Proto-OKN: Cross-Knowledge Graph Queries

Natural Language Queries using MCP Servers

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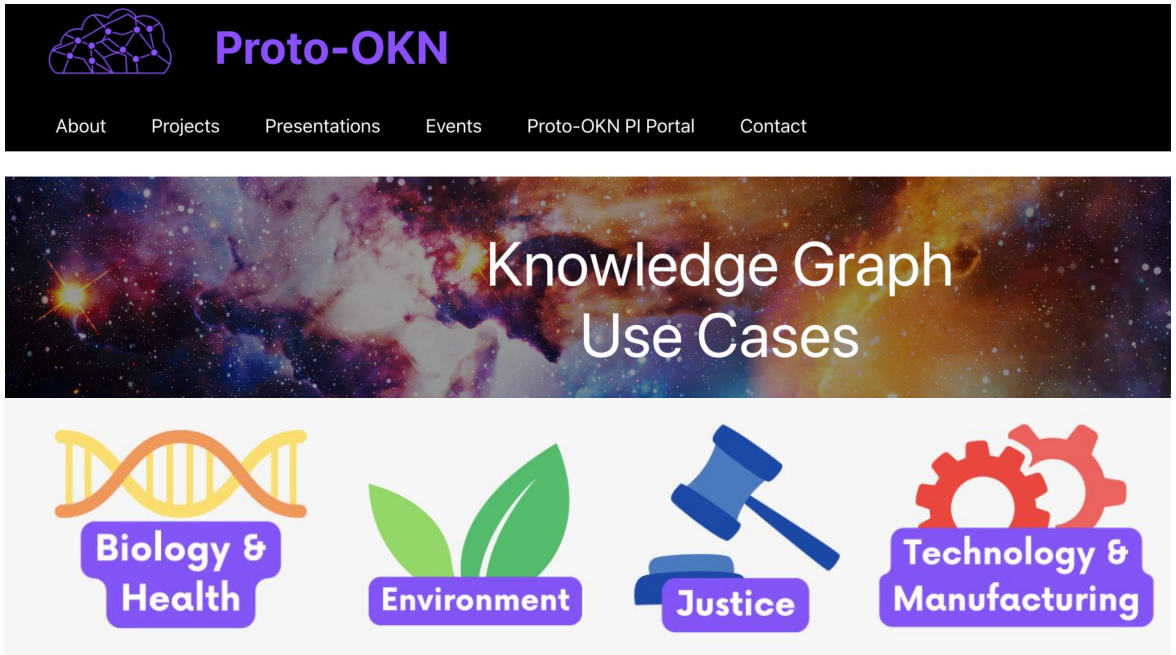
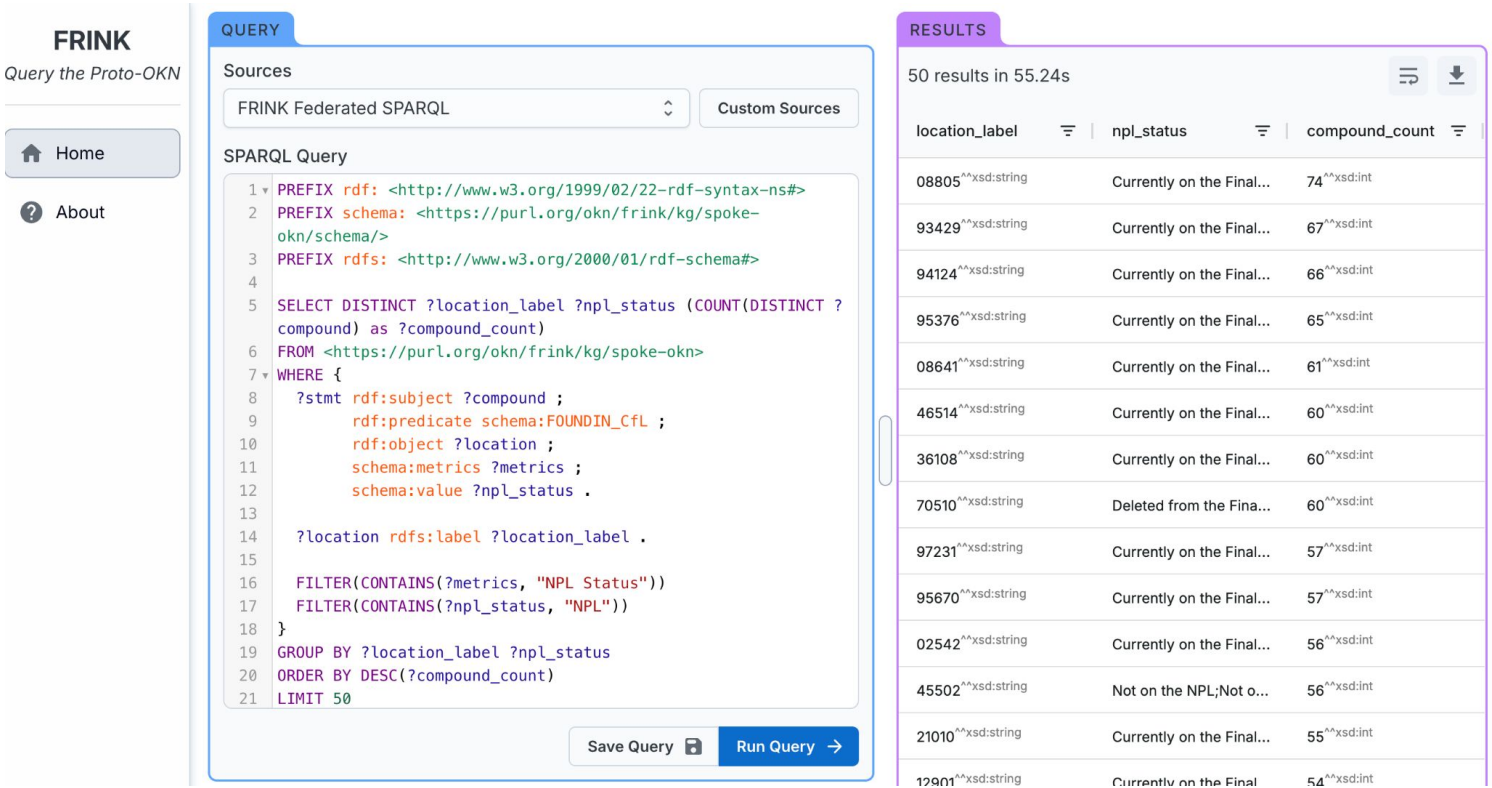
NSF Proto-OKN Program



