

Building GeoAgents: A Hands-on Guide to Agent Protocols

GeoAI 2026 Workshop

Workshop Title

Building GeoAgents: A Hands-on Guide to Agent Protocols

(Acronym: GeoAgents Workshop)

Main Organisers

Primary Organizer:

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Short Description

As agentic AI systems become increasingly central to geospatial applications, understanding emerging protocol standards is crucial for building interoperable, reliable, and reproducible GeoAI systems. This workshop advances knowledge and understanding of protocol-driven GeoAI architectures through hands-on exploration of key protocols: **Agent-to-Agent (A2A)** for backend agent orchestration and inter-agent communication, **Model Context Protocol (MCP)** for persistent state management and reproducibility, and **Agent-Governed UI (AG-UI)** for frontend UI/UX and safe human-in-the-loop workflows.

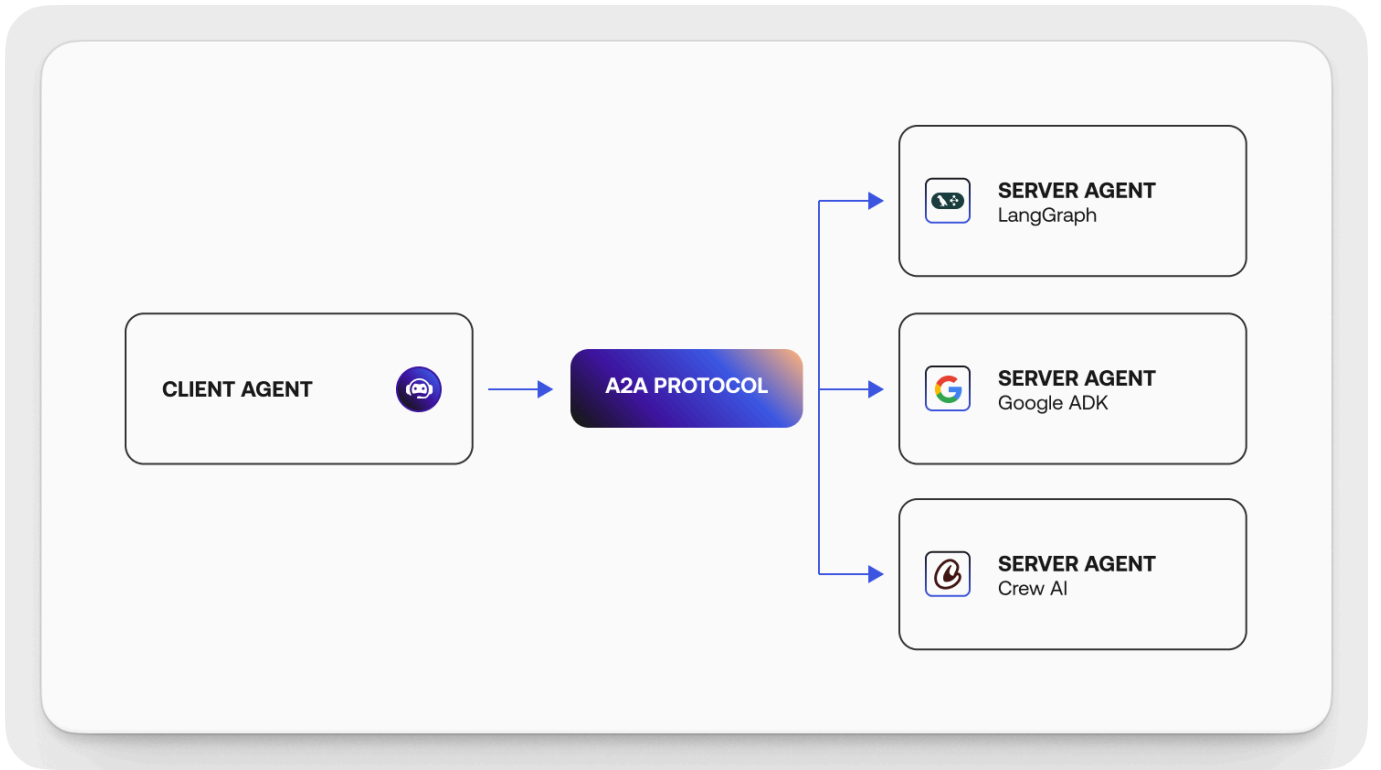


Figure 3: Agent-to-Agent (A2A) protocol for inter-agent communication

Model Context Protocol (MCP)

