端云协同 Agentic Browser 的研究

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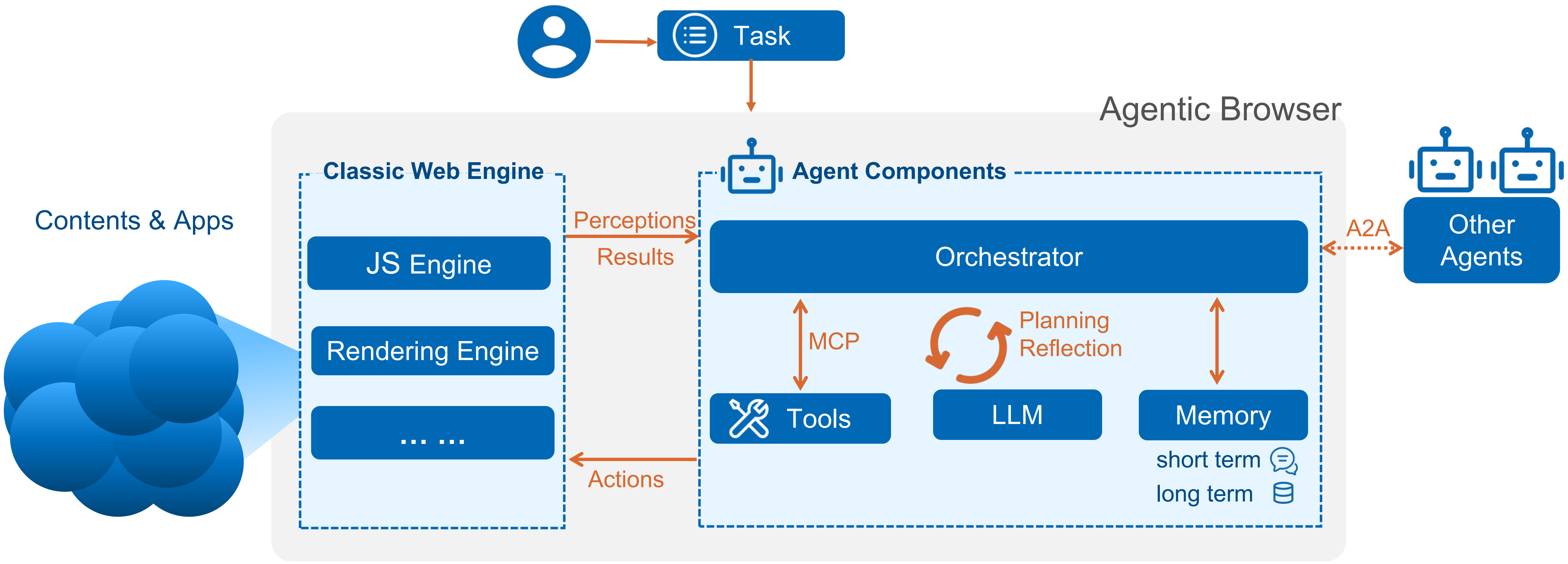
Agentic Browser 来到现实

Browser as the product with Agent Features	**Agent as the product good at operating Browsers**	**Open Src Agentic Browser Frameworks**
Perplexity Comet Edge Copilot Mode Opera Neon Dia Browser Fellou Browser … …	OpenAI ChatGPT Agent Google Project Mariner … …	Browser Use Stagehand Eko Nanobrowser … …

Agent 与 Browser 的协同

source: Perplexity Comet Browser

典型架构示例 – 基于云端 LLM



理论上大多数组件都可以部署在 **端侧** 或者 **云端** – 但目前大都使用 **云端** LLM

新机遇，新挑战

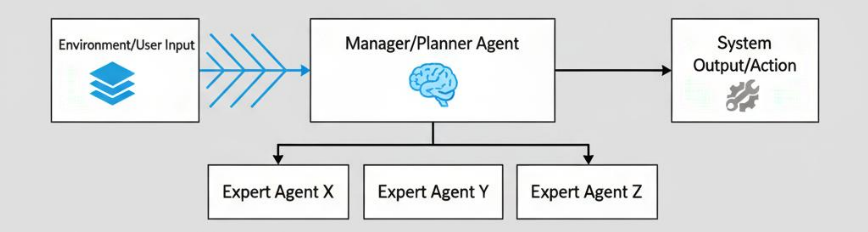
- 可靠性　并不保证每次都能成功完成任务
- 成本　大量的Token需求
- 延迟　简单任务也可能需要长时间
- 安全　无意或恶意(如Prompt Injection)的危险操作
- 隐私　浏览器页面和信息传送到云端

更智能高效的多模态模型
Context Engineering
Memory Compression
WebMCP
Human-in-loop
Prompt Sandwiching
Virtualization / Sandboxing
... ...

