

GEMSTONE

Government Enterprise Modeling and Simulation
Trusted Operations Networked Ecosystem

Case Number: AFRL-2026-2141 Approved for Public Release; Distribution Unlimited.
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THE PROBLEM



- M&S and Digital Engineering efforts are slow due to difficulty accessing data and tools
  - 40-80% of a study is gathering and wrangling data
- The Community is federated, diverse, and crosses many organizations
- Heterogeneous IT and Security Standards

Results in:

- Data NOT shared or reused
- Tools and work duplicated
- Difficulty discovering and accessing M&S and Engineering tools
- Disparate access to compute resources
- Quality and speed of work is reduced

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THE SOLUTION

GEMSTONE is an open technology stack that empowers users of new or existing environments to build, publish, discover, and integrate tools, data, and compute across organizations.

REUSE INSTEAD OF REBUILD

BRING YOUR OWN ENVIRONMENT

CONTROLLED COLLABORATION ACROSS ORGANIZATIONS AND NETWORK BOUNDARIES



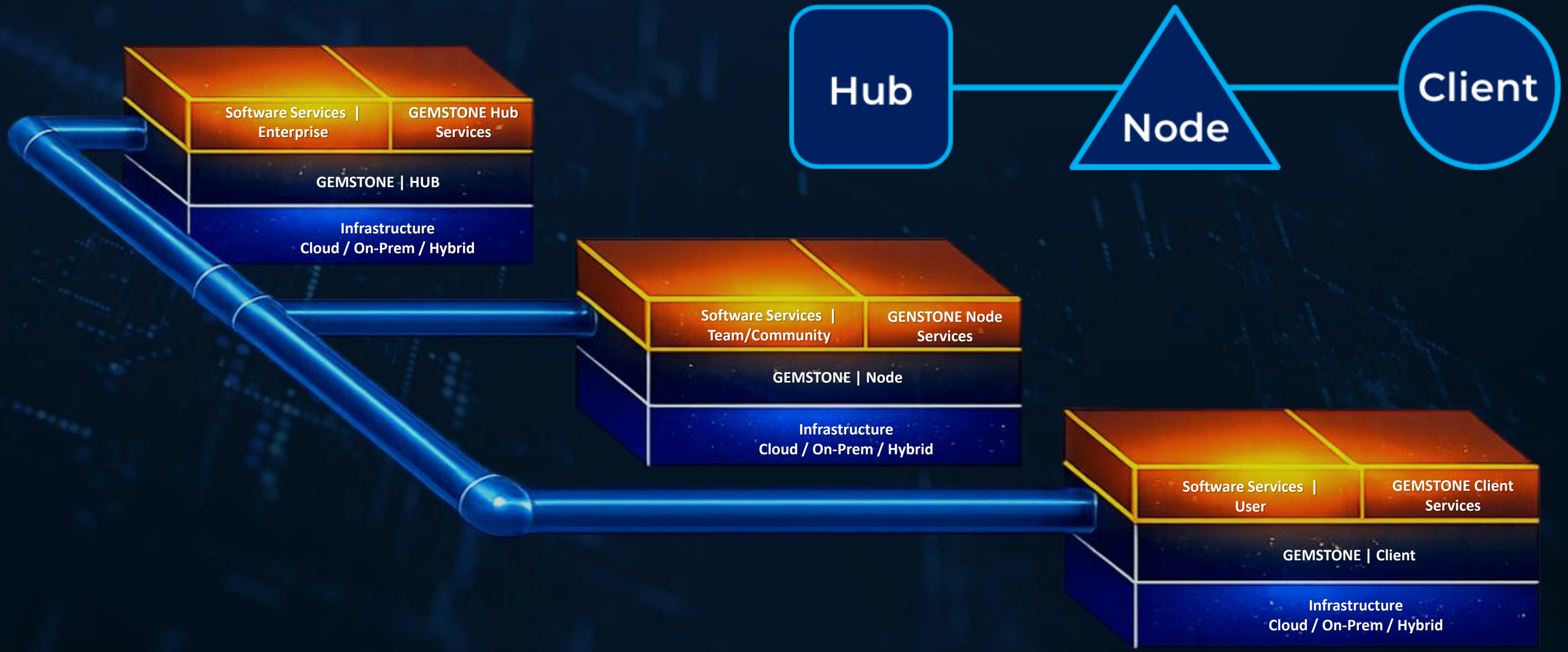
SECURITY-FIRST POSTURE

LOWER ADMIN FRICTION FOR TOOL AVAILABILITY

EXTENSIBLE ARCHITECTURE THAT IS OPEN-SOURCED OWNED BY THE GOVERNMENT

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THE ARCHITECTURE



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THE ARCHITECTURE



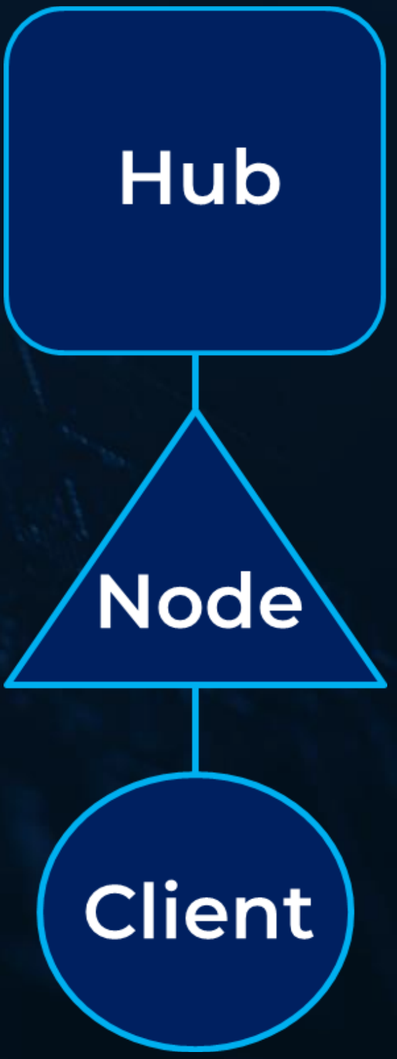
Centralized M&S services to streamline operations, reduce costs, and strengthen ecosystem connectivity.



Community-driven M&S backbones delivering mission-specific services through the GEMSTONE Hub.

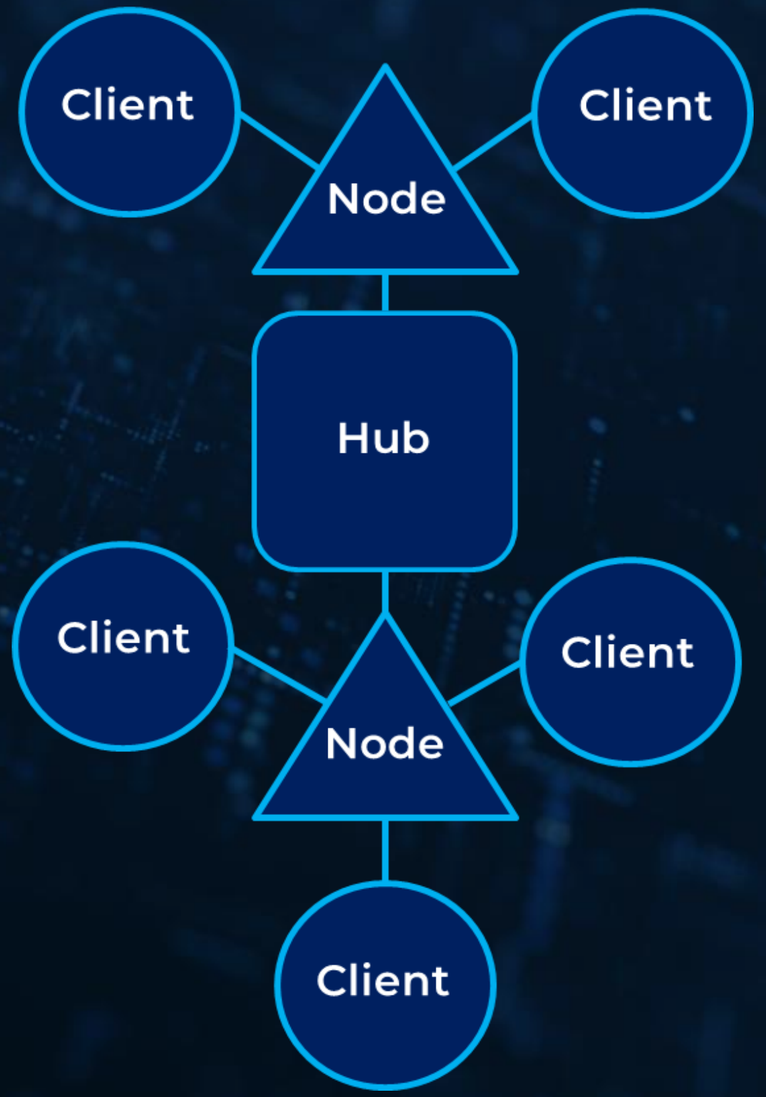


Tools and compute that enable digital artifact workflows through a GEMSTONE Node.