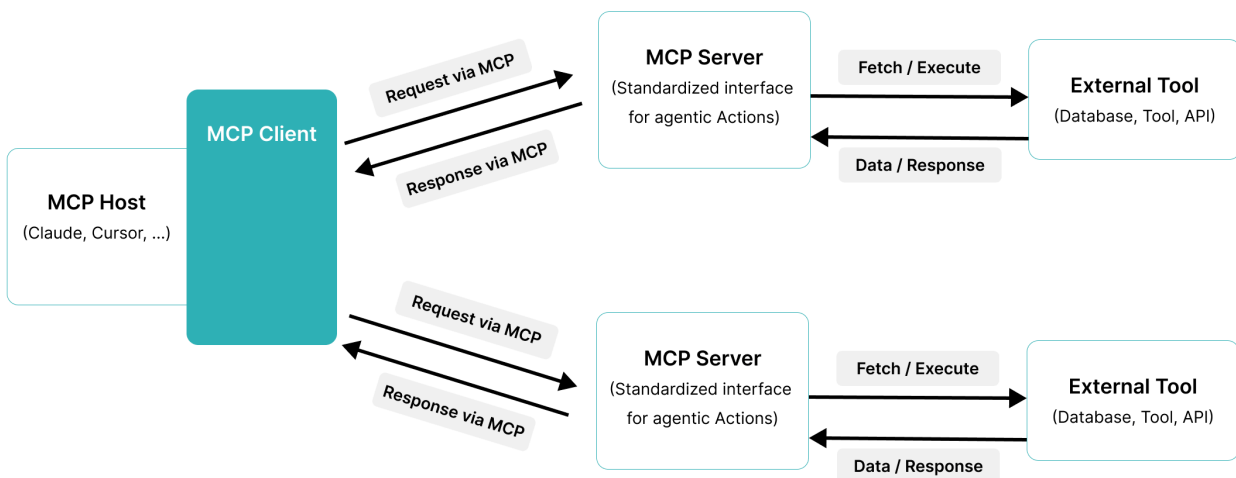


Figure 4: Model Context Protocol (MCP) for state management and reproducibility

Together, these protocols form a complete standards-based architecture spanning from user interfaces through agent orchestration to backend services. Through hands-on practice, participants will gain deep understanding of how protocol-driven architectures enhance interoperability, reproducibility, and system reliability in GeoAI applications.

