

# Research Net

Accelerate research and product development with an agentic automation platform for the complete product lifecycle

<https://www.researchnet.ai/>

MVP Release: 0.1.0  
August 5<sup>th</sup> 2025



# Research Net

Research, Innovate and Build

Research Net is dedicated to accelerating research and development through the automation platform. It is a collaboration between multiple universities and research institute to bring academic research to life.

Multiple packages are available for the startup community and product developers to bring their ideas to life in a cost-effective manner.

Research Net is built on Open Development Platform and enables Open-Source and Licensed products to be developed for production. Join the platform to build your own products at light speed.



## Arunava (Ron) Majumdar

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### FOUNDER, CEO

Research Net.ai,  
Open Development Platform,  
Panthers Sports Inc.,  
Chicago Panthers LLC.  
Former Head, IBM Center for  
Advanced Studies (USA)

<https://arunava.com>

 <https://www.linkedin.com/in/arunava-majumdar/>

**Arunava (Ron) Majumdar** is the Founder, CEO of Open Development Platform, providing an Open Source environment catered to Academics, Researchers and Professionals for co-development and free exchange of ideas. He is also the Founder, CEO of Research Net.AI Inc. where confidential products may be developed using the automation and agentic platform in a hyper-accelerated timeline.

He is the former Head of IBM Center for Advanced Studies (CAS) US and the coordinator for CAS India, CAS Australia and CAS Africa. He was the Principal Solution Architect with more than 28 years of software design, architecture and development leading the IBM Application Modernization portfolio for Signature Telecommunication Accounts.

Ron spearheaded numerous Academic Research initiatives with top universities (NC State, Northwestern, University of Chicago, etc.) across multiple industries. He has led teams and provided Architecture Solutions, Design, Development and Deployment of 50+ Projects with 40+ Fortune 500. His focus areas are Integration, Artificial Intelligence and Pattern Engineering and holds several patents in these fields. He is involved with automated deployment strategies to the Cloud and Kubernetes environments.

Ron is in the leadership board for IBM Open Innovation Community (OIC) Chicago Chapter, Chicago Chapter Leader for AI Camp, Host of Future Tech SIG at AITP Chicago and the Leader for the Developer Advocacy program in Chicago with AI Alliance and a mentor at the Polsky Center and Kaplan Institute. He is the Founder of IBM Services Asset Community and Chicago Panthers (sports).

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**Titles:** • Founder, IBM Services Asset Community • Founder, Open Development Platform • Lead, IBM Asset Strategy • Member, IBM Academy of Technology • Host, Future Tech SIG, AITP Chicago • President, Chicago Emerging Leaders • Board, IdeazShack Innovation Center • Chapter Lead, AI Camp • Founder, Chicago Panthers • Life Member, Poet's Foundation • Content Creator and Editor, Open Development, Developerworks TV • Mentor, Polsky Center, University of Chicago • Lead, Developer Advocacy in Chicago, AI Alliance





# Open Development Platform

*AI-driven Agentic Framework for co-development  
with academia, research and industry*

Arunava (Ron) Majumdar



## Open Development is a member of the AI Alliance

Open and transparent innovation is essential for equipping AI researchers, developers, and users with the knowledge and tools to leverage AI advancements safely and inclusively, prioritizing diversity and economic opportunity for all.

Through member-driven working groups, we bring together builders and experts from various fields to collaboratively and transparently address the challenges of generative AI and democratize its benefits.

# BUILDING THE OPEN FUTURE OF AI

We are technology developers, researchers, industry leaders and advocates who collaborate to advance safe, responsible AI rooted in open innovation.



### Skills & Education



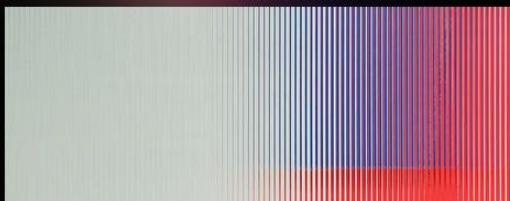
Supporting global AI skill-building, education, and exploratory research.

### Trust & Safety



Creating benchmarks, tools, and methodologies to evaluate and ensure safe, trusted generative AI.

### Applications and Tools



Building the most capable tools for AI model builders and GenAI application developers.



University of Notre Dame



NumFOCUS



New York University



Open Development Platform



OpenMined



OpenTeams



# IBM Center for Advanced Studies

IBM Centers for Advanced Studies specializes in high-touch collaborations with academia

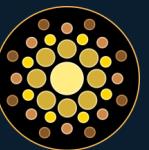
<https://www.ibm.com/ibm/cas/>

CAS centers around North America define the university relations strategies in their local communities

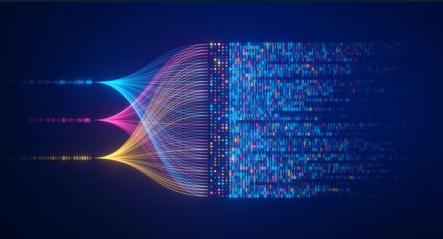


Partnering with IBM CAS





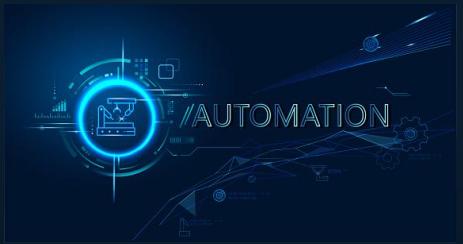
# Research Net



## Research Network

Connecting Academics to Products

Research on technologies is essential for new product development. The platform provides agents to retrieve, analyze and connect researchers to solve a problem. Connect with professors and universities already in the network and work with our team of experts.