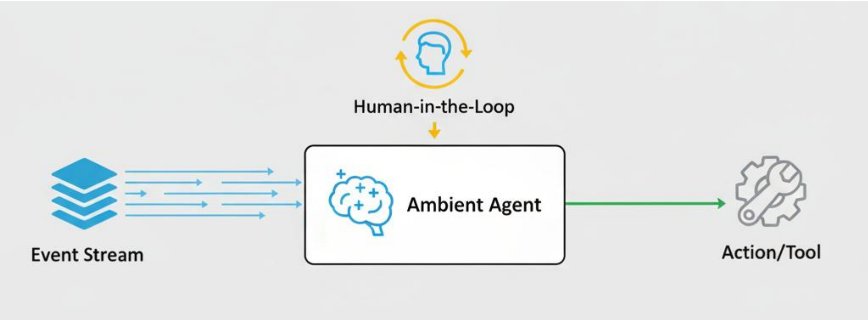
端侧AI：解决挑战的新途径?

为什么端侧AI适用于 Agent？

Multi-Agent System



Ambient Agent



SLM (Small Language Model)

- Acceptable Accuracy
- Low Compute Requirements
- Lower Energy Consumption
- Faster Inference
- On-Device AI
- Cheaper Deployment
- Customizability

40% to 70% of LLM calls in three popular open-src agentic systems could be replaced with specialized SLMs today.

Source: [Small Language Models are the Future of Agentic AI]

