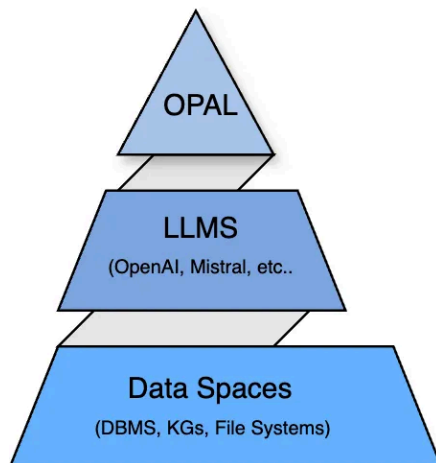


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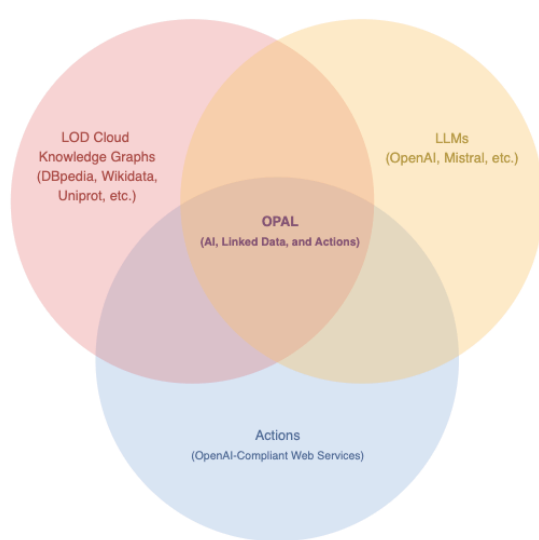
## Slide 1: Why The OpenLink AI Layer (OPAL) Matters

### OpenLink AI Layer (OPAL)

OPAL is a powerful AI-oriented middleware layer that enables the creation, deployment, and use of Smart Agents constructed by loose coupling Large Language Models (LLMs), OpenAPI-compliant Web Services, and Data Spaces (Databases, Knowledgebases, Knowledge Graphs, and File Systems).

### Benefits:

1. Easy Development & Deployment of Cutting-edge Smart Agents (or Assistants)
2. Hallucination Mitigation via Loose Coupling with Data Spaces
3. Enhanced User Interaction & Experience using Natural Language
4. Flexible Deployment of Smart Agents across Public & Private Networks

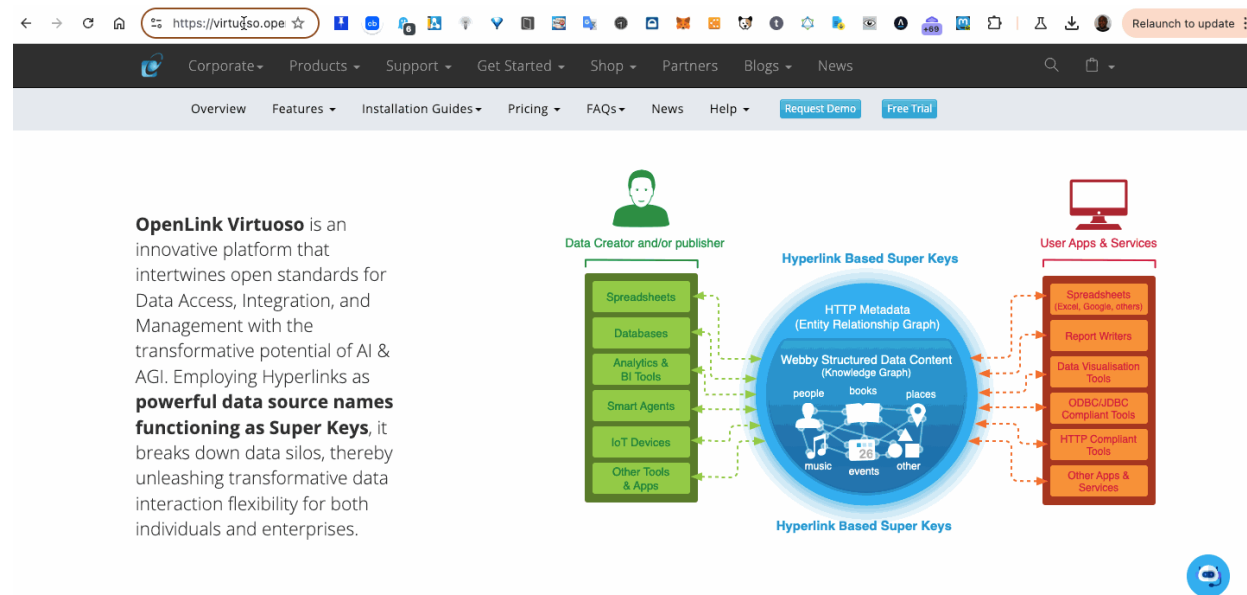


## Slide 2: Built-in Retrieval Augmented Generation (RAG)

**Feature:** Also known as GraphRAG, this feature enables LLM response specificity enhancements (i.e., hallucination effects mitigation) via high-performance access to external databases and knowledge graphs using declarative query languages such as SQL, SPARQL, SPASQL, and GraphQL.

### Benefits:

- Enhances sophisticated application functionality.



## Slide 3: External OpenAPI Service Support

**Feature:** OPAL consumes 3rd party OpenAPI-compliant Web Service descriptions while also using the same approach to provide an interface to its functionality usable by other applications and services. This integration adds new actions to prompt response production pipelines.