## Automation Platform

Build products not applications

Open Development Platform provides tools to accelerate the development of products by modeling the requirements and generating artifacts through pattern engineering and model to model transformations.



## Process Engineering

Agentic framework for activities

AI Agents are trained to automate most of the rudimentary tasks, monitoring the status and progress, notify and have a conversation with the user. The framework uses Knowledge Graphs for understanding the Retrieval Augmented Generation for accurate results.



## Support and Services

Hosting, Scaling, Developing, Fixing

We provide services to develop innovative products with our experts, architect solutions and partner with consulting companies to make your products successful and support it through the complete lifecycle.

Grow with **Open Development and Research Net**



# Research Net

Hardened and certified  
for production build

Outreach Program



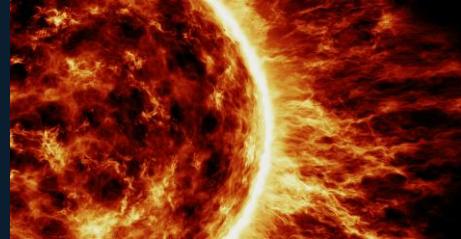
## Product Development

Development of products using the accelerated development platform to build application using pattern engineering. Automate your application development by building UX, API, DB, Cloud Deployments, DevOps, MLOps Pipelines, etc. through the power pattern generation. Services are available to help you build your brand.



## Course Curriculum

Development of course materials for teaching at universities and institutions. The material can then be supported on the platform to enable Classroom teaching for faculty and students. Already developed content and content from organizations can also be hosted. Virtual Coaching assistant to help guide students and teachers on the platform.



## Innovation Research

From Ideation, Design Thinking to Architecture, Design and Development for building new features or products with university research in coordination with experienced industry experts. Provide complete lifecycle management from development to production and handoff to Support teams. Research network and AI tools.



Open-Source collaborations with academia and research organizations to support innovations



## Open-Source Collaboration

Open Development Platform believes in the principal of Open Everything policy and contributions to Open Source. It provides a co-development platform for Innovators, Professionals and Academia using the underlying automation framework. Students will be provided mentors to guide them and certificates upon successful completion.



## Recruitment Services

Recruitment of students and professionals trained and certified through the Open Project programs with universities or through their contributions as mentors. Each participant in the program accumulates points for various activities and certifications upon completion. Recruiters can also get insights for the student contributions.



## Event Management

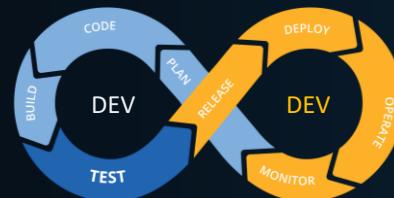
Open Development Platform provides a single environment for all the event management needs from requesting an event to providing support to host the events and streaming during the event. There are several tiers of support for this. Look at our plans and get started for free for meetups and open collaborations.



## BRIDGING THE GAP BETWEEN ARTIFICIAL INTELLIGENCE AND COMPLEX BUSINESS PROCESSES



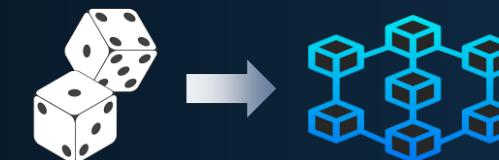
Focus on building **business applications** rather than generating code for the developer.



Support for the **complete development lifecycle** through patterns and plugins.



Requirements change over time and the **regeneration of artifacts** is achieved by preserving custom changes in delegate functions.



Moving from **probabilistic code generation** to **deterministic artifact generation** based on tested models.



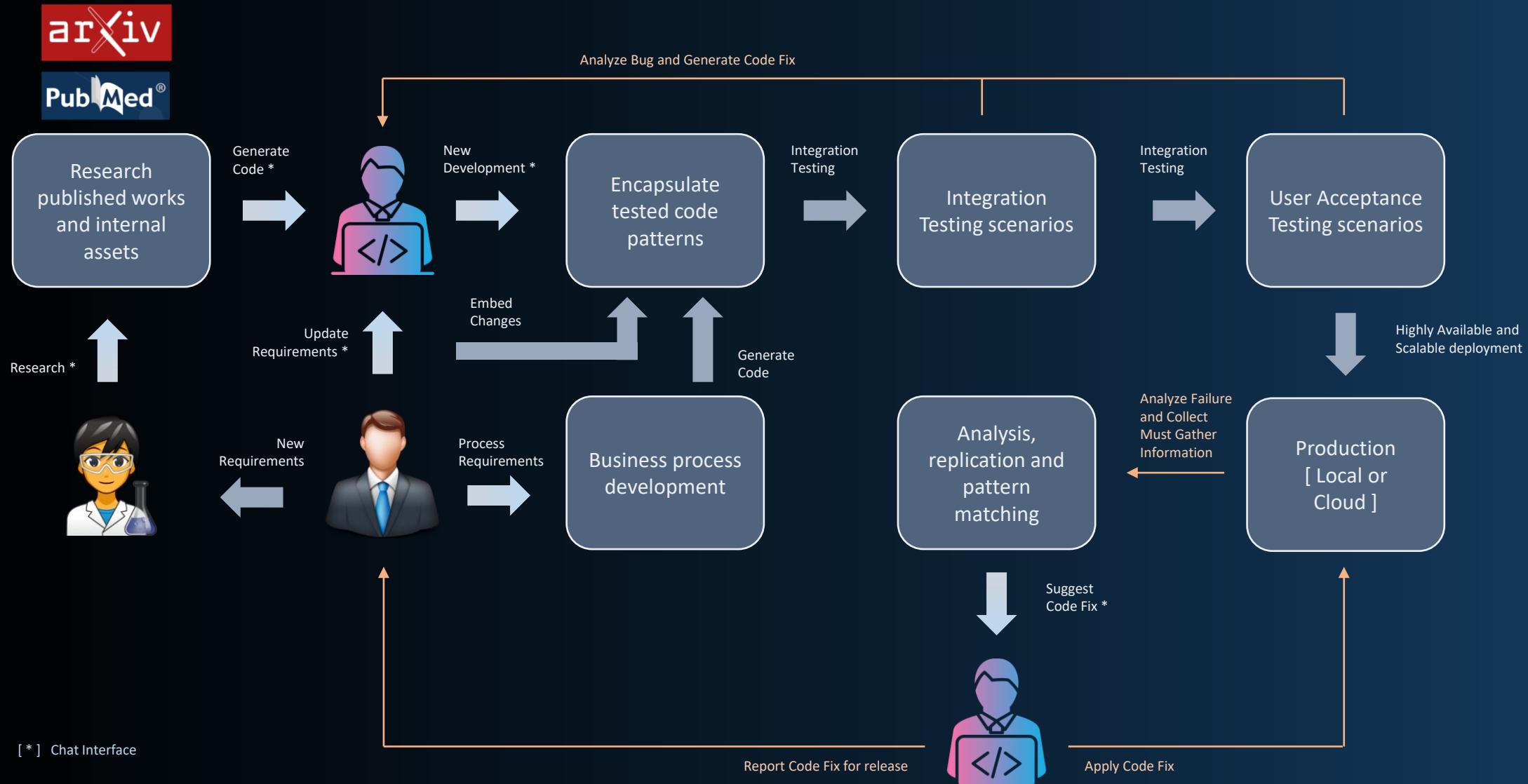
Connect with **Researchers and Scientists** around the world for collaborations on new research and products.