The Agent Protocol Stack

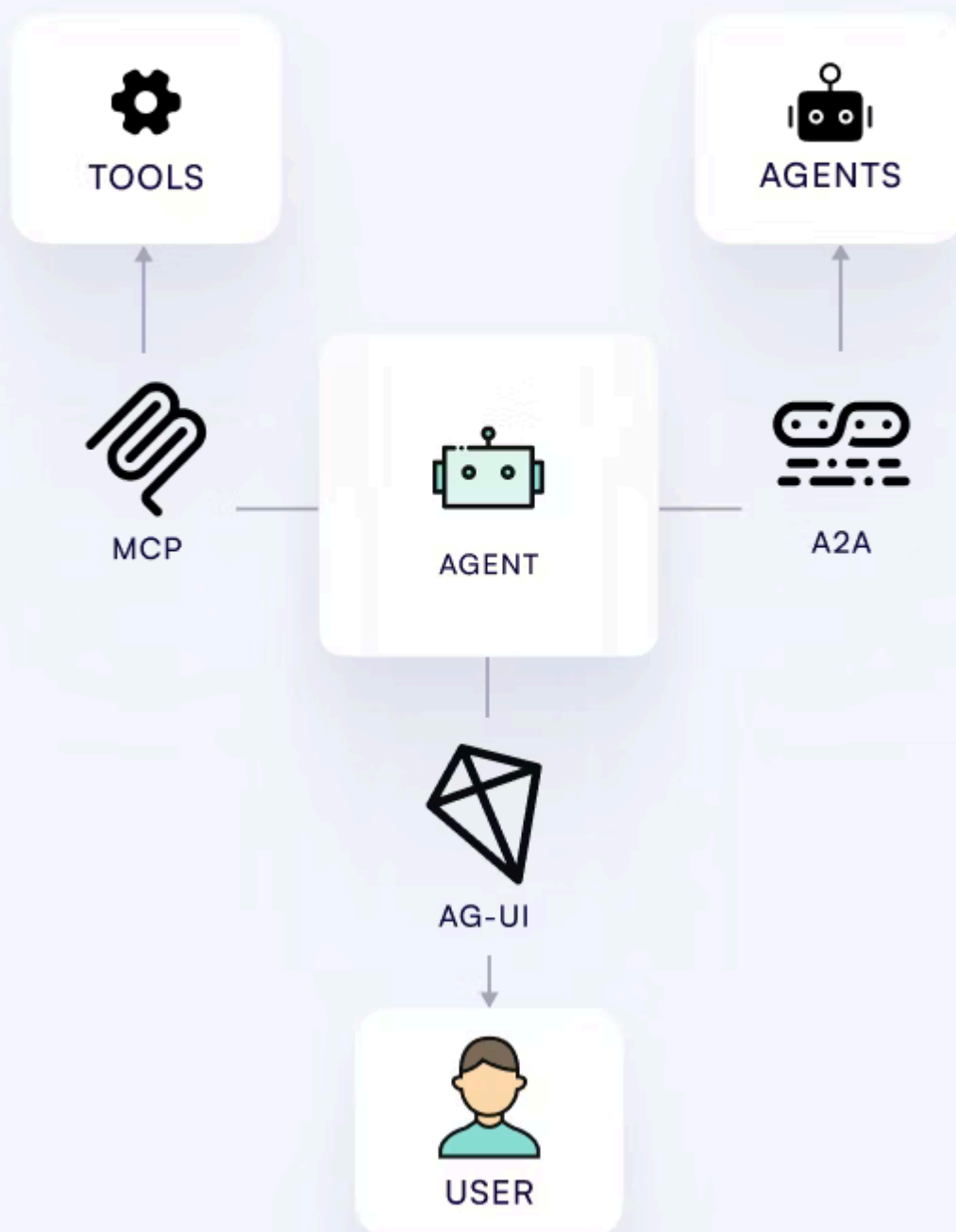


Figure 1: Agent Protocol Stack covering UI/UX (AG-UI), orchestration (A2A), and backend services (MCP)

Protocol-Driven Approach: Pros and Cons

Advantages:

- **Interoperability:** Standard protocols enable agents and services from different organizations to work together seamlessly

- **Reproducibility:** Protocol-driven state management (MCP) enables reproducible workflows and scientific validation
- **Composability:** Agents can be combined and orchestrated in flexible ways across different domains
- **Governance:** Built-in transparency and auditability through protocol standards
- **Future-proofing:** Standards evolve independently, reducing vendor lock-in

Challenges and Limitations:

- **Protocol overhead:** Additional abstraction layers may introduce latency and complexity
- **Learning curve:** Understanding multiple protocols (A2A, MCP, AG-UI) requires initial investment
- **Ecosystem maturity:** Protocols are emerging standards with evolving specifications
- **Integration complexity:** Coordinating multiple protocols across the stack requires careful design
- **Performance trade-offs:** Protocol compliance may limit optimization opportunities

Through hands-on exploration, participants will develop practical understanding of when protocol-driven approaches are beneficial and where alternatives might be more appropriate.

Format

Hands-on workshop combining:

- **Technical demonstrations:** Live coding examples demonstrating protocol implementation and practical applications
- **Interactive exercises:** Participants build their own GeoAgents using provided templates, gaining hands-on understanding
- **Knowledge sharing:** Discussion of protocol trade-offs, practical challenges, and emerging best practices

Participants will work through practical examples implementing A2A, MCP, and AG-UI protocols using Python, JavaScript, Pydantic AI, and geospatial APIs (STAC, OGC services). Examples draw from real-world applications including EarthGPT.app and geobase.app, demonstrating protocol-driven GeoAgent architectures in practice. Through hands-on experimentation, participants will develop understanding of protocol capabilities, limitations, and effective integration patterns. Pre-configured cloud environments ensure hands-on participation regardless of prior experience, enabling focus on learning and knowledge advancement.