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THE M&S MATRIX

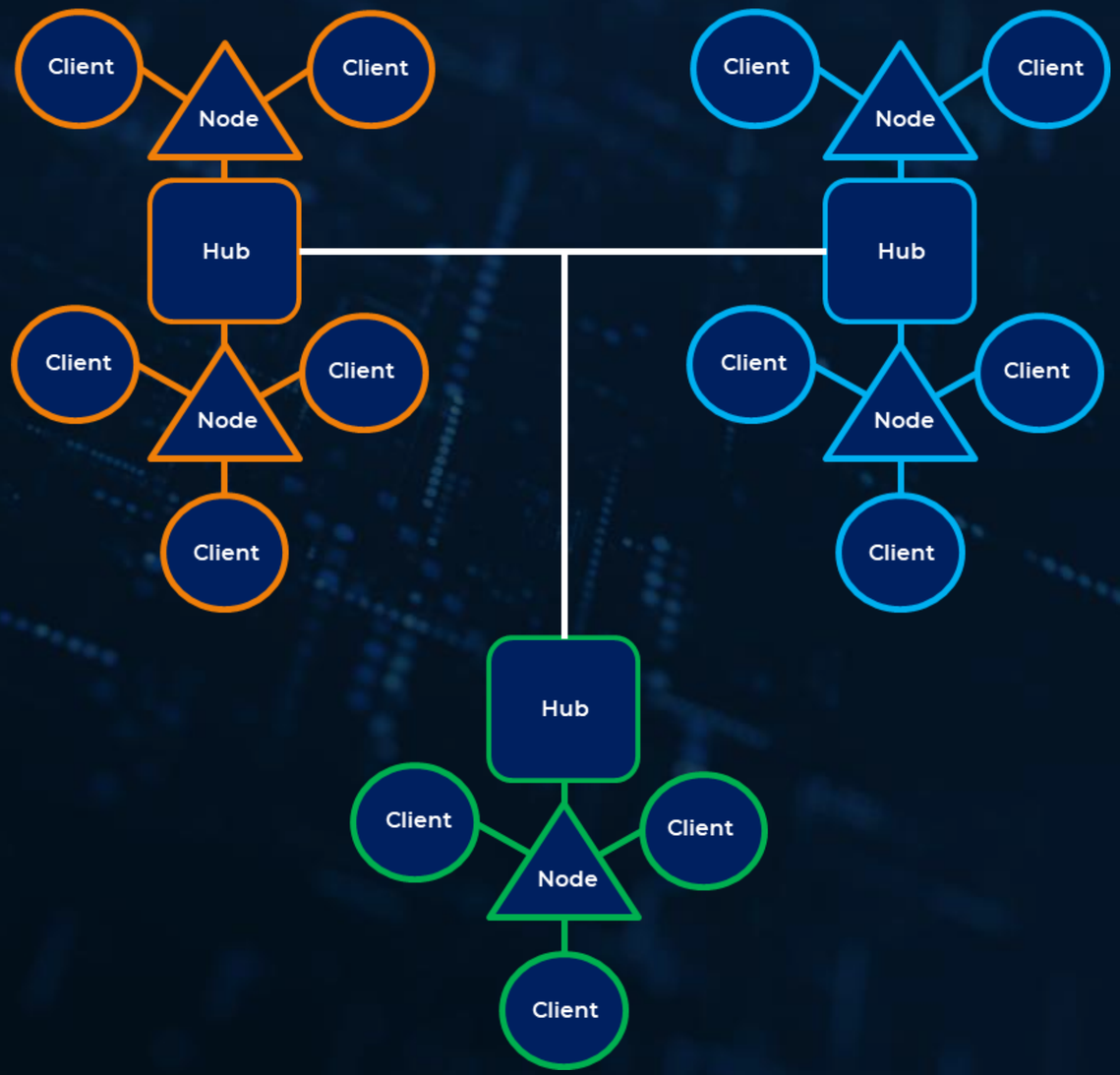


The M&S Matrix is a GEMSTONE-enabled multi-environment system.

- **Mission-tailored M&S/DE nodes**
- **Example DAF nodes: AFRL DLE and DTO LaunchPad**
- **Users can connect clients to one or more nodes based on mission needs**

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THE M&S ECOSYSTEM



- GEMSTONE connects DoW and industry through a shared ecosystem
- Organizations can securely connect, exchange, and share data
- Enables cross-organizational workflows and digital supply chains.
- Scales as organizations connect to the digital backbone

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THE M&S ECOSYSTEM

Unified Environments

Limits adoption by forcing into one environment

Proprietary data hard to share across boundaries

Slow to integrate new or proprietary tools

Data transfer between tools is difficult and often depends on third party software



GEMSTONE Hub-Node Architecture

Enables scalable adoption by tailoring to existing environments

Supports protection of controlled data, keeping it in an organization's network boundary

Provides marketplace for integrating new or custom tools

Includes built-in CI/CD-style data transformation across tools

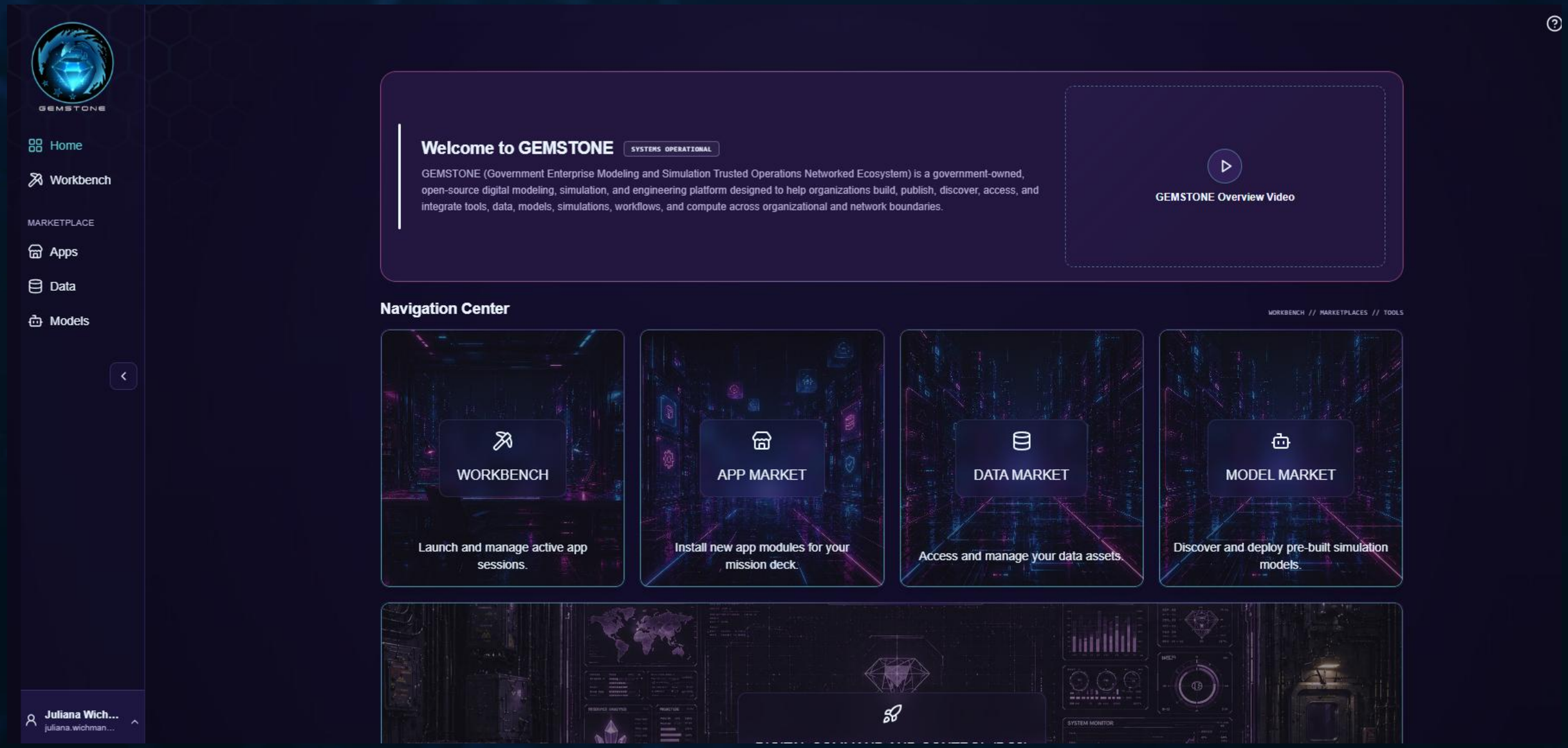
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THE DIFFERENTIATORS

