| `find_related` | Get all documents related to a specific document code (references, similarity, shared tags) |
| `find_by_tag` | Find documents matching a specific tag |
| `find_by_department` | Find all documents belonging to a department (e.g. "Fabrication", "Nuclear", "Quality") |
| `find_community` | List documents in the same Louvain community cluster |
| `top_documents` | Rank documents by PageRank — the most referenced/central documents in the system |
| `find_memories` | Retrieve agent memories by category (e.g. "fact", "preference") |
| `raw_cypher` | Execute a custom read-only Cypher query for anything the templates don't cover |

### When to use graph_query vs kb_search

- **kb_search** = "What does ASME B31.3 say about pipe supports?" → semantic content search across 52k text chunks
- **graph_query** = "What documents reference EQSGLO-D100-T108-C001-N026?" → structural relationship traversal across 318 document nodes

Use `kb_search` for **content questions** (what does a standard say?). Use `graph_query` for **structural questions** (what references what? what's the most important? what's in this department?).

### Rules

1. `graph_query` is read-only — it cannot modify the graph.
2. Always cite document codes in your response.
3. Use `find_related` before `raw_cypher` — the predefined templates are safer and faster.
4. The `limit` parameter defaults to 10 (max 50).
```

7) Define a lookup strategy in either TOOLS.md or AGENT.md

```
## Information Lookup Strategy

When you need to find information, follow this order strictly:

### Step 1: Vector Store (max 2 tool calls)

Search the vector databases first. These are fast and semantically aware.

- **memory_search** — Search things the user has told you (preferences, facts, decisions).
- **kb_search** — Search the engineering standards library (ASME, CSA, ISO, ANSI, ~52k chunks).

Try up to **2 tool calls** across these tools. If you find what you need, stop and respond.

### Step 2: Graph Query (max 2 tool calls)

If you need structural information — document relationships, cross-references, which documents are most important, what belongs to a department or community cluster — use the knowledge graph.

- **graph_query** — Query the Neo4j document and memory graph. Supports: `find_document`, `find_related`, `find_by_tag`, `find_by_department`, `find_community`, `top_documents`, `find_memories`, `raw_cypher`.

Use `graph_query` when:
- The user asks **"what references this document?"** or **"what's related to X?"** → `find_related`
- The user asks **"show me all fabrication/nuclear/quality documents"** → `find_by_department`
- The user asks **"what are the most important documents?"** → `top_documents` (PageRank)
- The user asks **"what documents are in the same cluster?"** → `find_community`
- The user asks **"what has been memorized about X category?"** → `find_memories`
- You need to explore relationships or graph structure → `raw_cypher`

Try up to **2 tool calls**. If you find what you need, stop and respond.

### Step 3: File Store (max 2 tool calls)

If the vector store and graph didn't have enough, fall back to the local document corpus.

- **file_storage** — Browse, search, and read ~4,567 markdown files in the workspace memory directory. Supports actions: `list_categories`, `list_files`, `search_files`, `read_file`, `follow_link`, `search_content`.

Try up to **2 tool calls** with this tool. If you find what you need, stop and respond.
```

8) Deploy a web application designed as being a front-end interface to Nemoclaw
    a. Socket streaming connection
    b. Configure a proxy on the host with change_origin enabled
    c. openshell forward start -d 0.0.0.0:18789 <sandbox-name>
    d. openclaw gateway --bind lan
9) Verify that, in a web browser, you can access the Openclaw configuration page at http://localhost:<web-app-port>/<endpoint-selected-in-proxy>



10) Generate an SSL access token and paste it in the Gateway Token field in the web-app and/or the Openclaw gateway access page, where required.

```
# Generate a random 48-character hex token
export OC_TOKEN=$(openssl rand -hex 24)
echo "Save this token: $OC_TOKEN"

# Set auth mode to token and apply the token
ssh openshell-my-assistant "openclaw config set gateway.auth.mode token"
ssh openshell-my-assistant "openclaw config set gateway.auth.token $OC_TOKEN"
ssh openshell-my-assistant "openclaw config set gateway.controlUi.allowedOrigins '[\"*\"]'"
ssh openshell-my-assistant "openclaw config set gateway.controlUi.allowInsecureAuth true"
ssh openshell-my-assistant "openclaw config set gateway.trustedProxies '[\"10.0.0.0/8\",\"172.16.0.0/12\"]'"

```

Gaps

Due to how new the project is, there are no guides that outline complete Nemoclaw deployment in a corporation and through a platform provider such as Azure or AWS.

There is also very limited guidance on how to configure specific Nemoclaw systems, such as custom plugins, unique blueprint policies, and filesystem access.

It will be very interesting to see how the technology develops as more organizations begin working with it, and to measure its impact on business operations. Any claims that have been made, on the internet or otherwise, are largely untested yet.

Conclusion

As an organization, it is vital that you have an AI policy, and that you have enough expertise and interest at the governance level to adapt to the changing technology landscape. AI has commoditized many white-collar roles. If you are not leveraging it, then your competitors are, and it is a matter of time until they are able to streamline operations, reduce cost of goods sold, deliver products to market quicker, and outcompete you. People may argue whether the timeline of change is 1 year, 5 years, or yesterday. It might depend on your industry, where you operate, and other factors. However, the necessity to adapt and risks of falling behind remain real, whatever that timeline is.

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