Ubiquitous On-Device AI by Web

Built-in AI

WebNN

WebGPU

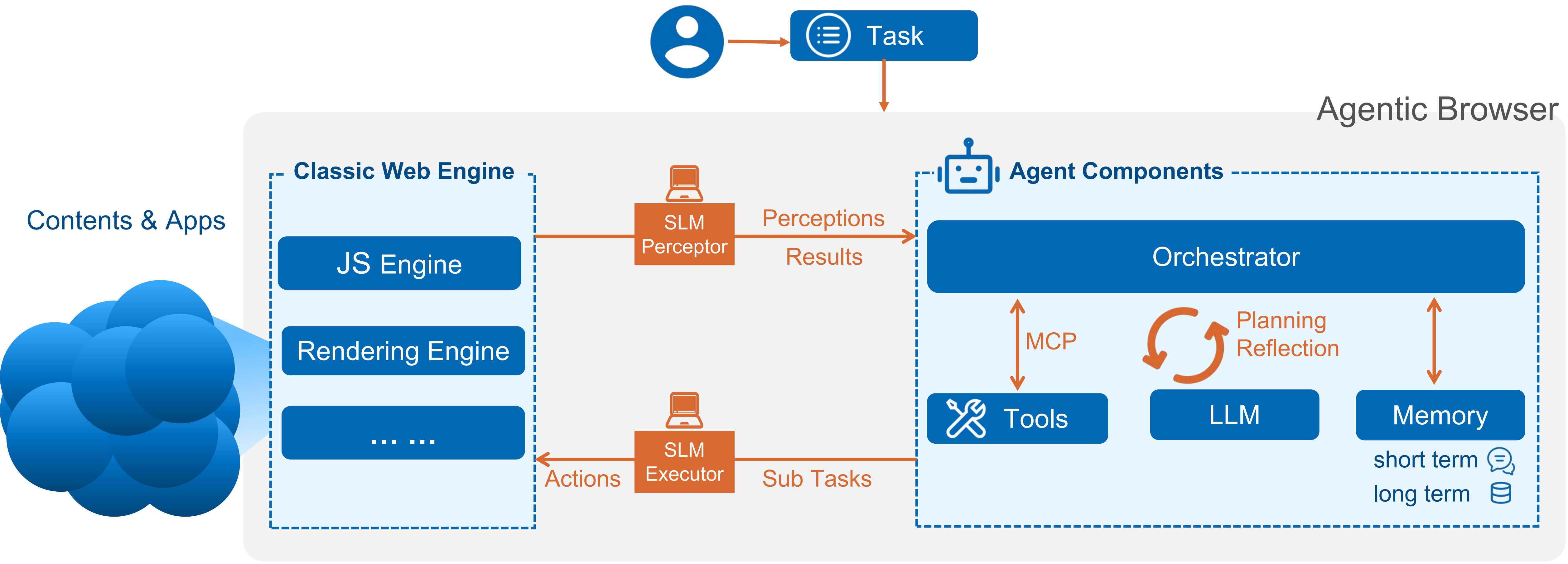
WebAssembly

… …

And Many Frameworks

… …

端侧AI与未来的 Hybrid Agentic Browsers



端侧Agent / 端侧AI 帮助解决

Proof-of-Concept - Hybrid Agentic Browser

Task in the Demo

Inspired by a use case from [WebArena]

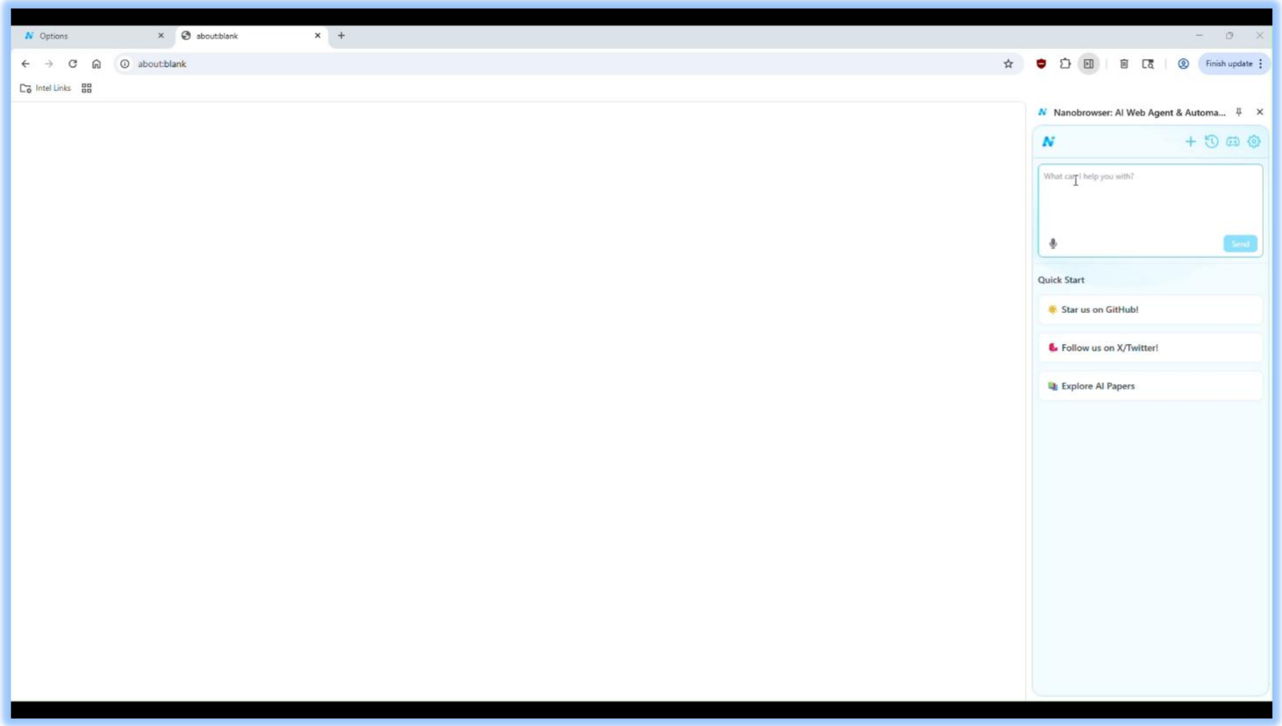
Automatically create a new Private Repo at Github, with a given name. Finally returned repo's URL.