Government Owned Open Source	Air Gap Deployment	Multiple security layers, including IL7	Secure libraries for application development
Distribution pipeline for new capabilities	Custom applications approved within 5 minutes	Development and deployment of tailored environments in 1 day	Unified plugin system
Approved & hardened Python libraries at IL 5 and above	Deploy models and simulations as API consumable web services	Customization and expansion via software development kit	Platform enables distributed simulations

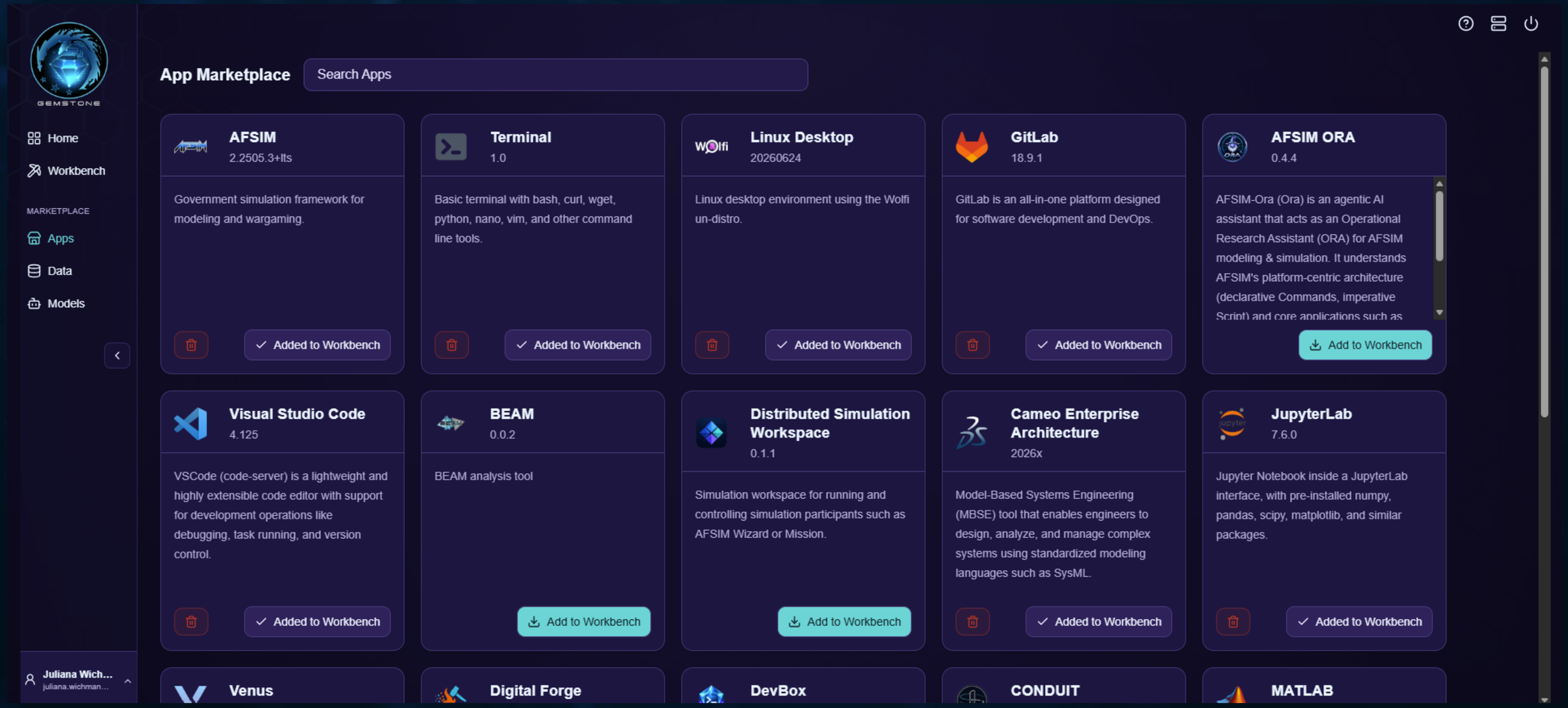
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THE HOME PAGE



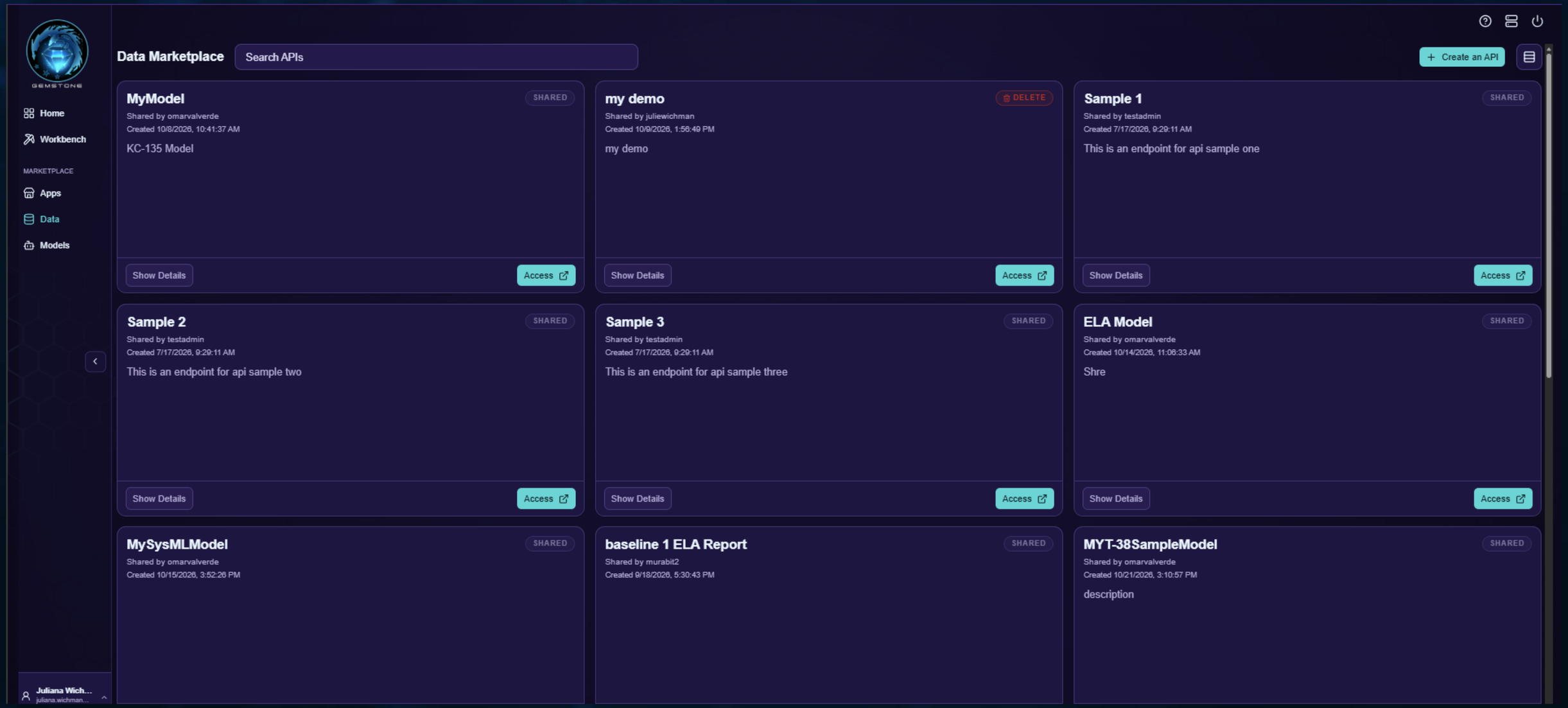
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THE APP MARKETPLACE