Program Structure:

- **Session 1:** Introduction to GeoAgents and agent protocols (A2A, MCP, AG-UI): foundations and practical context
- **Session 2:** Hands-on exercises: STAC discovery with MCP (understanding state management), routing agent with A2A (orchestration patterns)
- **Session 3:** Advanced applications: Multi-agent orchestration for climate resilience workflows, protocol integration strategies
- **Session 4:** Knowledge synthesis: protocol trade-offs, practical insights, and emerging directions

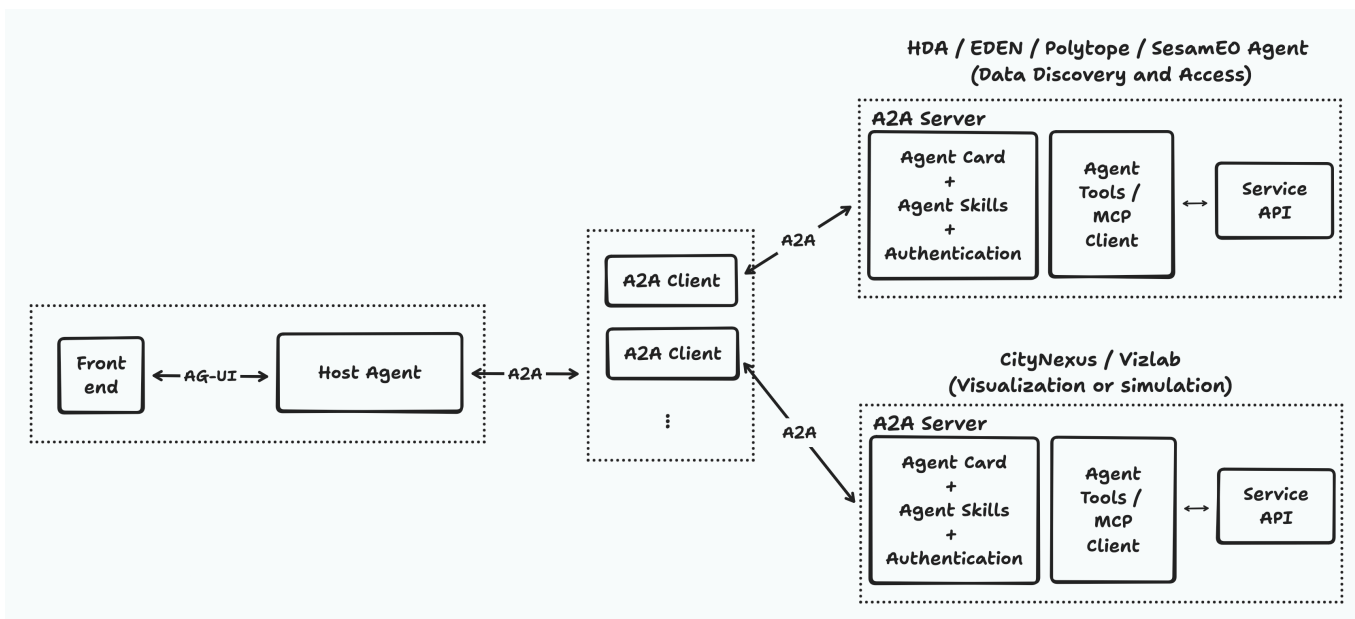


Figure 2: Example agentic flow showing orchestration across geospatial services

Call for Presentations

This workshop does not include a call for presentations. It is structured as a hands-on workshop with guided exercises and demonstrations led by the organizer. Participants will contribute through active experimentation, knowledge sharing, and collaborative learning.

Participation

Target Audience

Primary:

- Geospatial scientists and researchers working with location data
- AI/ML researchers and practitioners interested in geospatial applications
- Software developers building location-aware applications
- Data scientists working with Earth observation or spatial datasets

Secondary:

- Policy makers and domain experts (urban planning, climate science, transportation)
- Students and early-career researchers in GeoAI
- Industry professionals in logistics, real estate, environmental monitoring

Prerequisites

- Basic Python programming (intermediate level)
- Basic JavaScript/TypeScript (helpful for AG-UI exercises)
- Familiarity with geospatial concepts (helpful but not required)
- No prior experience with agentic AI required

Expected Number of Participants

Target: 30-50 participants

Rationale:

- Hands-on format supports interactive learning and knowledge exchange
- Manageable for individual support during exercises
- Large enough for diverse perspectives and collaborative understanding

Technical Requirements

Participant Requirements:

- Laptop (participants bring their own)
- Modern browser (Chrome, Firefox, Safari, Edge) for cloud-based environment
- Stable internet connection

Provided:

- Pre-configured cloud-based Jupyter environment accessible via browser
- Temporary API keys for workshop duration
- Pre-loaded sample datasets
- GitHub repository with code templates and documentation