“Open knowledge network (OKN) is a publicly accessible, interconnected set of data repositories and associated knowledge graphs that will enable data-driven, artificial intelligence-based solutions”

https://www.proto-okn.net/projects/

FRINK: SPARQL Query of the Proto-OKN KGs

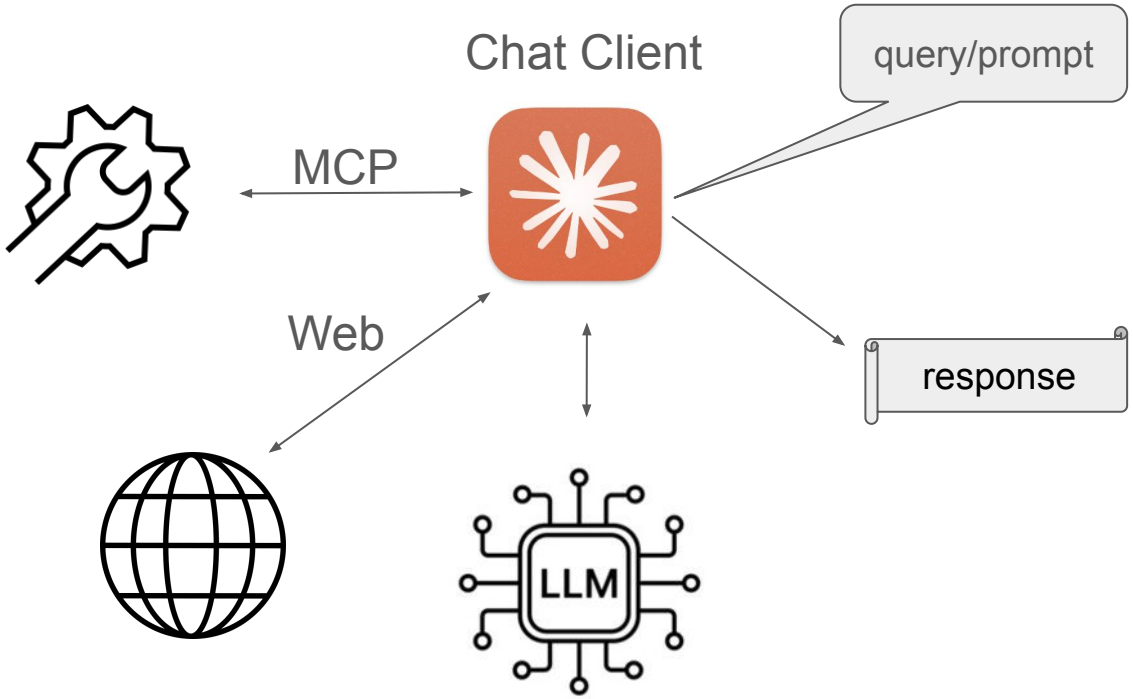