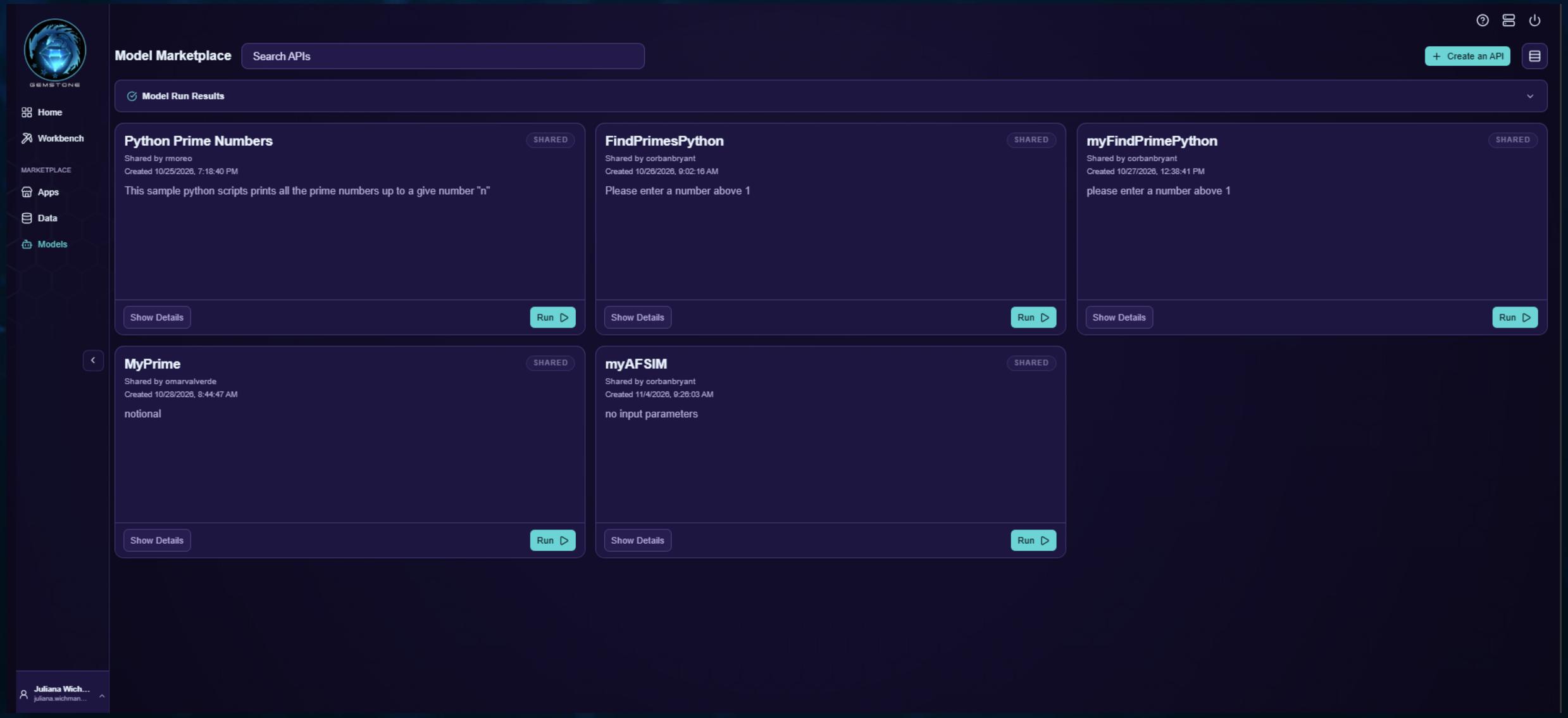
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THE DATA MARKETPLACE



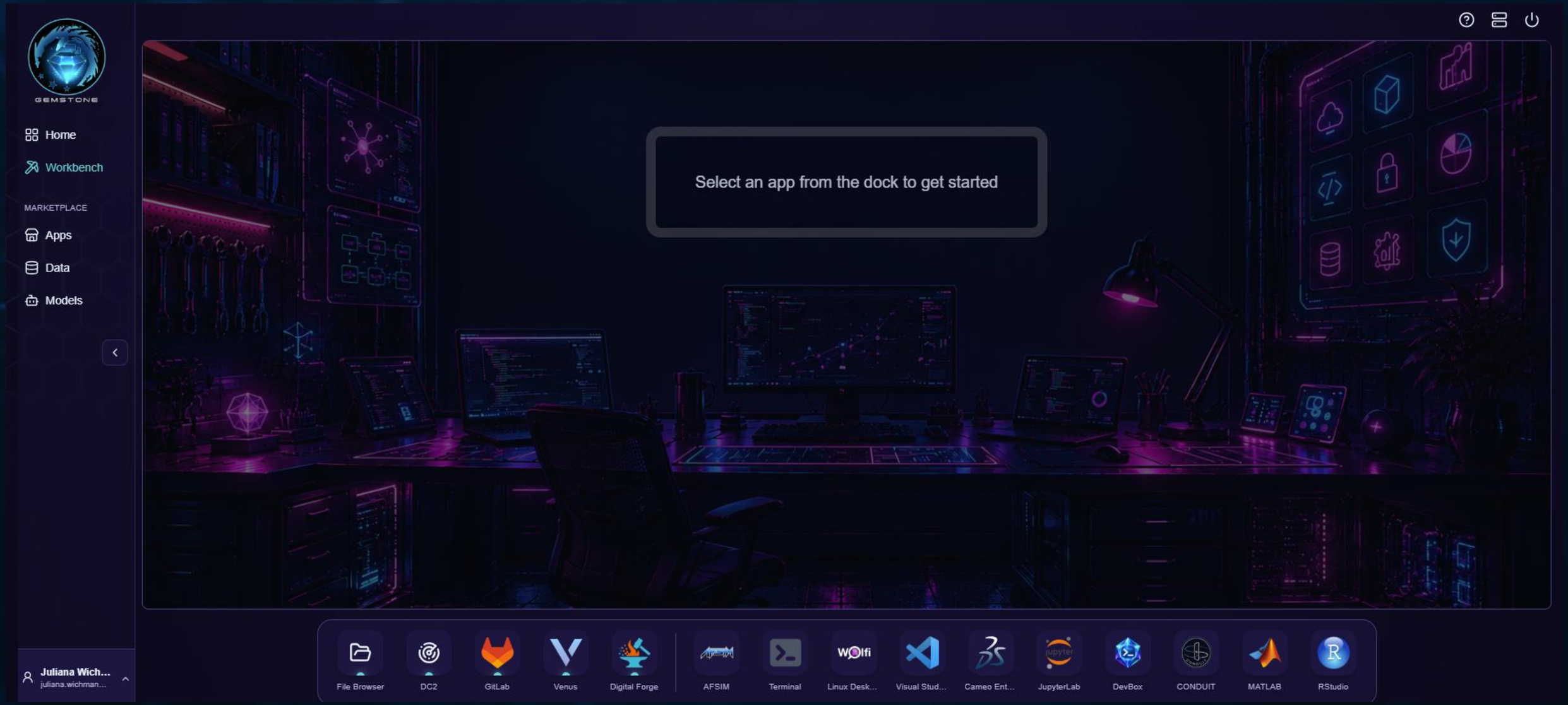
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THE MODEL MARKETPLACE



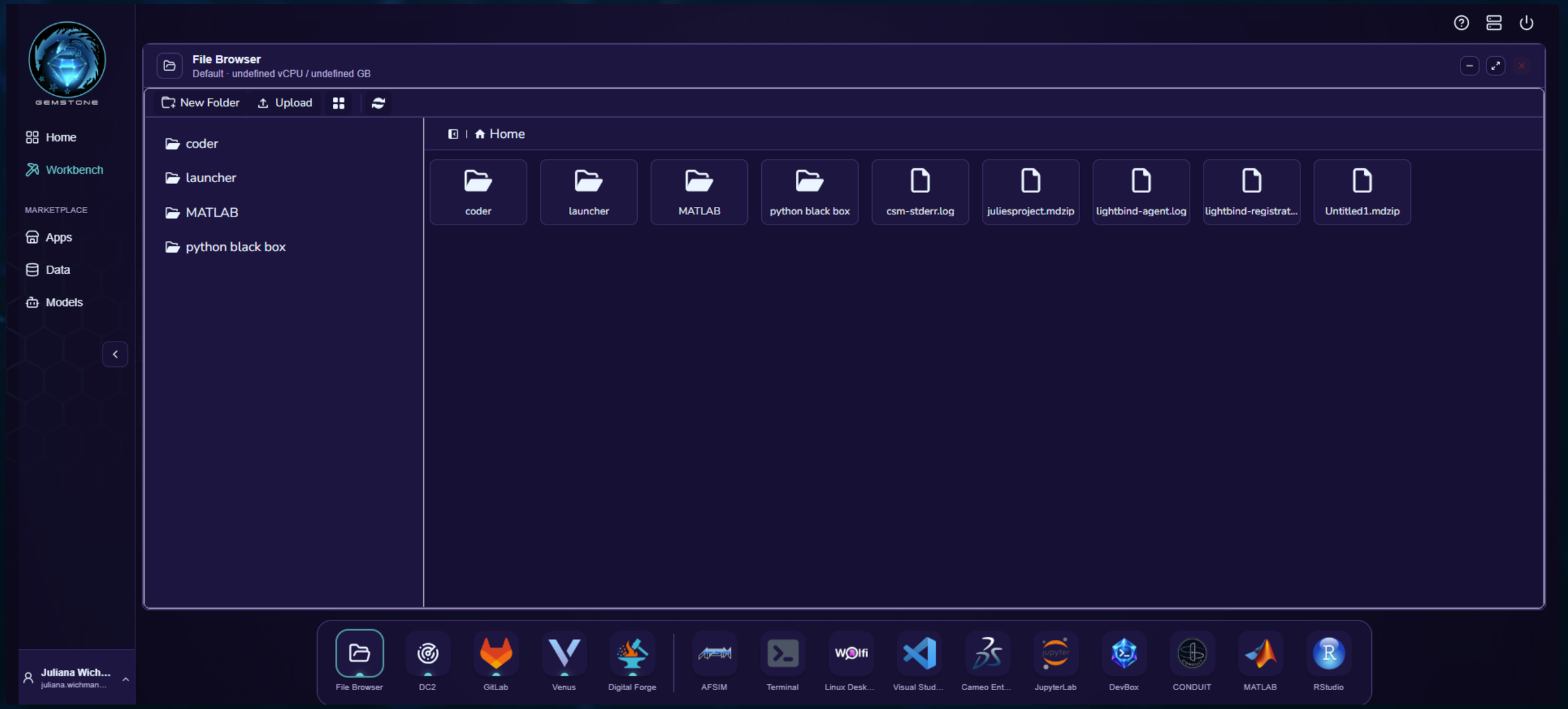
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THE WORKBENCH