Provide generation and integration **with complex business processes** for essential operations of the business.



**Complex data structures** are mapped with AI powered models for ERP systems.





## Collaborate on Open Source and Confidential Research on a Single Plane:

- Work with students and faculty on Open Project initiatives with Capstone projects
- Develop assets and publish academic papers for the work
- Participate in Open Events – hackathons, meetups, executive panels, etc.
- Work on Confidential projects, develop and submit patents
- Academic courses in collaboration with universities
- Earn Micro-credentials as digital badges for the contributions

## RESEARCH COLLABORATION AT SCALE

CCODE UX			CCODE API							
Discord Bot	Manual Approvals	Google Workspace	Github	Access Control	Cloud Integration					GCP
Agentic Graph RAG based Process Orchestration										
OpenAssets	Open Projects	Open Profiles	Open Courses	Whitepapers	Open Events		Products	Projects	Patents	AWS
Open Development Platform										
Open Assets	Open Projects	Open Profiles	Open Courses	Whitepapers	Open Events		Products	Projects	Patents	Azure
Open Assets	Open Projects	Open Profiles	Open Courses	Whitepapers	Open Events		Products	Projects	Patents	IBM

## Open Development

The Platform is build to provide a common interface either using the UI or the API to access each component consistently using the Accelerated Asset Platform (AAP). All the libraries for the platform are also available as Open Source and can be licensed for supported usage.

This is a fully automated platform to publish information as soon as they are approved through each of the processes. The Discord Bot will answer most of the questions through the channels when started with '@bot'. One can also run commands through starting with '!'.

