Hack Nation 4th Global AI Hackathon
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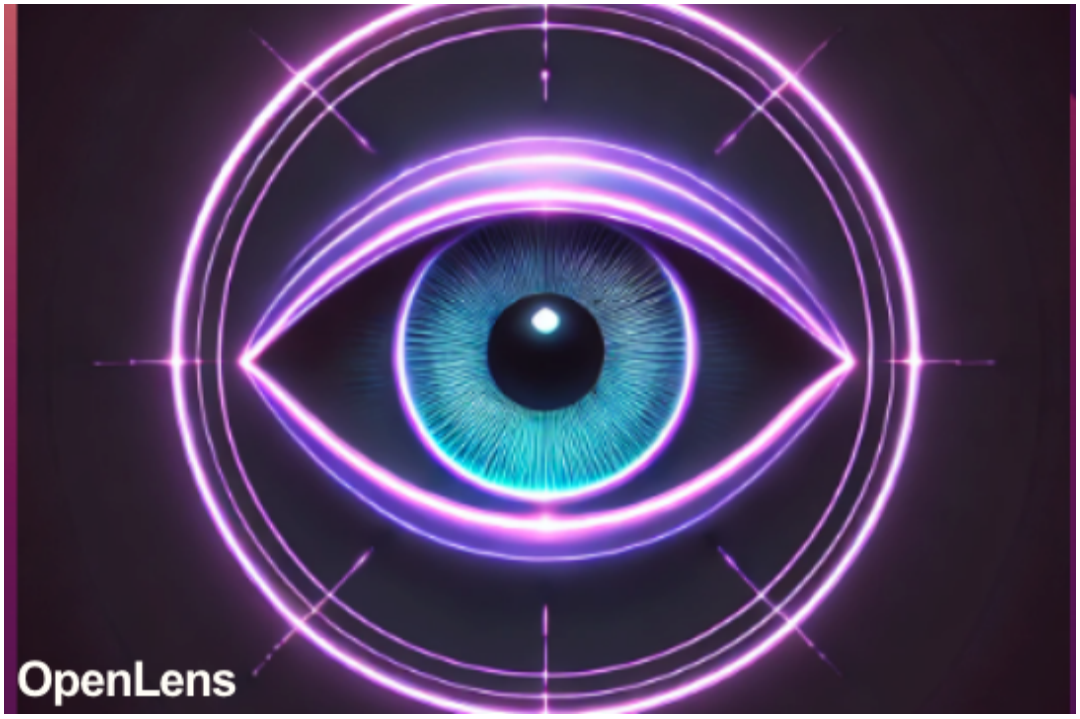
OpenLens

User-aware AI for the Open Web

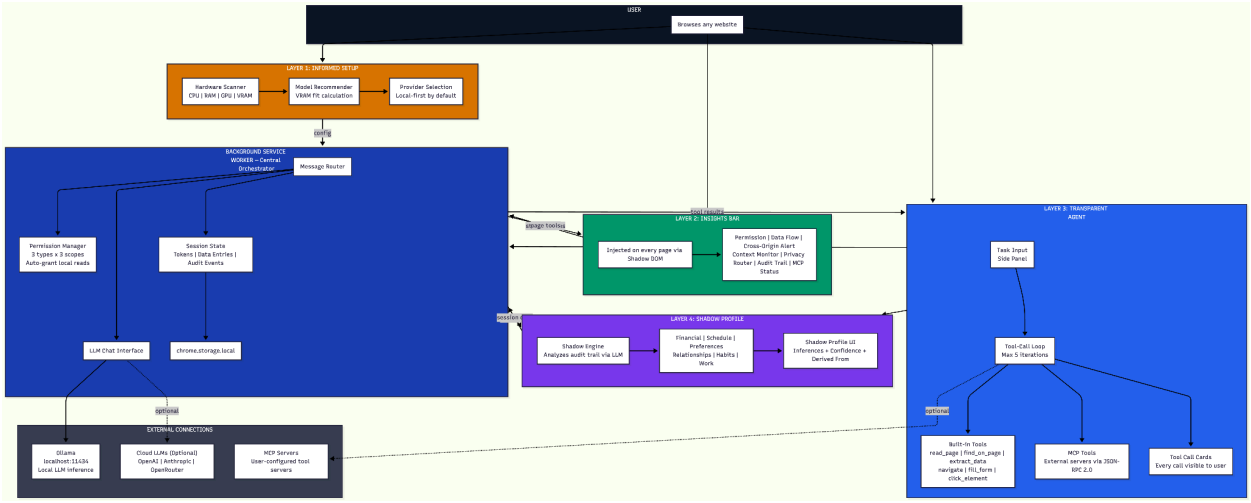


1. Problem and Challenge

Browser AI assistants process vast amounts of personal data such as browsing habits, purchase history, schedules, and preferences in order to assist users. Over time, this creates an invisible “shadow profile” — a detailed model of who the user is, built from data they never explicitly shared.