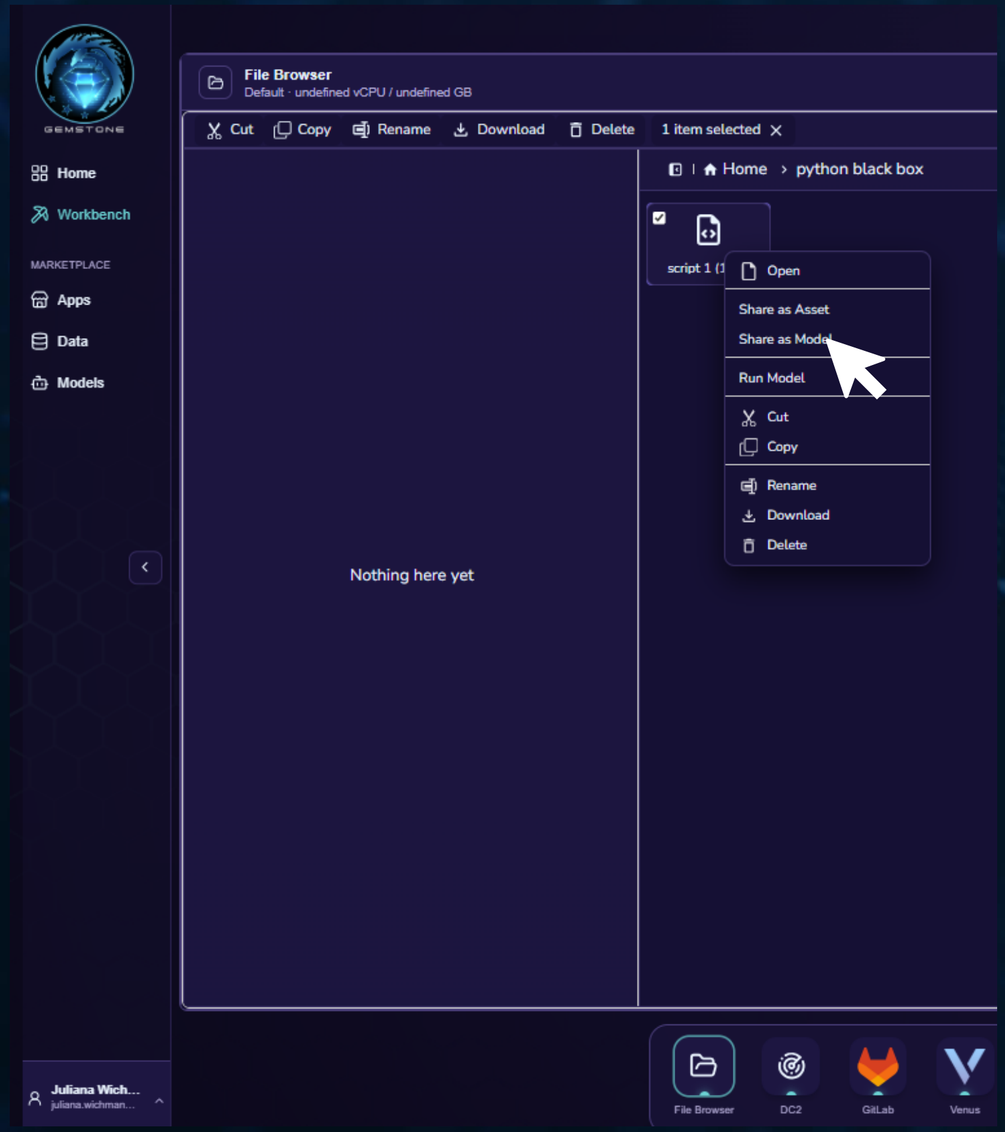
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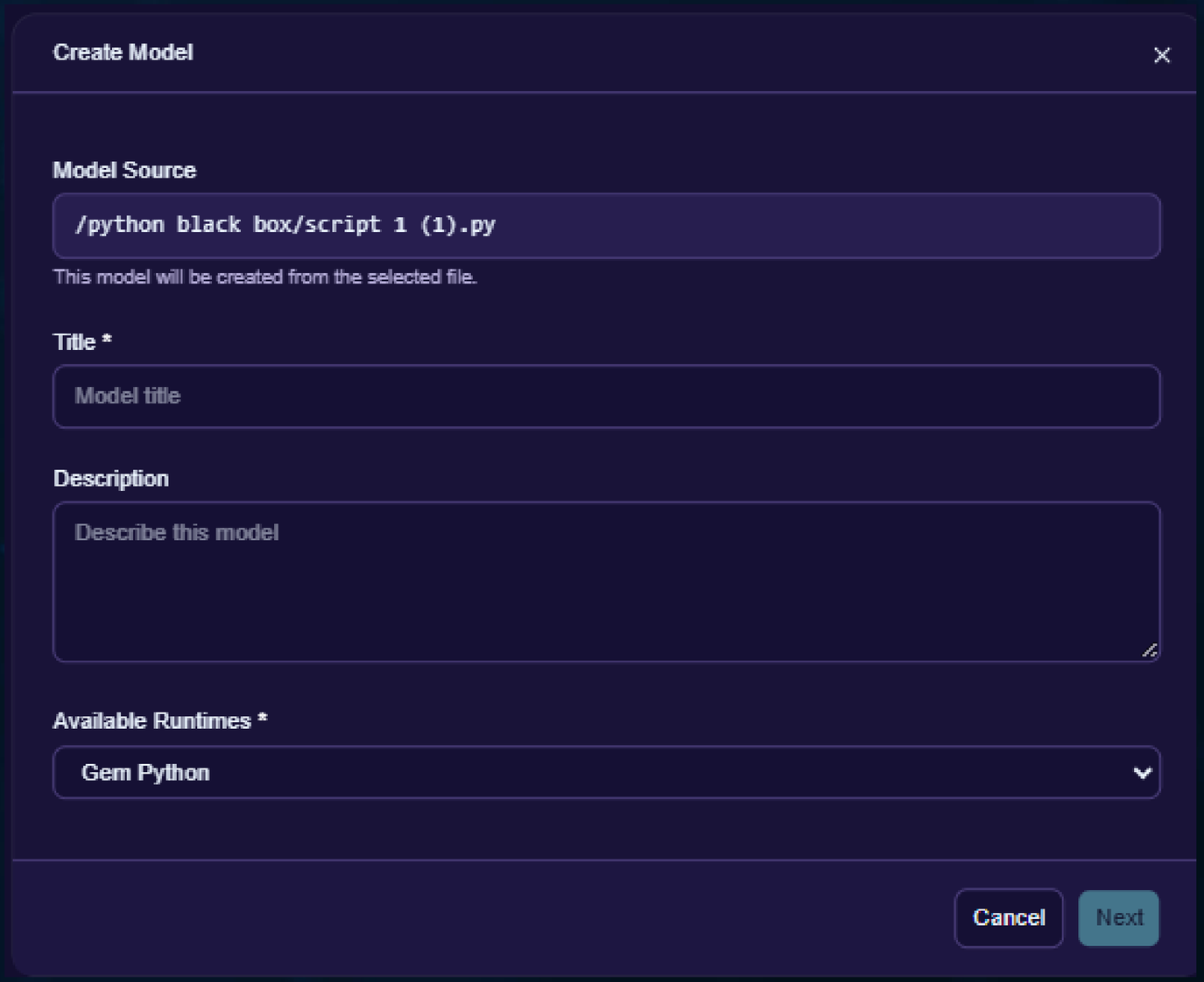
THE FILE BROWSER