SPARQL queries are verbose and complex

Few users have SPARQL experience

https://frink.apps.renci.org/

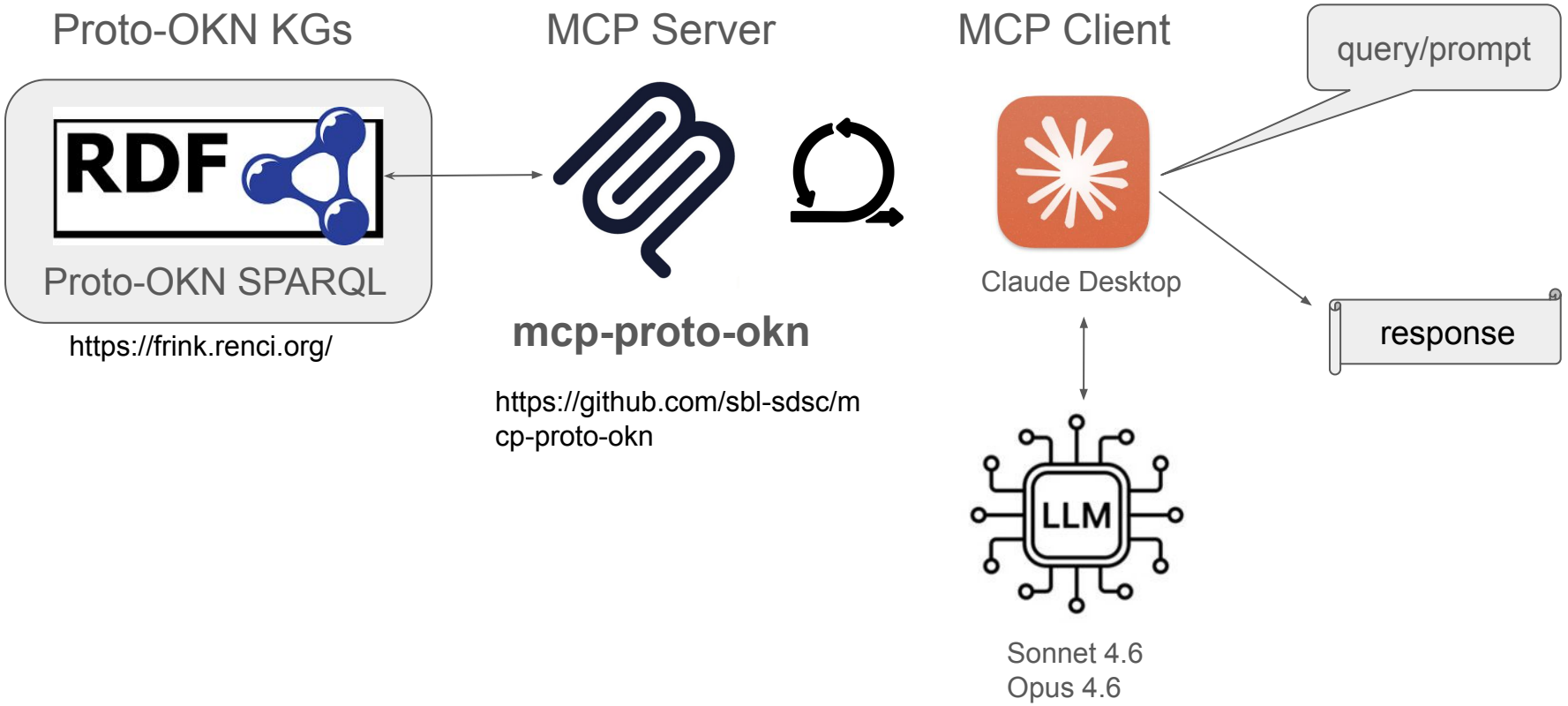
AI Assistants and Tools



MCP (Model Context Protocol) is an open protocol that standardizes how applications provide context to large language models.