### Benefits:

- Expands functionality through external services.
- Facilitates integration with third-party APIs.
- Enhances application capabilities.
- Promotes interoperability through loose coupling of application functionality.

### Helper functions

- ☐ GraphQL Query Execution
- ☐ GraphQL Query Execution scoped to an Endpoint
- ☐ UDA HowTo Guides Text Focused
- ☐ URIBurner SPARQL Web Service
- ☐ VOS KB Search
- ☐ NW SQL Query
- ☐ SPASQL Query

temperature

top\_p

Max tokens

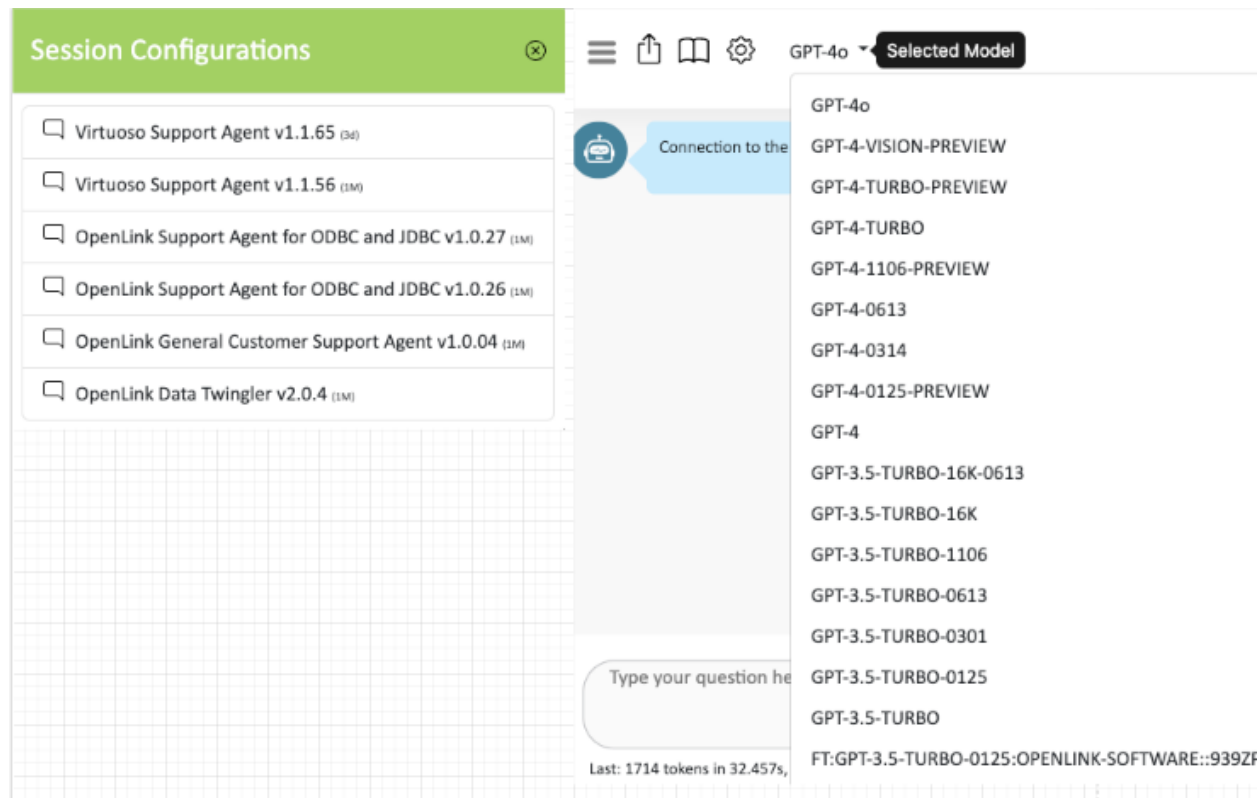
Max Sessions

## Slide 4: Custom Configuration

**Feature:** Controls behavior through JSON-based configuration documents, incorporating user preferences and fine-tuning templates.

**Benefits:**

- Promotes ease of integration.