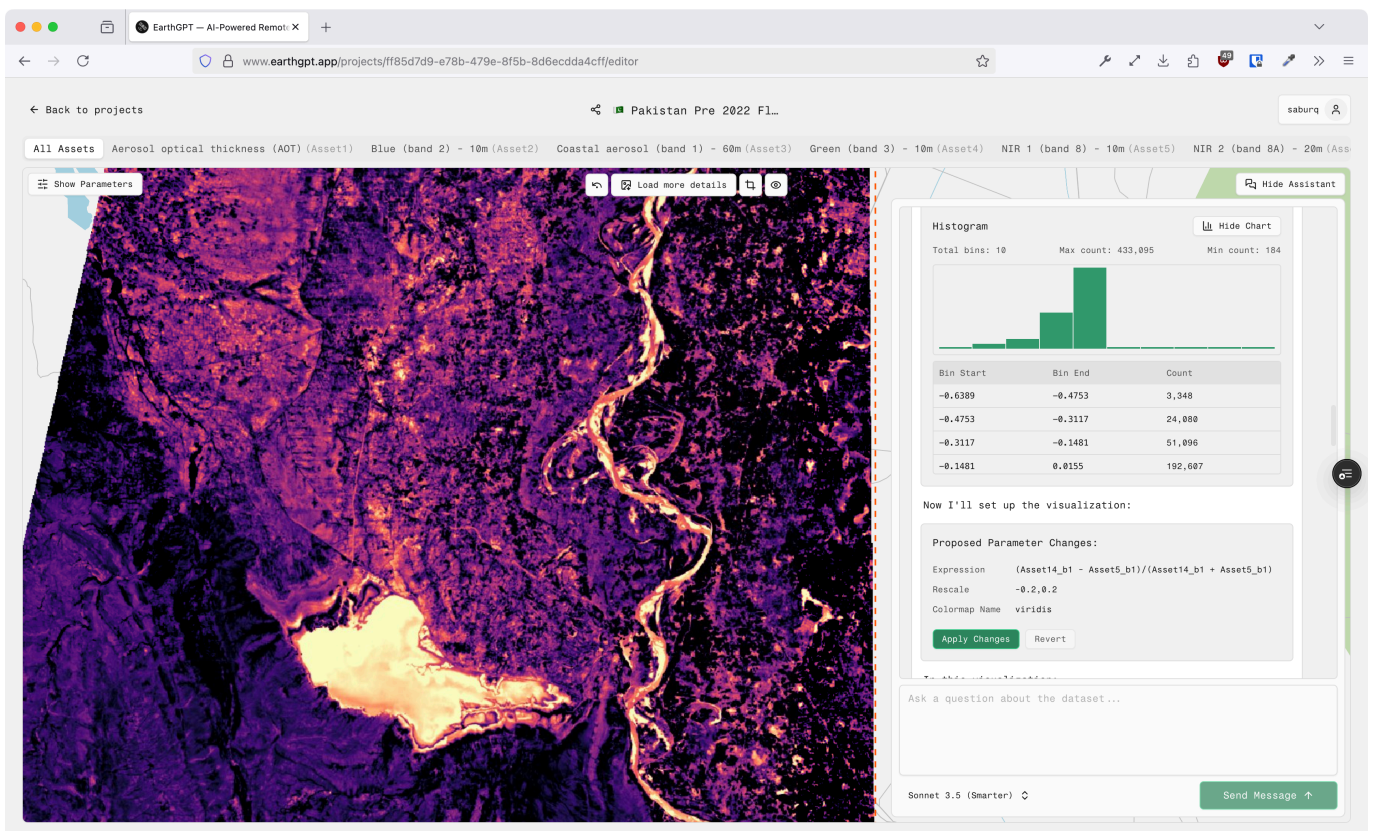


Figure 5: Example GeoAgent applications - EarthGPT.app and geobase.app demonstrating protocol-driven GeoAgent architectures

Workshop Website

Website: <https://decision-labs.com>

For additional information and updates, please visit the organizer's website or contact shoaib@decision-labs.com

Contact Information

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This workshop contributes to the GeoAI 2026 theme "GeoAI – Bridging AI and Geography for Science and Society" by advancing understanding of standardized agent protocols that enable full-stack interoperability between AI and geospatial systems. Through hands-on practice and knowledge sharing, participants will deepen their understanding of protocol capabilities, integration strategies, and practical applications, fostering collaboration between AI practitioners and geospatial experts.