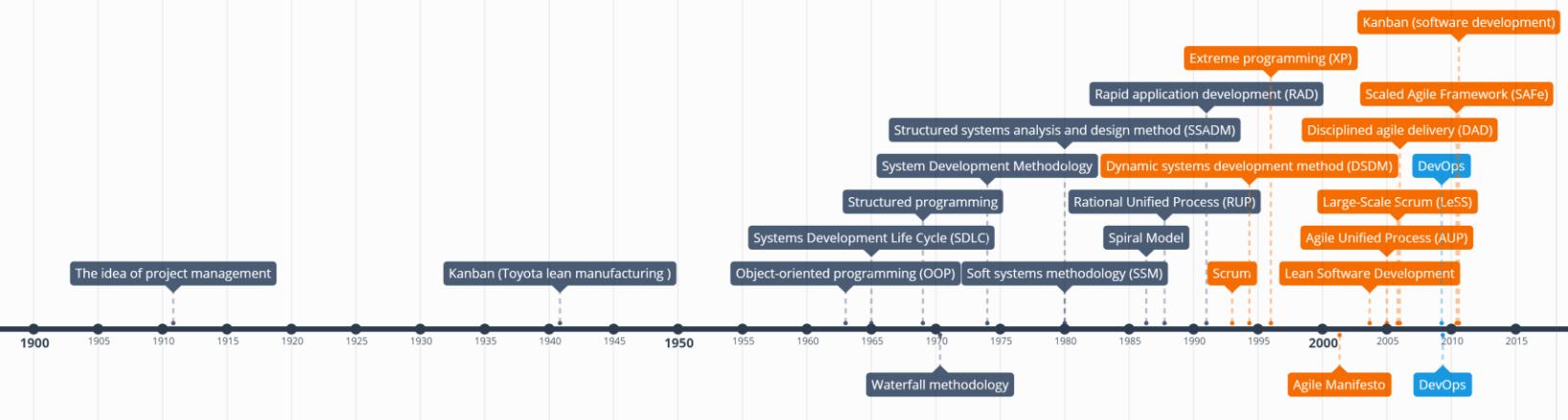


## Code Development Lifecycle:

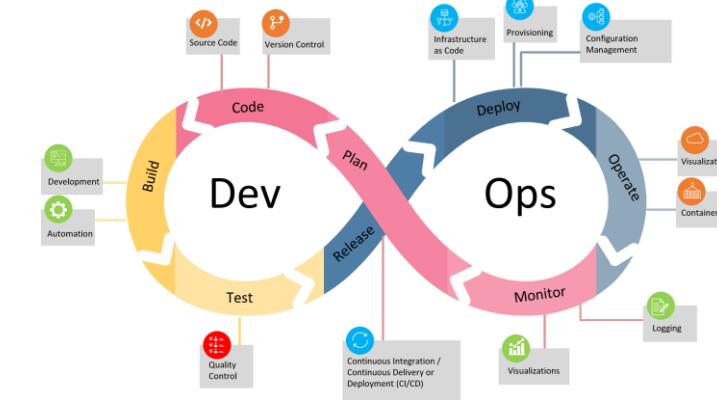
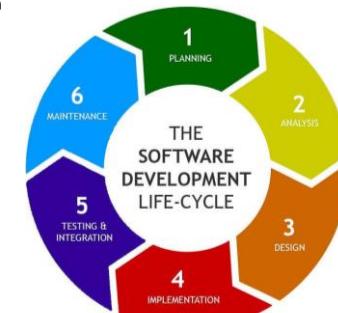
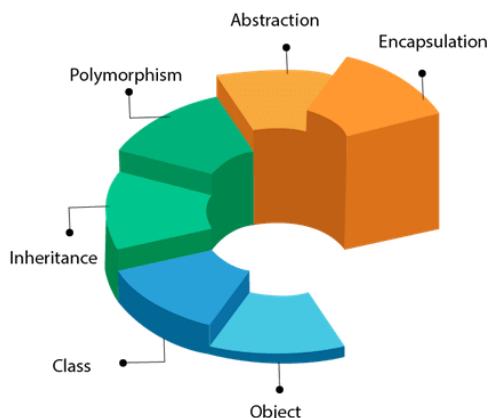
- 1910 | The idea of project management
- 1940 | Kanban (Toyota lean manufacturing )
- 1970 | Waterfall methodology
- 1963 | Object-oriented programming (OOP)
- 1965 | Systems Development Life Cycle (SDLC)
- 1969 | Structured programming
- 1974 | System Development Methodology
- 1980 | Soft systems methodology (SSM)
- 1980 | Structured systems analysis and design method (SSADM)
- 1986 | Spiral Model
- 1987 | Rational Unified Process (RUP)
- 1991 | Rapid application development (RAD)
- 1993 | Scrum
- 1994 | Dynamic systems development method (DSDM)
- 1998 | Team software process
- 1996 | Extreme programming (XP)
- 2001 | Agile Manifesto
- 2003 | Lean Software Development
- 2005 | Agile Unified Process (AUP)
- 2005 | Large-Scale Scrum (LeSS)
- 2006 | Disciplined agile delivery (DAD)
- 2009 | DevOps
- 2010 | Kanban (software development)
- 2011 | Scaled Agile Framework (SAFe)
- 2020 | Citizen Development | Digital Transformation (DX)



NORC, the [world's most powerful computer](#), designed and built at Columbia University's [Watson Lab, 612 West 115th Street NYC, 5th floor rear](#), 1954.



## Object Oriented Programming

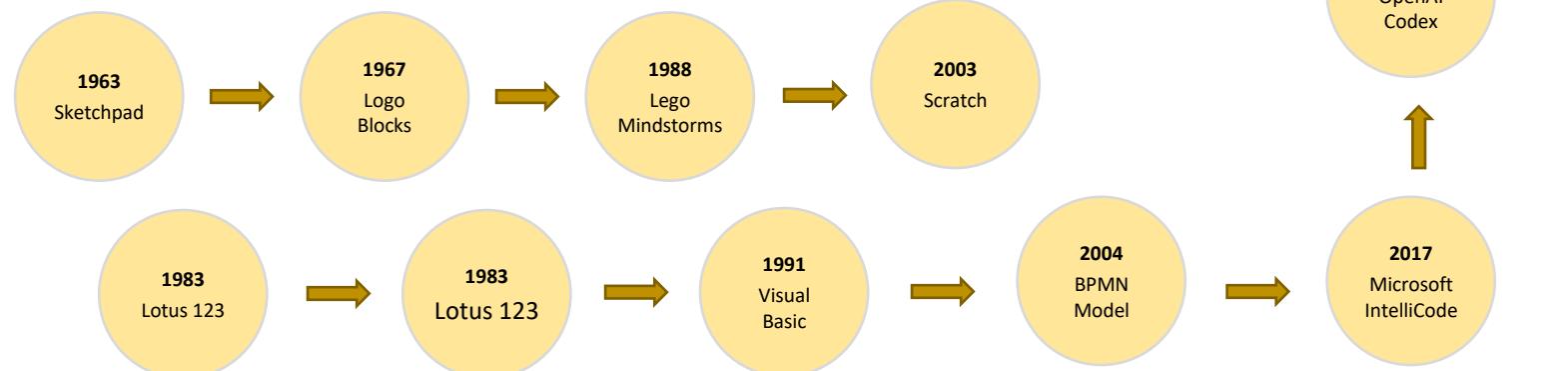




## Code Tooling:

- The Holy Grail for the participation of the non-coding contributors to the development of software has always been a NO-CODE tool that can eliminate the requirement of highly technical developers.
- The first attempt was made as early as 1963 by Ivan Sutherland for his MIT thesis, the birth of graphical interface and eventually the CAD software invented at GM by Patrick Hanratty the same year.
- Several attempts were made to develop no-code systems for teaching coding to STEM students like Logo Blocks, Lego Mindstorms, Scratch, etc.
- The Enterprise applications moved more with business-oriented programs like Lotus 123, RAD tools like Visual Basic, Process Modeling with BPMN, etc.
- UML standardization in 1977 and CASE tooling invented at Nastec in 1982 paved the way for generation of code and artifacts and adopted into Rational Rose.
- The AI revolution started by Microsoft's IntelliCode and Open AI Cortex incorporated into Microsoft Co-Pilot integrated into VS Code, started the revolution and ecosystem of AI code generators.