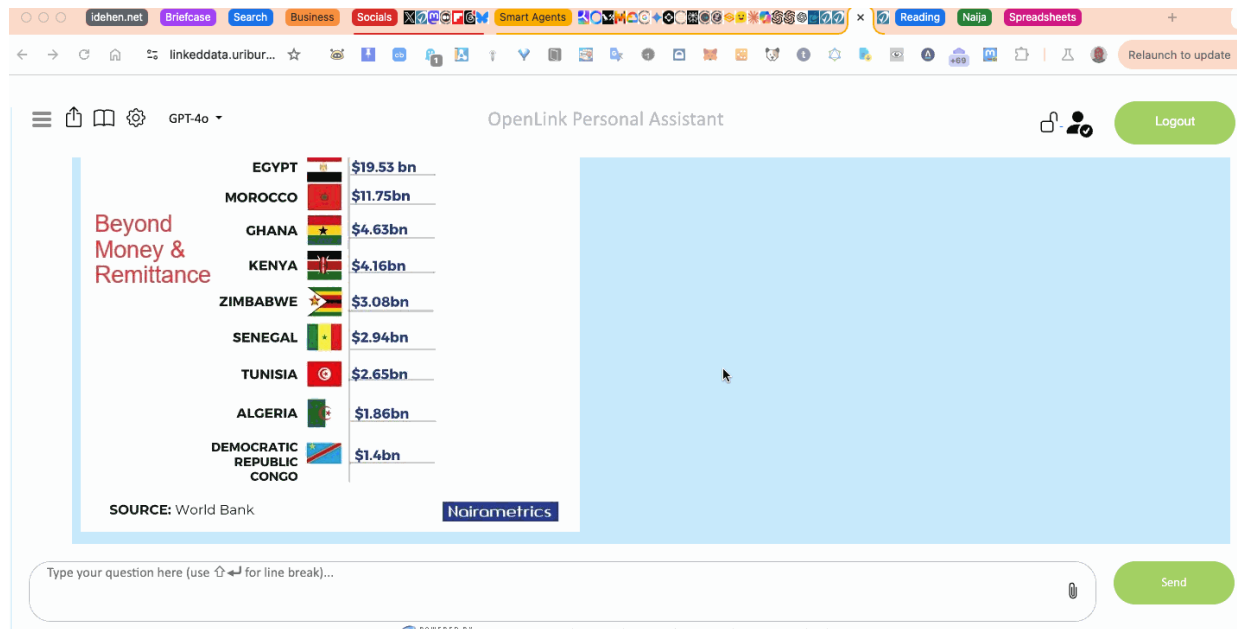


## Slide 5: Exportable and Importable Session Logs

**Feature:** Provides the ability to export and import session logs for analysis, sharing, and troubleshooting purposes.

### Benefits:

- Aids the sharing of sessions.
- Aids troubleshooting.
- Loosely couples application and data.

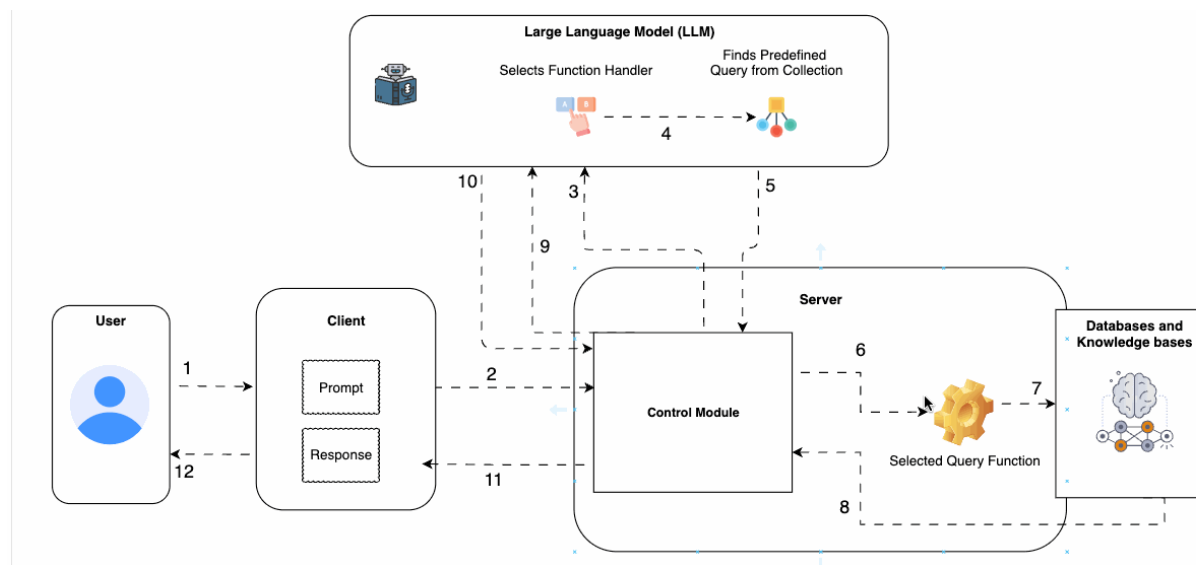


## Slide 6: Loosely Coupled Architecture

**Feature:** Integrates external services, custom configurations, and fine-tuning templates; fully re-skinable conversational user interface.

### Benefits:

- Enhances usage and integration options.
- Promotes ease of integration.