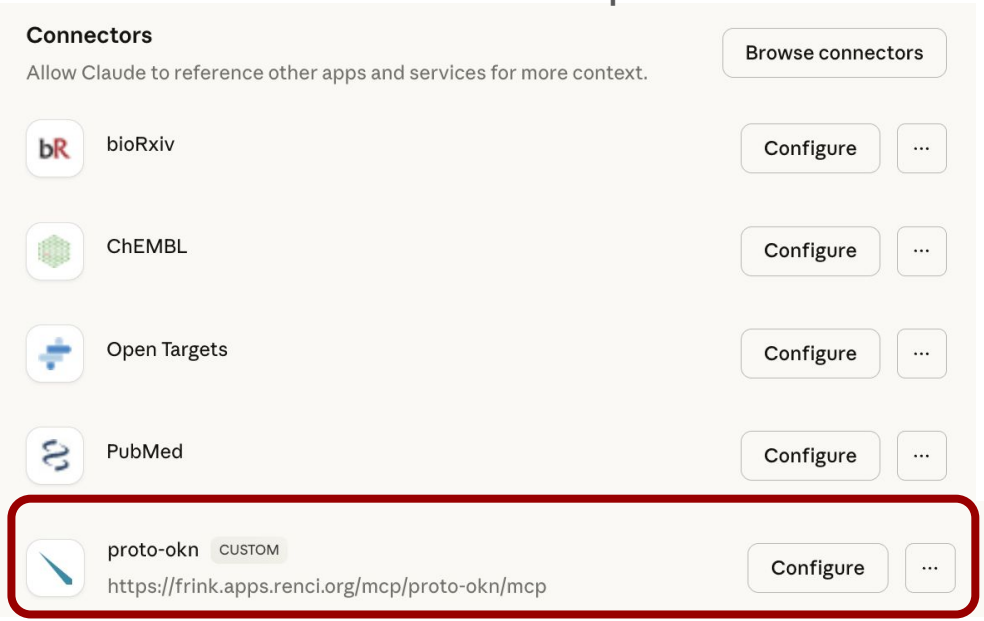
https://modelcontextprotocol.io/

MCP-Proto-OKN - Natural Language Queries

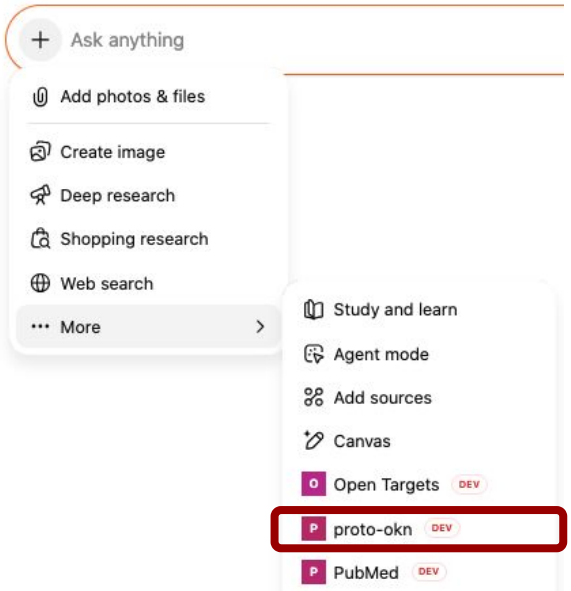


Setup mcp-proto-okn in AI Assistant

Claude Desktop



ChatGPT



Configuration instructions:
https://github.com/sbl-sdsc/mcp-proto-okn?tab=readme-ov-file#installation-and-configuration

Demos

1. Proto-OKN KGs Descriptions

Generate a table of all Proto-OKN Knowledge Graphs with two columns: “KG Name” and “Description”

2. Single KG query

@spoke-genelab: Give a high-level overview of this knowledge graph, including its main entities, relationships, and purpose

3. Perfluorooctanoic acid (PFOA) safety profile - cross-KG

https://github.com/sbl-sdsc/mcp-proto-okn/blob/main/docs/examples/pfoa-safety-profile.md

4. Spaceflight disease risks - cross-KG + cross-MCP

https://github.com/sbl-sdsc/mcp-proto-okn/blob/main/docs/examples/space-flight-disease-relationships.md

5. Spaceflight microbiome investigation - cross-KG + cross-MCP

https://github.com/sbl-sdsc/mcp-proto-okn/blob/main/docs/examples/spaceflight_microbiome_cross-graph_investigation.md

6. Full list of examples

https://github.com/sbl-sdsc/mcp-proto-okn?tab=readme-ov-file#example-queries

Tips for Writing Better Prompts

- Be specific, provide context, and clearly state your goal
- Break complex tasks into steps
- Constrain the scope (e.g., specific KG) and anchor to known entities
- Ask for the schema to explain the KG's structure
- Request evidence, assumptions, or intermediate reasoning
- Redirect it when it goes off track and iterate
- Give clear feedback on plots or diagrams
- Ask it to improve your prompt
- Ensure web search is off
- Specify the desired output format (table, csv, plot, etc.)
- Use the prompt "Create chat transcript" to create a document with prompts, responses, and model version that you can save as a .md or .pdf file (see examples)