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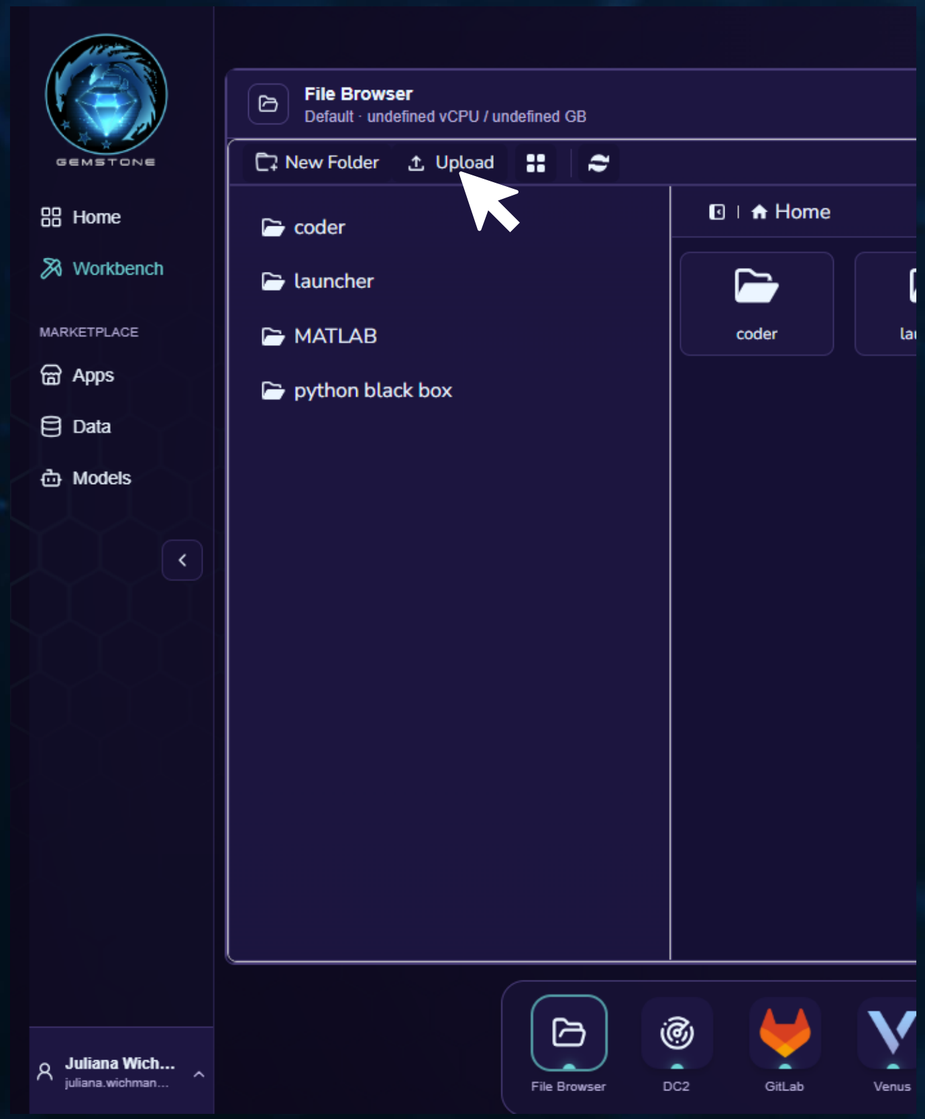
SHARING A MODEL