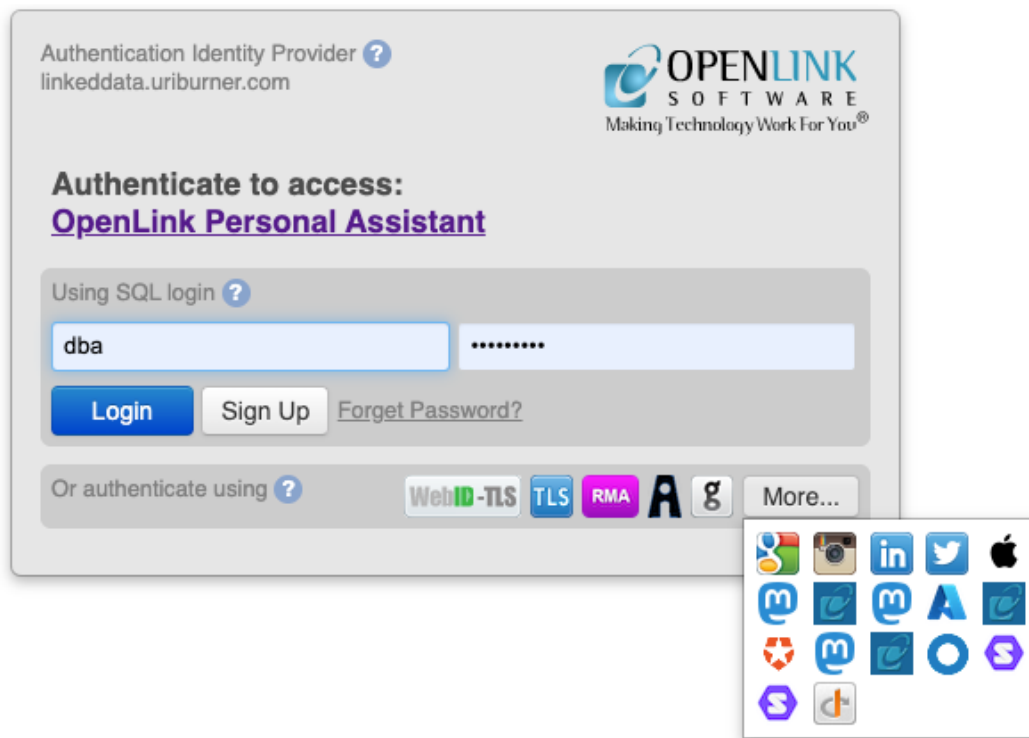


## Slide 7: Multi-Protocol Authentication

**Feature:** Supports data access control through various authentication protocols.

**Benefits:**

- Ensures secure access.
- Compliance with industry standards.



The screenshot displays the OpenLink Software authentication interface. At the top left, it identifies the 'Authentication Identity Provider' as 'linkeddata.uriburner.com'. The OpenLink Software logo is in the top right. The main heading is 'Authenticate to access: OpenLink Personal Assistant'. Below this, the 'Using SQL login' section contains a username field with 'dba' and a masked password field. 'Login', 'Sign Up', and 'Forgot Password?' buttons are present. An alternative section, 'Or authenticate using', lists various protocols: WebID-TLS, TLS, RMA, and social media icons for Facebook, Google+, and others, followed by a 'More...' button. A grid of 16 social media and service icons is shown in a separate window below the main interface.




## Slide 8: Query Execution

**Feature:** Direct execution of queries using SQL, SPARQL, SPASQL, and GraphQL, including access to SPARQL and GraphQL endpoints.

### Benefits:

- Enhances sophisticated application functionality.

OpenLink Data Twingler >


 Talked to linkeddata.uriburner.com

Here is the result of the executed SQL query, which retrieves the top 5 products with the highest units in stock:

ProductID	ProductName	UnitPrice	UnitsInStock
75	Rhönbräu Klosterbier	7.75	125
40	Boston Crab Meat	18.4	123
6	Grandma's Boysenberry Spread	25	120
55	Pâté chinois	24	115
61	Sirop d'érable	28.5	113

If you need further information or another type of query, feel free to ask!


Write and execute a sample SPARQL query.

 Talked to linkeddata.uriburner.com

Here is the result of the executed SPARQL query, which retrieves 5 triples from the dataset:

Subject	Predicate	Object
<a href="http://dbpedia.org/resource/Maahes">http://dbpedia.org/resource/Maahes</a>	<a href="http://dbpedia.org/property/cultCenter">http://dbpedia.org/property/cultCenter</a>	<a href="http://dbpedia.org/resource/Taremu">http://dbpedia.org/resource/Taremu</a>
<a href="http://dbpedia.org/resource/Maahes">http://dbpedia.org/resource/Maahes</a>	<a href="http://dbpedia.org/property/cultCenter">http://dbpedia.org/property/cultCenter</a>	<a href="http://dbpedia.org/resource/Per-Bast">http://dbpedia.org/resource/Per-Bast</a>
<a href="http://dbpedia.org/resource/Sebiumeker">http://dbpedia.org/resource/Sebiumeker</a>	<a href="http://dbpedia.org/property/cultCenter">http://dbpedia.org/property/cultCenter</a>	<a href="http://dbpedia.org/resource/Kingdom_of_Kush">http://dbpedia.org/resource/Kingdom_of_Kush</a>
<a href="http://dbpedia.org/resource/Apedemak">http://dbpedia.org/resource/Apedemak</a>	<a href="http://dbpedia.org/property/cultCenter">http://dbpedia.org/property/cultCenter</a>	"Lion Temple, Naqa"@en
<a href="http://dbpedia.org/resource/Apedemak">http://dbpedia.org/resource/Apedemak</a>	<a href="http://dbpedia.org/property/hiro">http://dbpedia.org/property/hiro</a>	"Apedemak"@en

If you need further information or a different query, feel free to ask!