Today, users have no visibility into what their AI has inferred about them, what data it consumed, which sources were merged, or whether the data stayed on the local device or was sent to the cloud. While traditional privacy tools focus on website tracking, there are currently no tools that monitor the behavior of the AI itself.

ARCHITECTURE DIAGRAM



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2. **Target Audience**

Primary Audience

Privacy-conscious everyday users who rely on AI-assisted browsing and want clear visibility into what their tools learn about them, without requiring technical expertise.

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3. **Solution and Core Features**

OpenLens is a browser extension for Chrome and Firefox that monitors AI activity in real time and clearly reveals what the AI infers about the user.

Key features include:

Informed Setup

Scans the user's hardware, detects available local Ollama models, and recommends models based on available VRAM. Supports both local inference (Ollama) and cloud providers such as OpenAI, Anthropic, and OpenRouter.

Insights Bar

A persistent bar displayed on every webpage, containing seven live modules:

- Permission state
- Data flow tracking
- Cross-origin data merge alerts
- Context window usage and capacity
- Local versus cloud routing
- Full audit trail
- MCP tool execution status

Transparent Agent

Uses MCP-style tool calling where every tool invocation, input argument, and result is displayed step by step. Permissions are enforced at runtime:

- Page reads are auto-granted for local processing
- Cloud requests and write actions require explicit user consent with scoped permissions

Shadow Profile

After each AI task, the system analyzes the session and surfaces inferred attributes across eight categories:

- Financial
- Schedule
- Preferences
- Relationships
- Habits
- Work
- Location

- Health

Each inference includes a confidence level and a clear derivation chain showing exactly how the inference was formed. Users can inspect, export, or permanently delete this profile.

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4. **Unique Selling Proposition**

   No existing tool shows users what their AI has inferred about them.

   OpenLens tracks inference.

   The Shadow Profile is a first-of-its-kind feature that transforms the AI's internal understanding of the user into something visible, understandable, and controllable. Unlike post-hoc logs, OpenLens operates in real time and detects cross-origin data merging as it happens.

   Combined with a fully local-first architecture where data never leaves the device by default, OpenLens delivers a level of AI transparency that does not exist in any current browser tool.

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5. **Implementation and Technology**

   Component: Extension Framework
   Technology: WXT (wxt.dev)
   Role: Vite-based build system supporting Chrome MV3 and Firefox MV2

   Component: User Interface
   Technology: React 18, TypeScript, Tailwind CSS v4
   Role: Popup UI, side panel, and reusable component system

   Component: Local LLM
   Technology: Ollama REST API
   Role: Inference execution, tool calling, and shadow profile generation

Component: Tool Protocol
Technology: MCP (JSON-RPC over HTTP)
Role: Extensible external tool servers

Component: Bar Isolation
Technology: Shadow DOM
Role: Ensures injected UI is fully isolated from website CSS

Component: Permissions
Technology: chrome.permissions.request()
Role: Dynamic runtime permission granting

Component: Storage
Technology: chrome.storage.local
Role: Session state, shadow profiles, and MCP configurations

The background service worker orchestrates all LLM calls, tool execution, permission enforcement, and state broadcasting. The content script handles webpage reading and rendering the Insights Bar.

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6. **Results and Impact**

- Fully working end-to-end POC flow from setup to shadow profile generation
- Seven real-time insight modules updating live during AI activity
- Robust permission system with three permission types, three scopes, and auto-grant logic for local processing
- MCP integration with complete audit visibility into all tool calls
- Approximately 520 KB total build size, ensuring fast load times

- Zero cloud dependency by default with complete local-first operation

“If we had 24 more hours, we would add cross-session shadow profile growth visualization and persistent cross-origin rules so users could set policies like ‘never merge my calendar with shopping data’ once and never think about it again.”

Built by Shreya Jaiswal

GITHUB
https://github.com/ShreyaJaiswal1604/OpenLens-User-aware-AI-for-the-open-web

YOUTUBE
https://youtu.be/cZkjrHSwVbU

Mozilla x Hack-Nation Global AI Hackathon 2026
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