The concept of CASE (Computer-Aided Software Engineering) tools and the term itself were pioneered by the Nastec Corporation in 1982, with their [GraphiText](#) tool, according to UMSL. Nastec's GraphiText was an integrated graphics and text editor that marked an early milestone in the development of automated software engineering tools, according to a paper from University of Missouri Saint Louis:  
<https://www.umsl.edu/~sauterv/analysis/Term%20Papers/f14/CASE.htm>



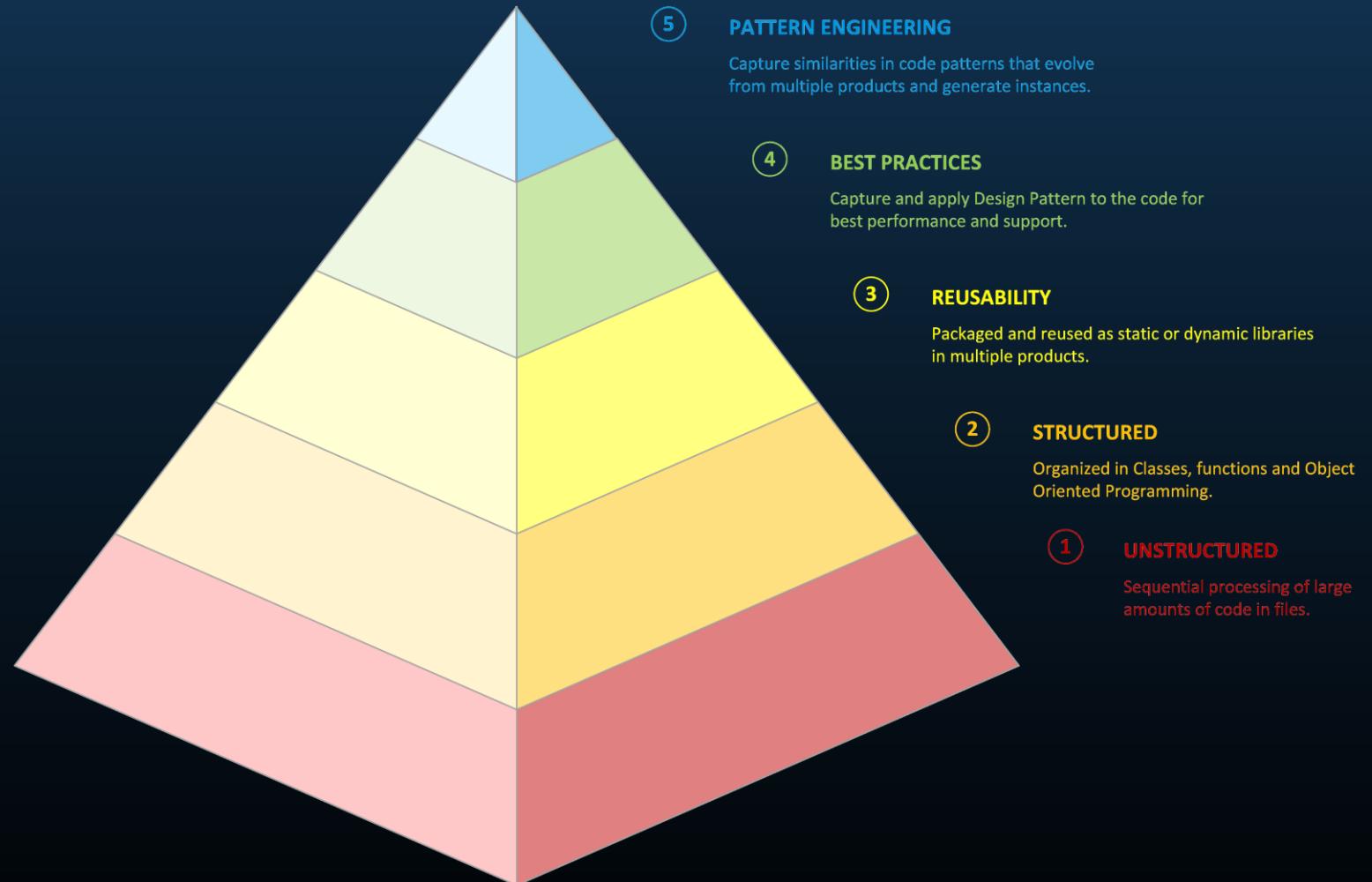
# Rise of AI Agents

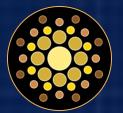




## Code Maturity Level:

- The quality of the code matters whether written by *AI Models* or *Human Developers*.
- Methods for improving quality has a long history to make the code performant, robust and supportable in production.
- Code should follow best practices, structured properly and reusable components identified and packaged separately.
- Proliferation of bad code only amplifies the problem.
- Quality code and artifacts can then be patternized and replicated with all the identified variants.