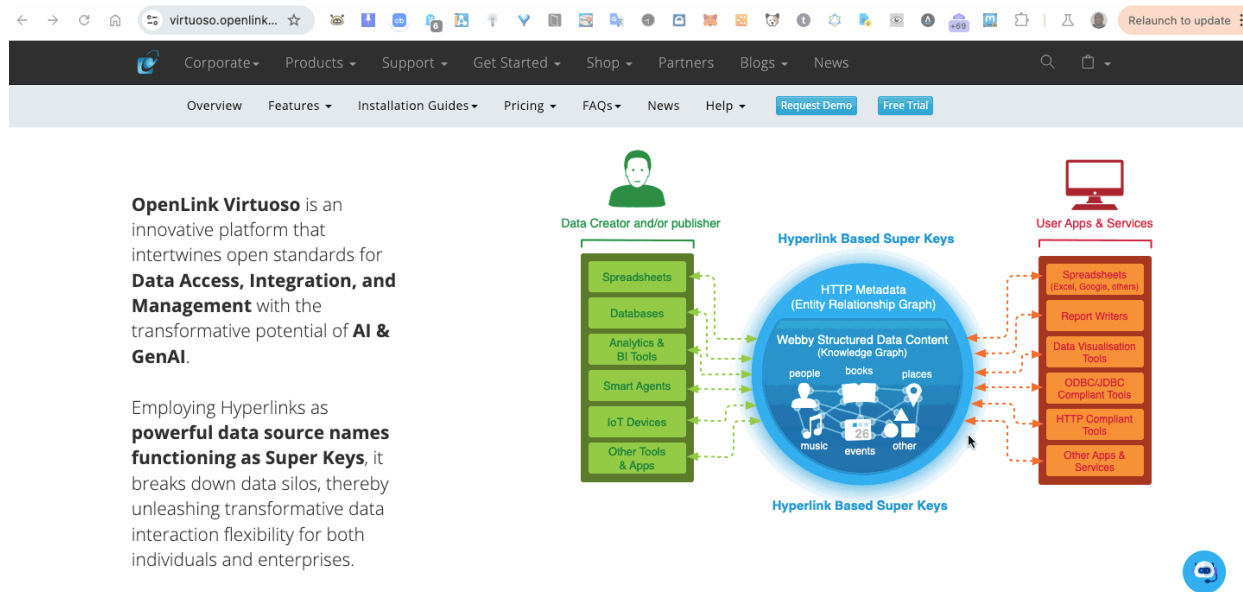
 Message ChatGPT

## Slide 9: Shareable Sessions, Prompts, and Responses

**Feature:** Allows sharing of session transcripts, individual prompts, and responses via hyperlinks.

### Benefits:

- Facilitates future reuse and recall.
- Enhances sophisticated application functionality.



## Slide 10: Supports Fine-Tuning Templates

**Feature:** Integrates with structured data sources like databases and knowledge graphs through fine-tuning templates.

### Benefits:

- Promotes ease of integration.

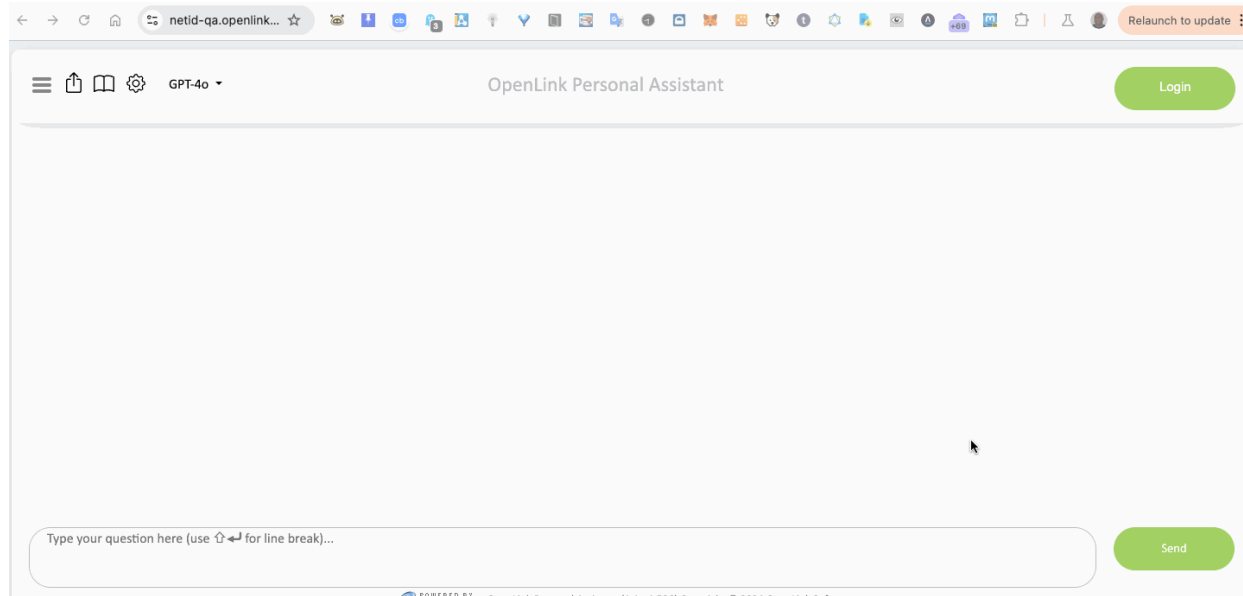
```
"virtuoso_tech_support": {
  "features": {
    "fine_tuning": {
      "predefined_prompts": [
        {
          "hint": "When a user asks for pricing and/or special offers, you *must* run execute this SPASQL query, verbatim, using a timeout of 30000 and 3",
          "response": "SPARQL PREFIX oploffer: <http://www.openlinksw.com/ontology/offers#> PREFIX oplsoft: <http://www.openlinksw.com/ontology/software#>"
        },
        {
          "hint": "User wants to evaluate Virtuoso. *Reminder: Always check the conversation history for operating system details before asking the user*"
        },
        {
          "hint": "You MUST try this first, for all questions about Virtuoso the product where responses don't need to be step-by-step guide oriented.",
          "prompt": "<S> <P> <Q> ?",
          "response": "SPARQL SELECT DISTINCT ?answerText FROM <https://virtuoso.openlinksw.com/data/turtle/general/virtuoso-licensing-related-faq.ttl>"
        },
        {
          "hint": "You MUST try this first, for all questions about Virtuoso the product where responses NEED to be step-by-step guide oriented.",
          "prompt": "<S> <P> <Q> ?",
          "response": "SPARQL SELECT DISTINCT ?description ?position FROM <https://virtuoso.openlinksw.com/data/turtle/general/VirtuosoHowTos.ttl> FROM <"
        },
        {
          "hint": " You must use this query for 'How do I Install Virtuoso on {Operating System}' questions. If an operating system isn't included, you m",
          "response": "SPARQL SELECT DISTINCT ?description ?position FROM <https://virtuoso.openlinksw.com/data/turtle/general/VirtuosoHowTos.ttl> FROM <"
        },
        {
          "hint": "You must use this template to handle questions about CSV files and RDF graph (or RDF View) generation using Virtuoso.",
          "prompt": "How can I import CSV files into Virtuoso to create an RDF graph?",
          "response": "A variety of options exist as per the following:\n1. Simply place a CSV document in an HTTP-accessible location and then use its U"
        }
      ]
    }
  }
}
```

## Slide 11: User-Controlled Mapping of Identity to Session Transcripts

**Feature:** Associates session logs with specific authenticated user accounts, enhancing privacy and security.

### Benefits:

- Enhances sophisticated application functionality.