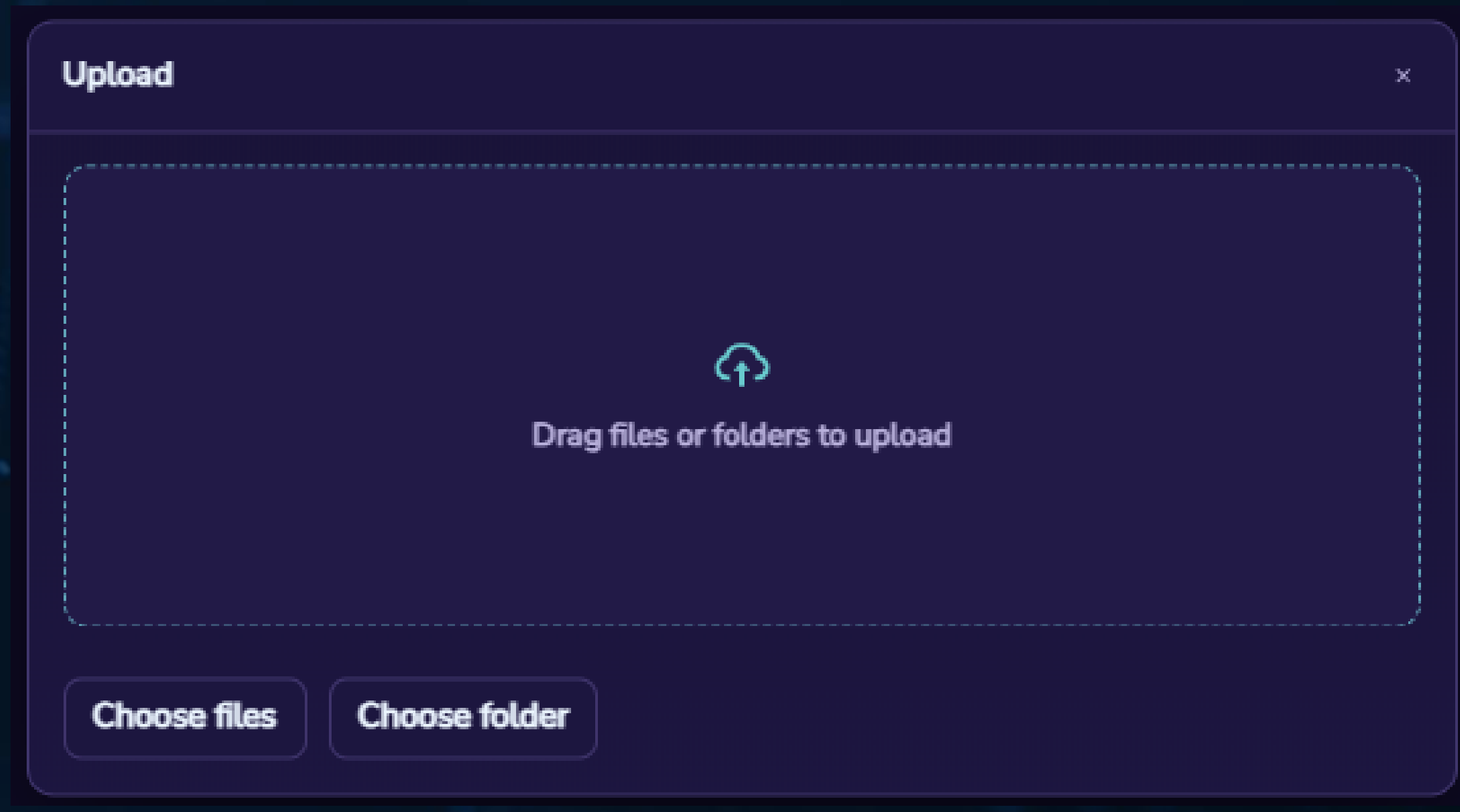




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UPLOADING A FILE

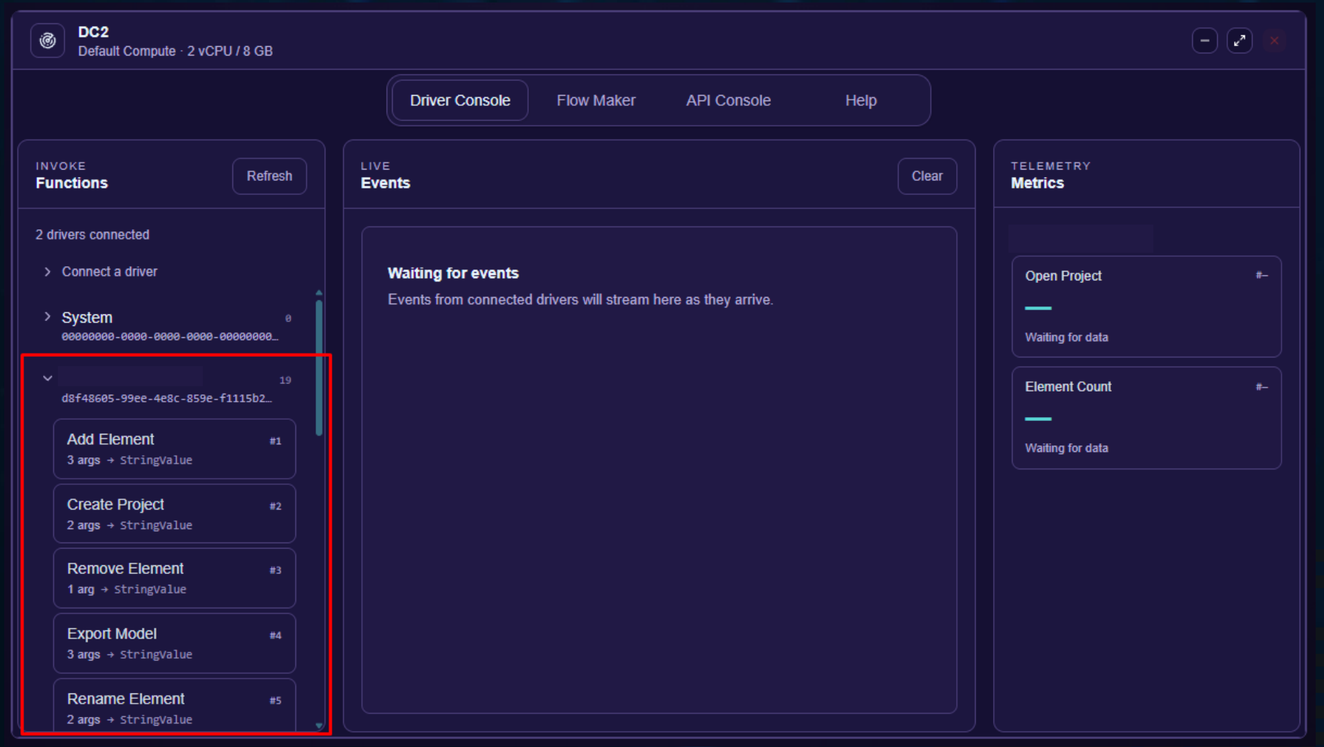




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DIGITAL COMMAND AND CONTROL (DC2)

Command your digital enterprise to execute the mission



SDK that wraps and exposes DC2 APIs

Low-code/no-code workflow engine for propagating data and commands across tools

Shared API layer for tool integration and interoperability

Programmatic access to DC2 commands and exposed apps, models, or data

Integrate DC2 capabilities directly into custom applications

Build extensions for any tool using the programming language of your choice

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DevBox

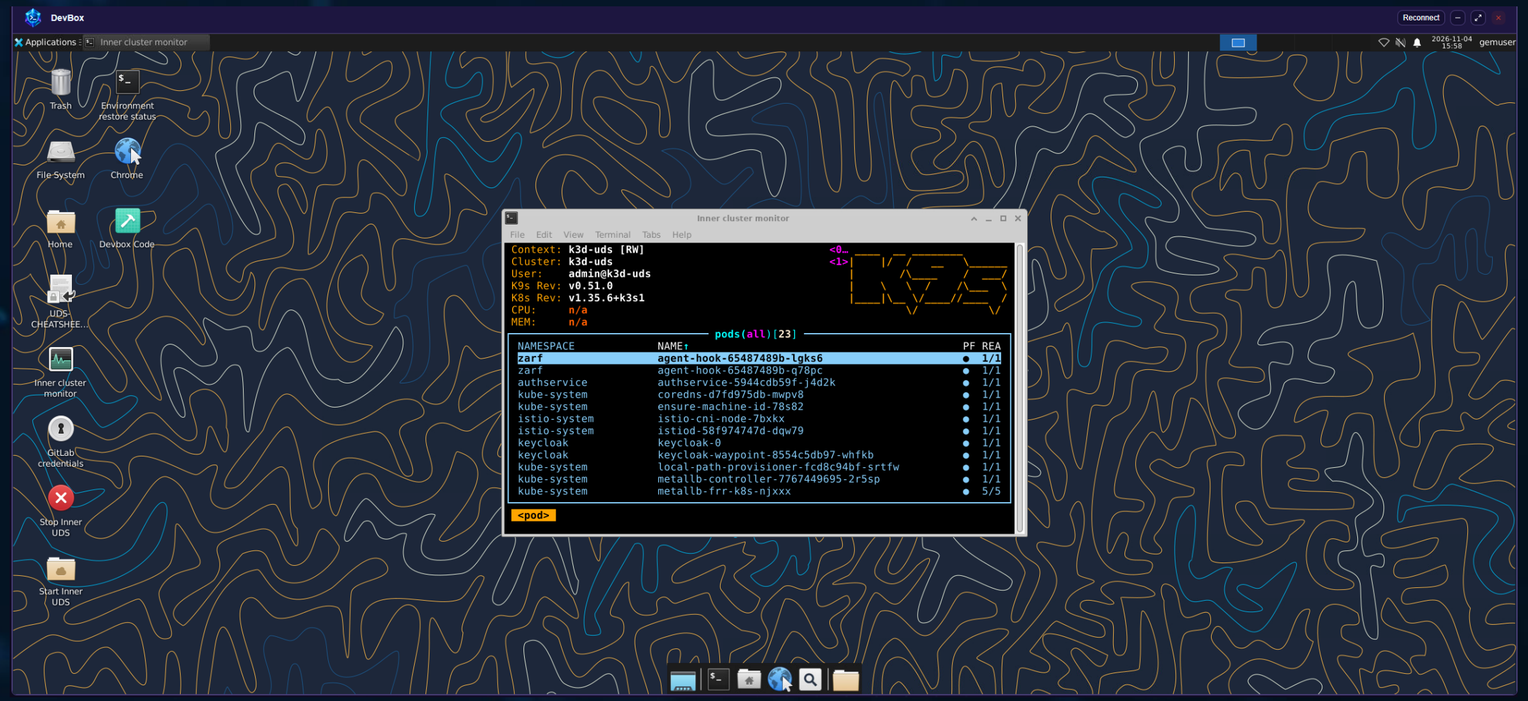
Develop applications securely within your digital enterprise

Reduces cyber risk by isolating development in temporary virtual machines

Retains code and development artifacts in between sessions

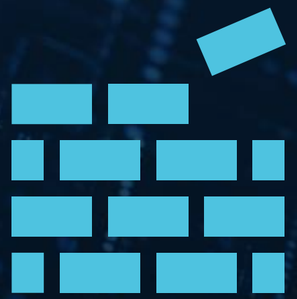
Provides access to shared GEMSTONE files, models, and data

Supports common programming languages in a standardized, ready-to-use environment



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UPCOMING FEATURES

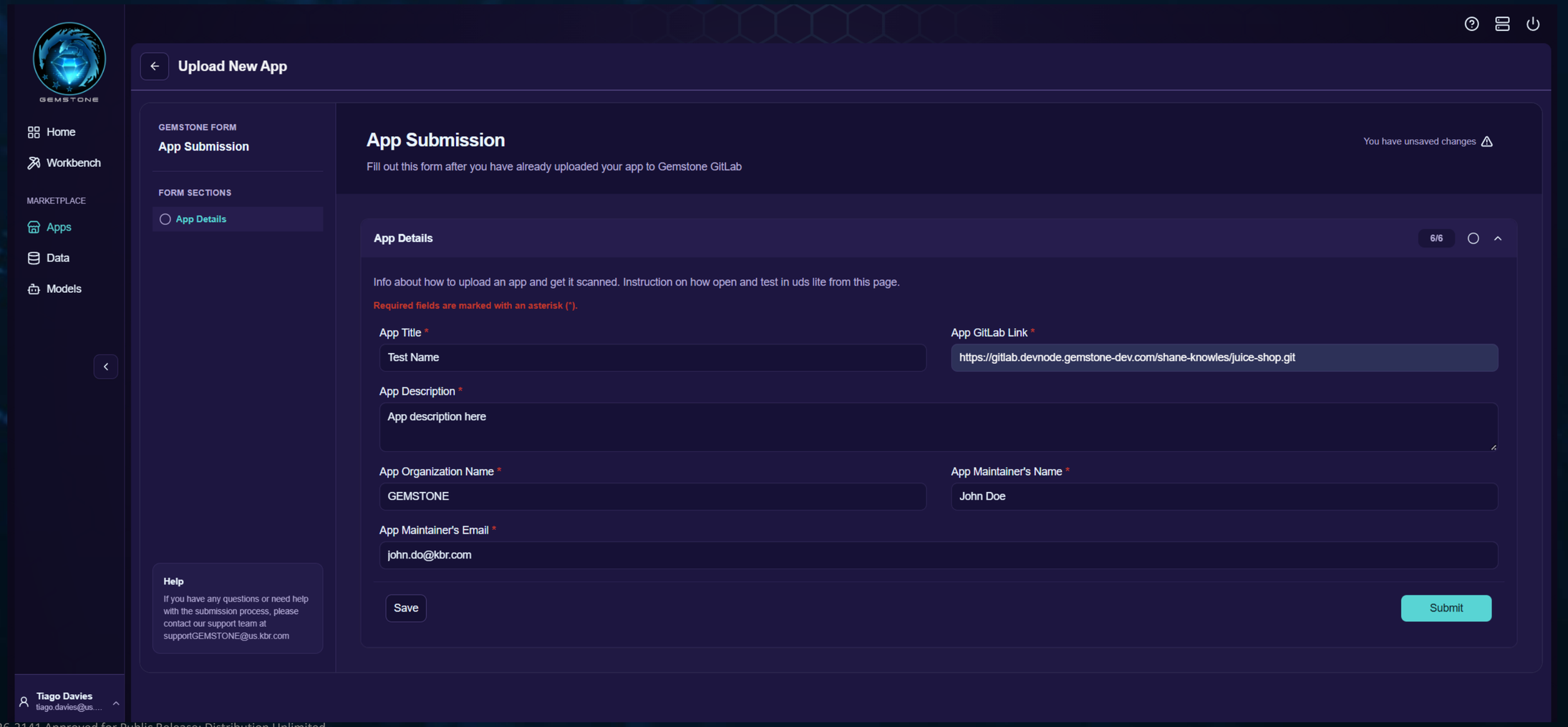


Currently, we are live on IL5, with IL6 and IL7 coming soon!