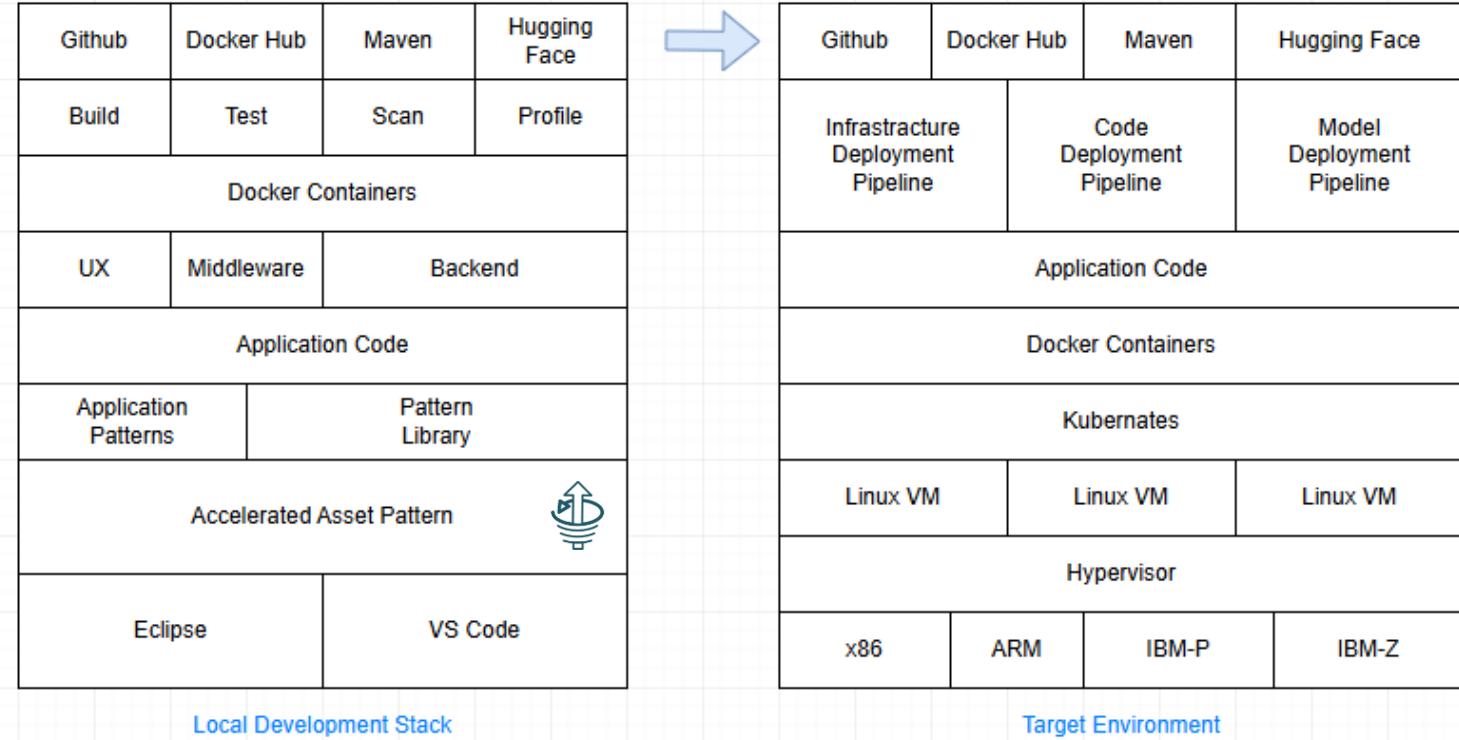


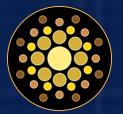


# Research Net

## Building Blocks of Orchestration:

- Development Tool support: Eclipse and Visual Studio Code.
- Code Library to support the acceleration of product development built on Vortex Pattern Engine.
- Standard Pattern Library and the ability build one's own application patterns and plugins to generate UX, Middleware and the Backend.
- All containerized in the local environment for development and deployment consistency.
- DevOps process connected through standard pipelines for infrastructure, code and model deployments to Kubernetes clusters.
- Support for any Linux environment on supported Hypervisor and hardware.