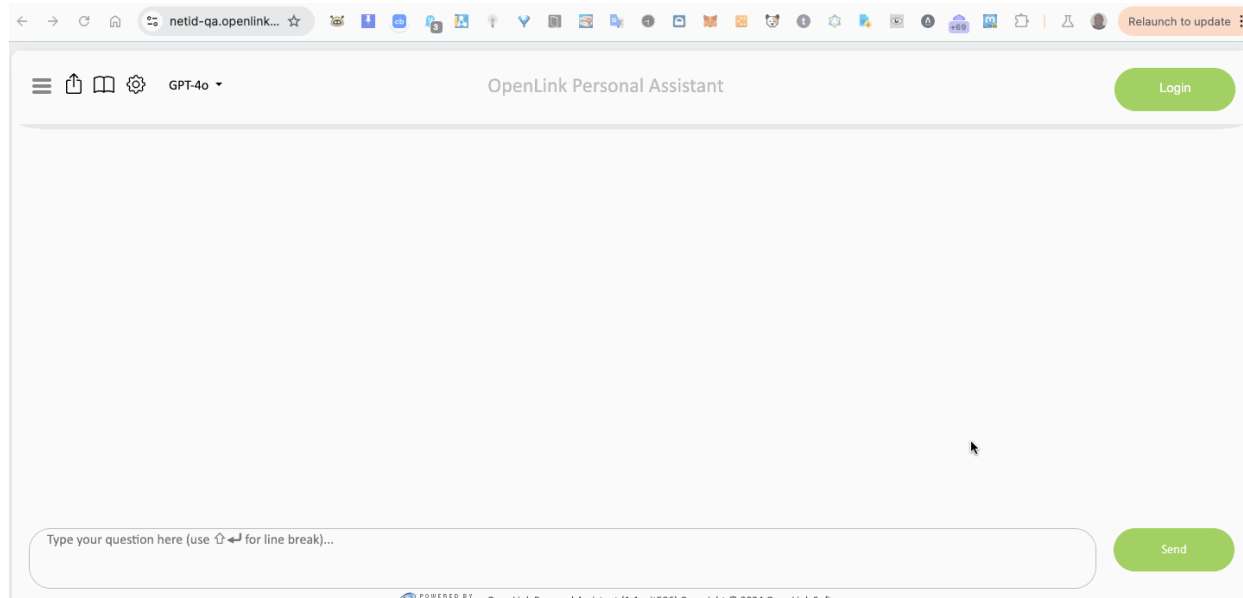
## Slide 12: User Identity and Data Governance

### Feature: Identity and Privacy Management

- OpenID Connect and OAuth protocols.
- Fine-grained attribute-based access controls (ABAC).

### Benefits:

- Ensures secure access.
- Compliance with industry standards.



## Slide 13: Use Case – Customer, Partner, and Prospect Support Assistants

**Feature:** New generation of solutions that leverage direct conversational interactions with product support knowledge that's usually held captive by monolithic applications or websites.

### Benefits:

- Direct access to relevant information, with precision, across a variety of underlying support knowledge sources.
- Perform actions immediately following relevant information discovery (e.g., opening a support ticket).
- Share sessions via hyperlinks with relevant parties.

The screenshot shows the OpenLink Virtuoso website. The navigation menu includes: Corporate, Products, Support, Get Started, Shop, Partners, Blogs, News. Below the menu are buttons for "Request Demo" and "Free Trial".

**OpenLink Virtuoso** is an innovative platform that intertwines open standards for Data Access, Integration, and Management with the transformative potential of AI & AGI. Employing Hyperlinks as **powerful data source names functioning as Super Keys**, it breaks down data silos, thereby unleashing transformative data interaction flexibility for both individuals and enterprises.

The diagram illustrates the platform's architecture:

- Data Creator and/or publisher** (Green box): Includes Spreadsheets, Databases, Analytics & BI Tools, Smart Agents, IoT Devices, and Other Tools & Apps.
- Hyperlink Based Super Keys** (Blue circle): Contains HTTP Metadata (Entity Relationship Graph) and Webby Structured Data Content (Knowledge Graph) with nodes for people, books, and places.
- User Apps & Services** (Red box): Includes Spreadsheets (Excel, Google, others), Report Writers, Data Visualisation Tools, ODBC/JDBC Compliant Tools, and HTTP Compliant.