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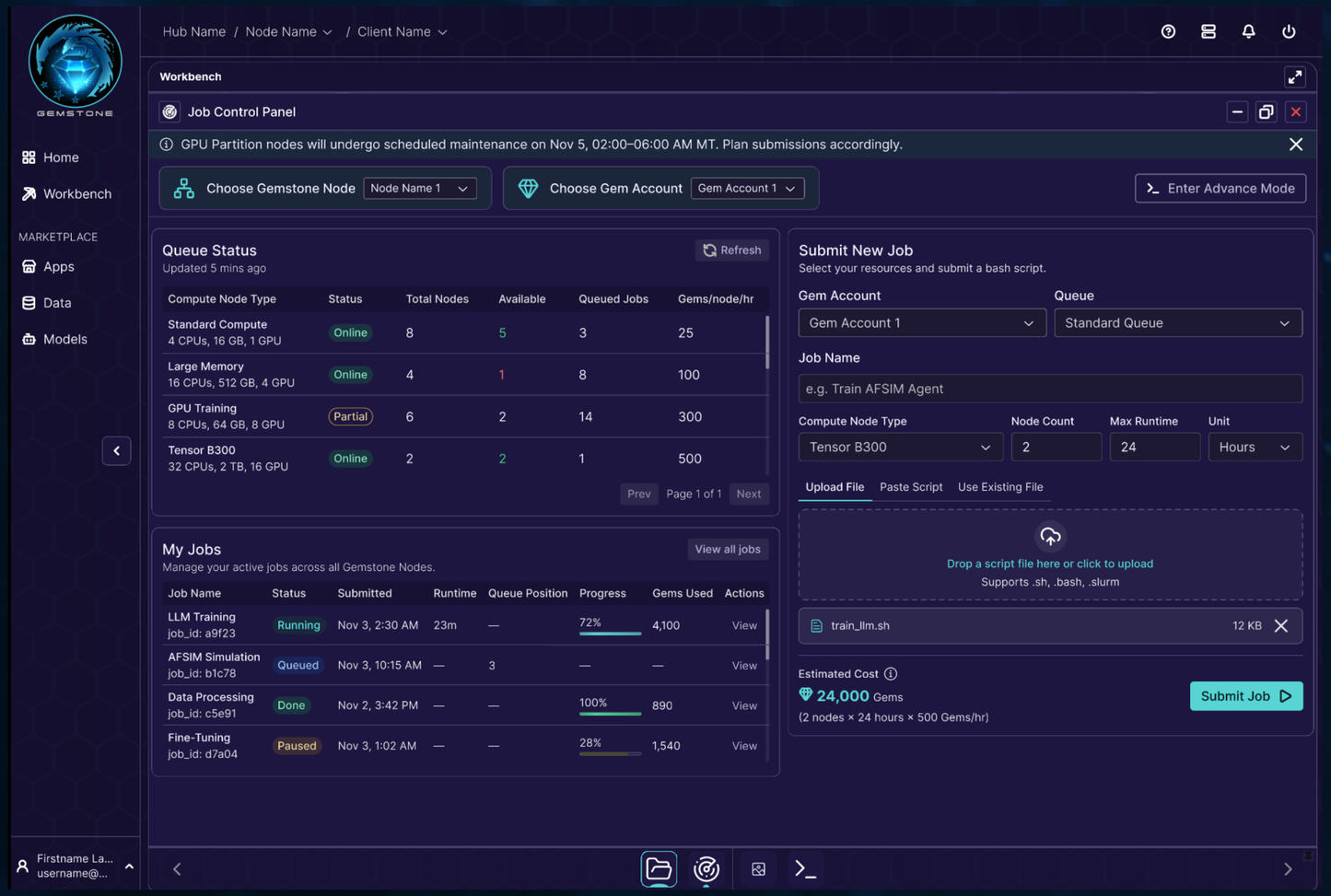
Self-service Add an App to the Marketplace

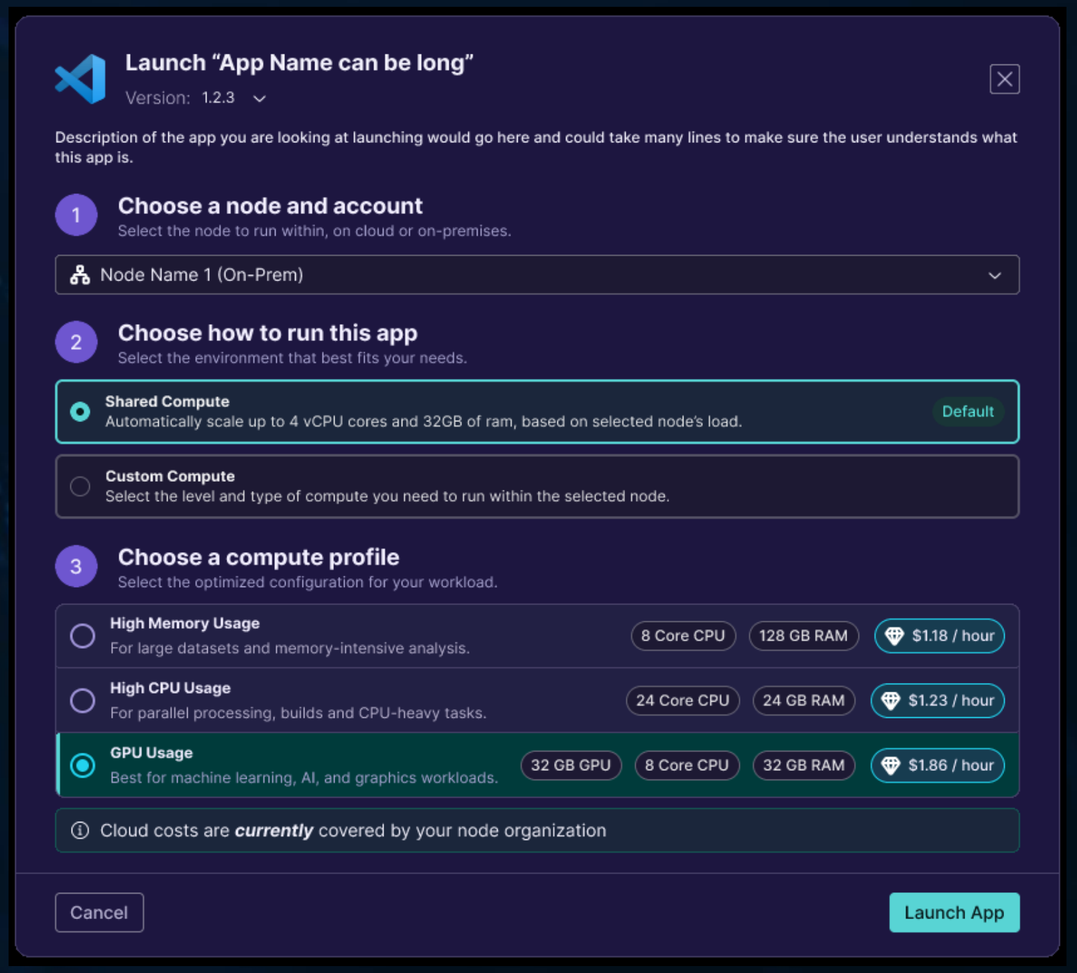


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UPCOMING FEATURES

Compute Control Panel





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Waiting in line or have more questions?

Browse our site: www.gemstoneplatform.org

OR

Contact us at AFRL.DAFMEO.GEMSTONE@us.af.mil

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