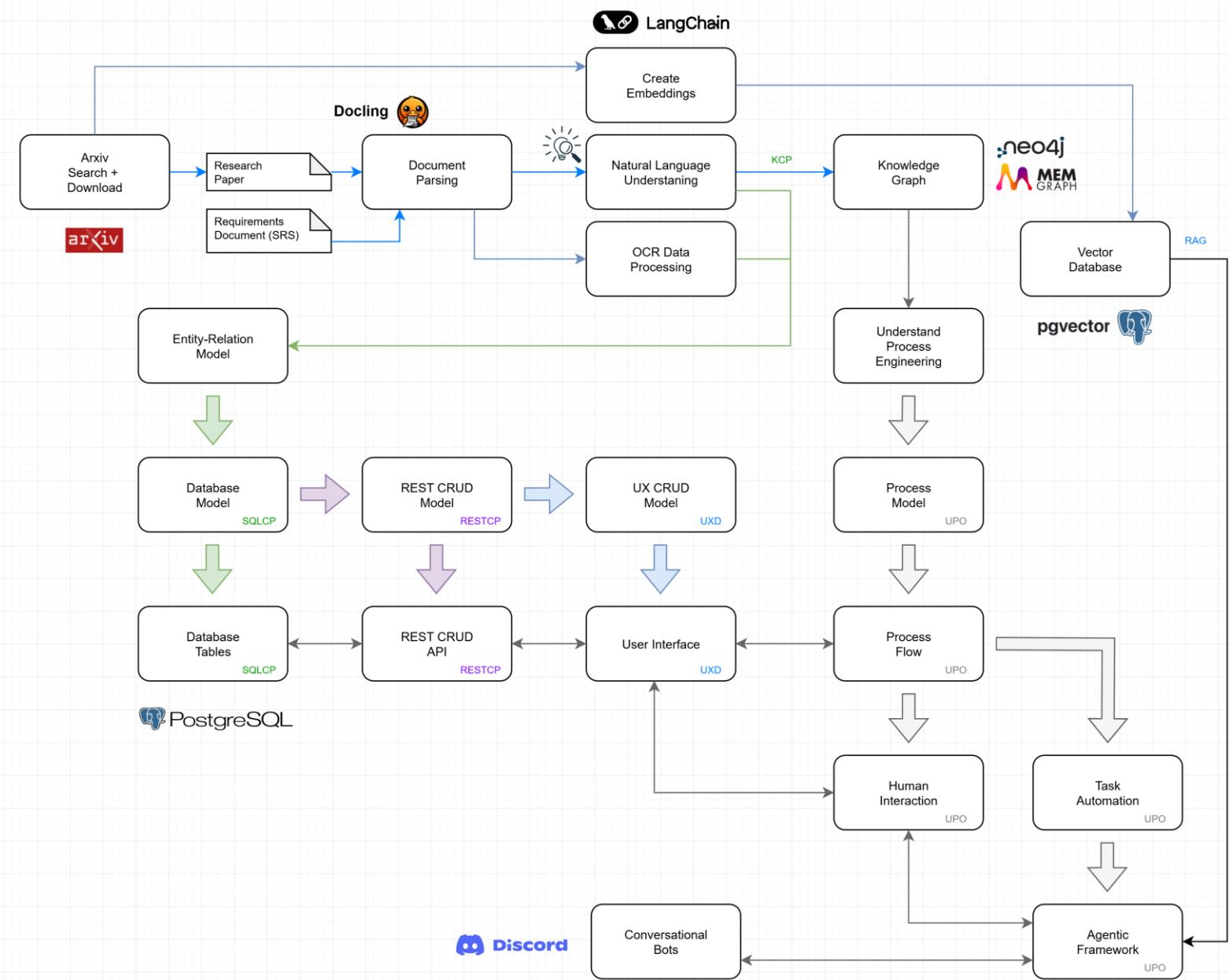




# Research Net

## Research Accelerator:

- Build research criteria
- Retrieve research papers from Arxiv, Pubmed, etc.
- Build a knowledge graph
- Build the entity relation model
- Generate Database, REST, UX models
- Enrich the models
- Generate Database schemas, API and user interface
- Generate Process models and enrich flows
- Generate Agentic Framework and other flows
- Generate conversational bot





# Research Net

## Open Development Platform Bot:

- Commands may be sent from a channel to the Discord Server where the message is routed through the Redis Publish/Subscribe Engine to the RAG processor.
- The RAG processor accesses data from a Vector database and sends it to the Google ADK Agent that can then go through any of the supported Model Serving Hosts for the Model of choice.

!arxiv

Download papers from <https://arxiv.org/> based on a search criteria for analysis.

!loaddb

Vectorize and add papers to Vector DB.

!cleardb

Delete all records from Vector DB.

!ptree

Process the Pattern Tree for all the products.

!odpbot

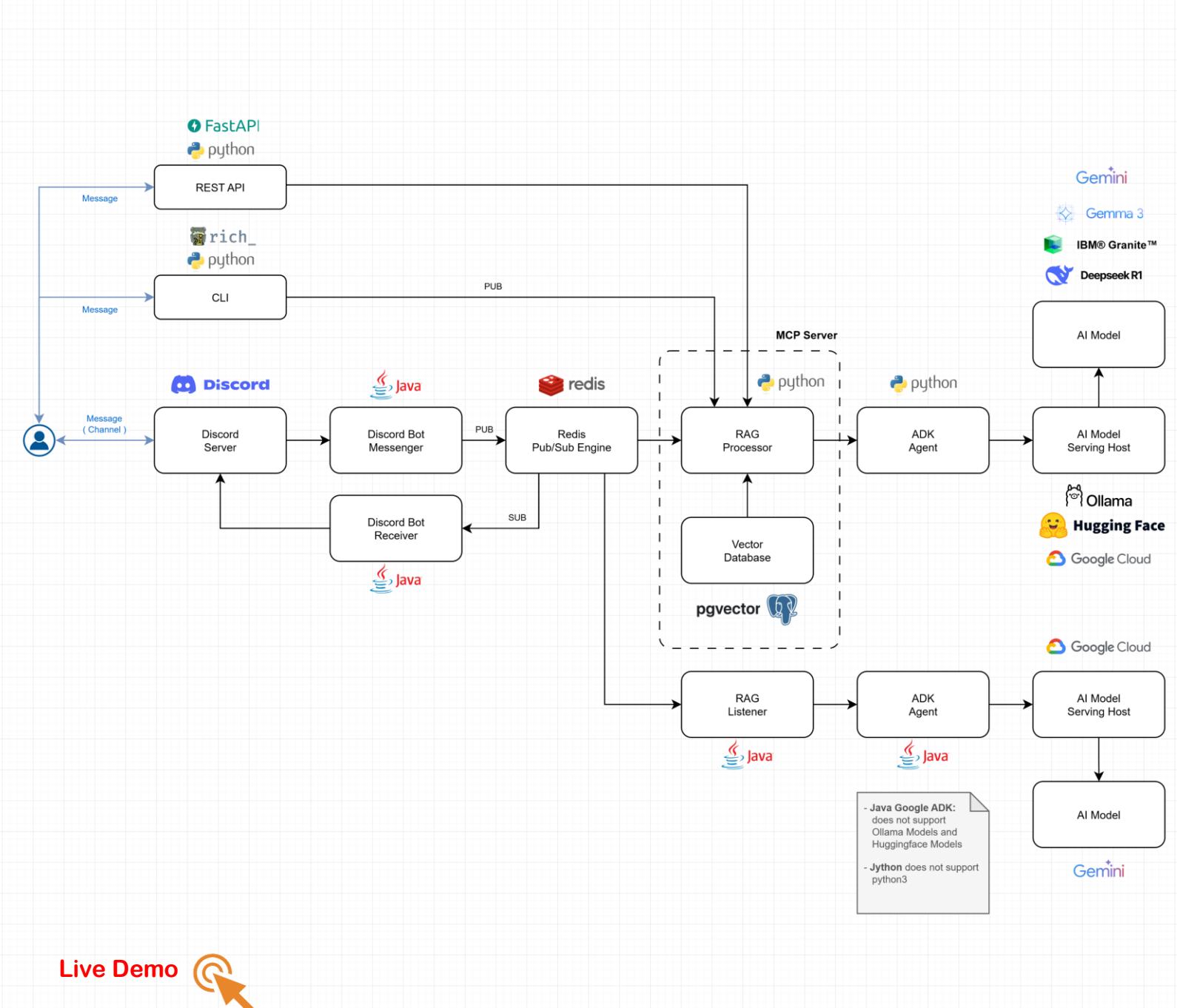
Chatbot backed with RAG to answer questions from papers.