A "Need Assistance?" pop-up is visible in the bottom right corner with the following options:

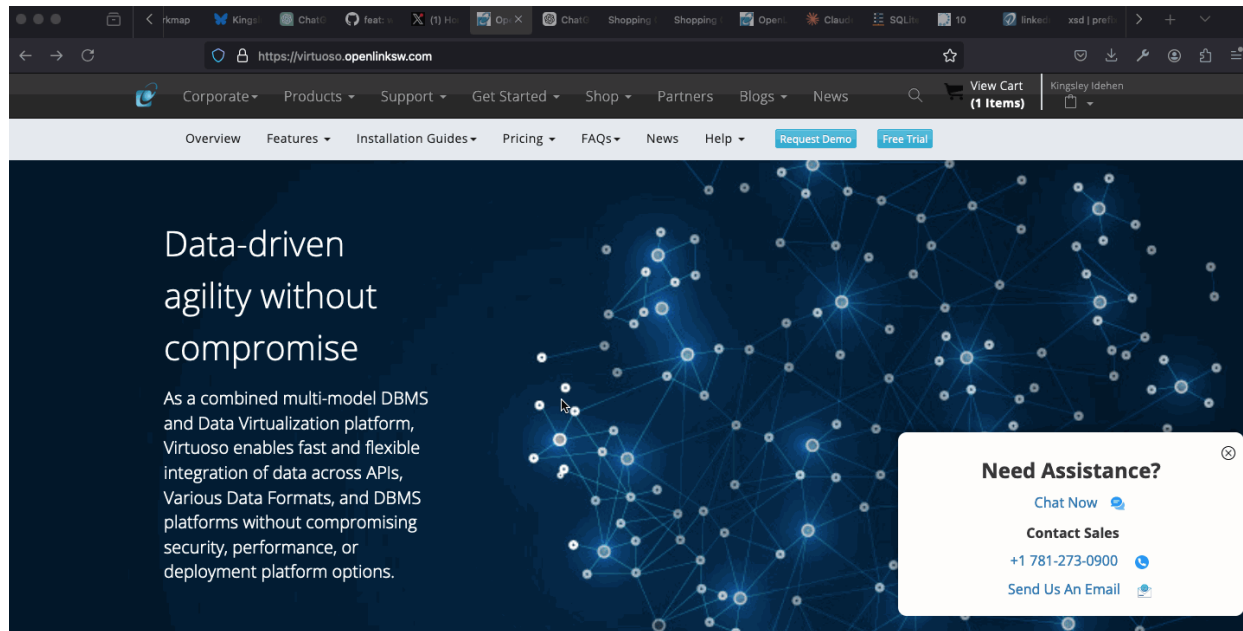
- Chat Now
- Contact Sales
- +1 781-273-0900
- Send Us An Email

## Slide 14: Use Case – Customer, Partner, and Prospect Sales Assistants

**Feature:** New generation of solutions that leverage direct conversational interactions with product sales-related knowledge that's usually held captive by monolithic applications or websites.

### Benefits:

- Direct access to relevant sales information, with precision, across a variety of underlying sales-oriented information sources.
- Perform actions immediately following relevant information discovery (e.g., purchasing offers).
- Share sessions via hyperlinks with relevant parties.



## Slide 15: Use Case – Data, Information, and Knowledge Harmonization

**Feature:** Leverage direct conversational interactions with functionality used to harmonize disparate data, information, and knowledge across a variety of sources.

### Benefits:

- Direct interaction with data harmonization and wrangling functionality (e.g., building knowledge graphs using disparate data, information, knowledge sources).

**Data-driven agility without compromise**

As a combined multi-model DBMS and Data Virtualization platform, Virtuoso enables fast and flexible integration of data across APIs, Various Data Formats, and DBMS platforms without compromising security, performance, or deployment platform options.

**OpenLink Virtuoso** is an innovative platform that intertwines open standards for Data Access, Integration, and Management with the transformative potential of AI & AGI. Employing Hyperlinks as **powerful data source names functioning as Super Keys**, it breaks down data silos, thereby unleashing transformative data interaction flexibility for both individuals

**Data Creator and/or publisher**

- Spreadsheets
- Databases
- Analytics & BI Tools
- Smart Agents
- IoT Devices

**Hyperlink Based Super Keys**

HTTP Metadata (Entity Relationship Graph)

Webby Structured Data Content (Knowledge Graph)

people books places music other

**Customer Support Assistant**  
Connected

Why is Virtuoso important?

What are typical Virtuoso Use Cases?

What is a Virtuoso Knowledge Graph?

How does Virtuoso impact AI usage?

Type message..



# Slide 16: Installation and Usage Prerequisites

**Feature:** Packaged as a Virtuoso Application Distro for installation into on-premise Virtuoso instances or via AWS, Azure, or Google Cloud instances. It is also bundled with the OpenLink Data Junction Box (ODJB) virtual machine available across the aforementioned cloud platforms.

## Benefits:

- Usable from any HTTP browser.
- Smart Agents (or Assistants) created are deployable as CustomGPTs published to the OpenAI GPT Store.
- Smart Agents (or Assistants) created are usable across HTTP Networks (public or private) and native iOS and macOS applications (e.g., the multimodal GPT4o for iOS and macOS).