Planner

Deepseek-R1 @ Cloud

Executor

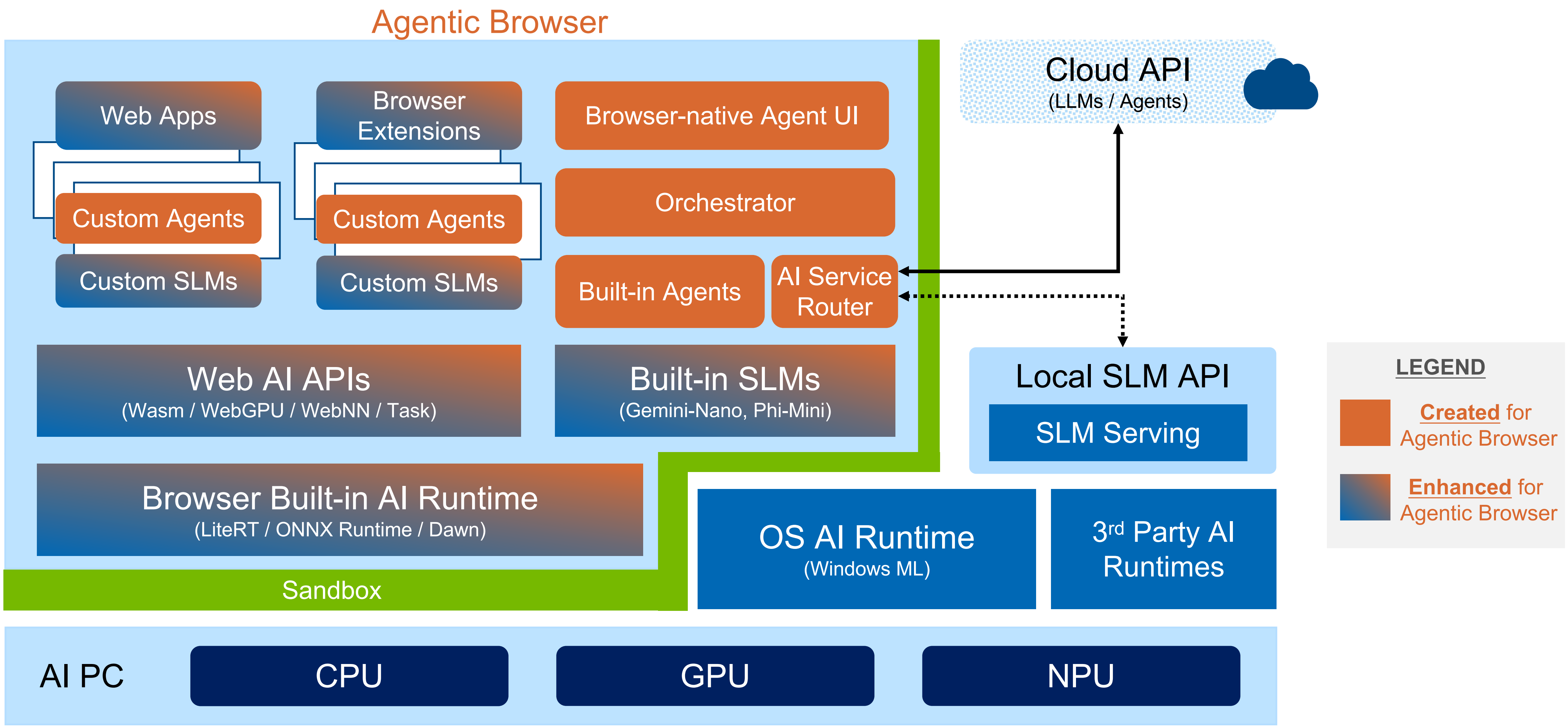
Qwen3-8b @
Intel® Core™ Ultra



built on top of nanobrowser

More innovations on the way

Essential Building Blocks of Hybrid Agentic Browser



总结与展望

- Agentic Browser 带来了全新的机遇与挑战
- 端云协同提供了应对这些挑战的新思路
- 为实现端云协同，Agentic Browser 将引入或增强更多组件
- 持续的创新将共同推动 Agentic Web/Browser 的未来发展