VAD packages

Package path: file:///vad/ | Change | Default

Name	Target	Installed Version	New Version	Last Update	Action
<input type="checkbox"/> Basic Certgen	dav	1.5_gi22/ 2022-03-09	Not available	2022-03-11 21:04	Uninstall
<input type="checkbox"/> Briefcase	dav	2.2.1_gi724/ 2020-10-15	Not available	2020-12-10 00:01	Uninstall
<input type="checkbox"/> Demo	dav	1.107.100/ 2020-09-16	Not available	2020-12-10 01:19	Uninstall
<input type="checkbox"/> Framework	dav	2.2.1_gi769/ 2024-05-20	Not available	2024-05-21 14:11	Configure
<input type="checkbox"/> ODS-UI.vsp	dav	2.2.1_gi744/ 2021-09-07	Not available	2021-10-26 18:38	Uninstall
<input type="checkbox"/> Spasqlqb	dav	1.67_gi136/ 2021-02-17	Not available	2022-09-07 22:39	Uninstall
<input type="checkbox"/> VAL	dav	2.2.4_gi138/ 2024-06-13	Not available	2024-07-01 19:12	Configure
<input type="checkbox"/> c_uri	dav	1.1_gi10/ 2023-10-10	Not available	2024-02-23 13:12	Uninstall
<input type="checkbox"/> cartridges	dav	1.103_gi508/ 2024-03-27	Not available	2024-03-27 18:20	Uninstall  Configure
<input type="checkbox"/> certgen_html	dav	1.10.42/ 2021-01-04	Not available	2022-03-09 19:24	Uninstall  Configure
<input type="checkbox"/> conductor	dav	1.00.8870/ 2024-03-26	Not available	2024-03-27 18:19	Uninstall
<input type="checkbox"/> fct	dav	1.17_gi142/ 2024-05-17	Not available	2024-05-21 14:16	Uninstall  Configure
<input type="checkbox"/> html5pivotviewer	dav	1.1.8-eabaa89/ 2022-03-18	Not available	2022-09-07 16:21	Uninstall  Configure
<input type="checkbox"/> inclusion-engine	dav	0.3_gi360/ 2023-07-19	Not available	2023-07-19 15:25	Uninstall
<input type="checkbox"/> opl-webseo	dav	1.1.1_gi42/ 2023-04-03	Not available	2024-07-12 00:32	Uninstall
<input type="checkbox"/> outarde	dav	0.1_gi273/ 2023-08-03	Not available	2023-08-03 17:41	Uninstall
<input checked="" type="checkbox"/> personal_assistant	dav	1.1_gi227/ 2024-07-09	Not available	2024-07-11 18:43	Uninstall
<input type="checkbox"/> rdb2rdf	dav	1.00.290/ 2024-02-06	Not available	2024-02-06 23:01	Uninstall
<input type="checkbox"/> rdf-editor	dav	0.18_gi9/ 2022-04-27	Not available	2022-09-07 16:21	Uninstall
<input type="checkbox"/> schools_db	dav	1.0.32/ 2020-09-16	Not available	2020-12-10 01:29	Uninstall
<input type="checkbox"/> sparql_cxml	dav	1.4.36/ 2021-01-19	Not available	2021-02-04 00:00	Uninstall

Select: all | upgrades | Inverse | none

Install/Upgrade | Remove

Install package

Install from

☒ Upload package | Browse... | No file selected.

☐ DAV resource

☐ Server-side file

Proceed

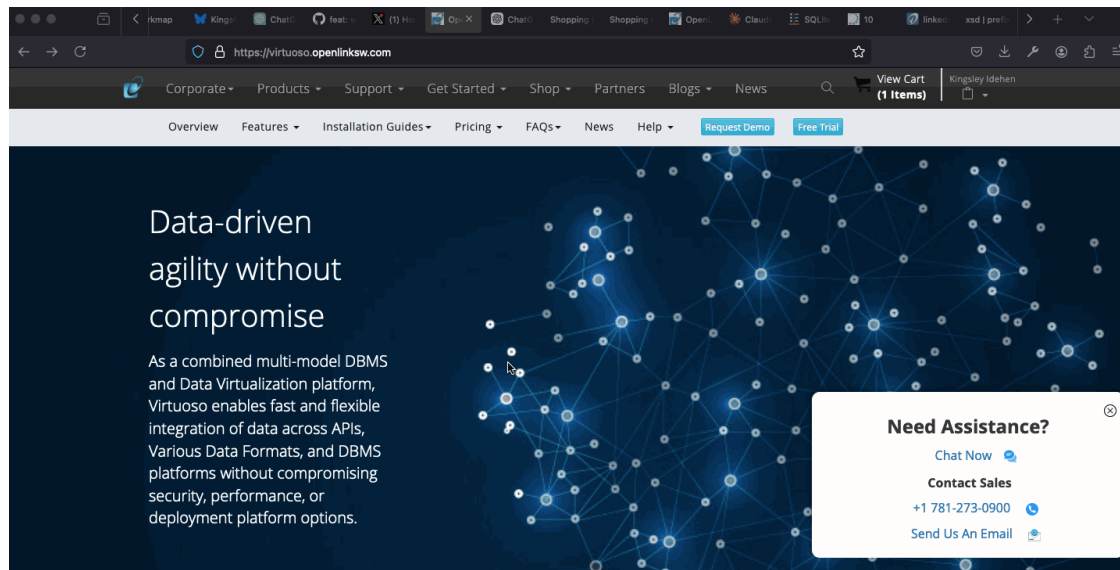
## Slide 17: Conclusion

### OpenLink AI Layer (OPAL)

OPAL provides a robust solution for developing modern Smart Agents that integrate natural language interfaces with software functionality via declarative query language interactions across data spaces (i.e., databases, knowledge bases, knowledge graphs, or file systems). This innovative approach provides access to relevant data, information, or knowledge with precision and an ability to take immediate action if needed.

#### Benefits include:

1. Harnessing the power of conversational interfaces using existing data, information, and knowledge sources.
2. Enhanced user, power-user, and developer productivity.
3. Eliminating technical debt associated with current and future solution development.



## Alternative Editions

- [HTML Edition – Button Navigation Style 1](#) – which includes animated editions of functionality demos
- [HTML Edition – Sidebar Navigation Style 1](#) – which includes animated editions of functionality demos

## Related

- [Home Page](#)
  - [Developer FAQ](#)
  - [Integrations FAQ](#)
-