!odprest

Call the REST API for the bot backend operation.

!odpagent

Call Java ADK agent with limited support for models (Gemini, Claude, etc.).



Live Demo



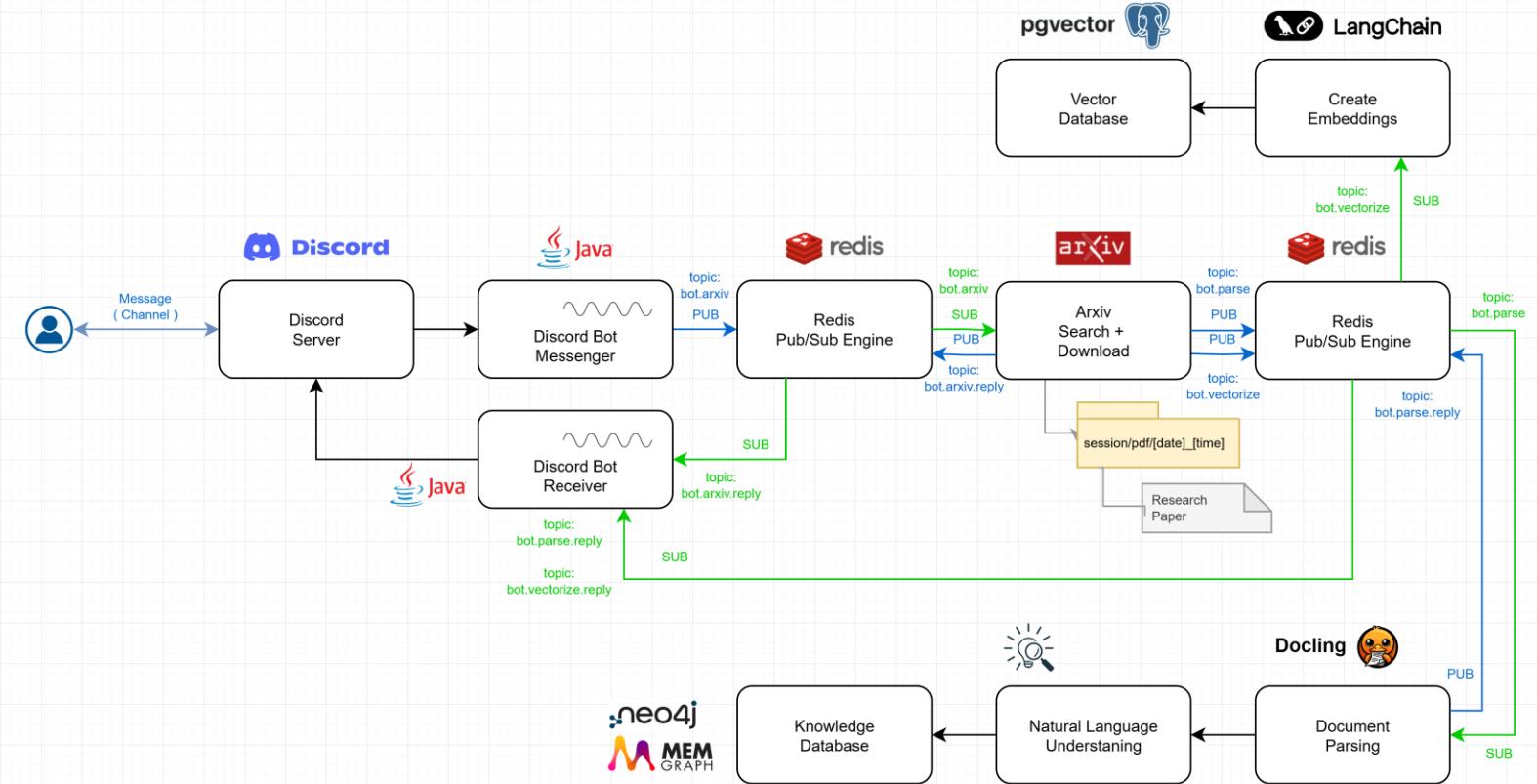
# Research Net

## Open Development Platform Bot:

- Command send through the Discord Bot through the redis server.
- Papers are downloaded from arxiv based on the search criteria for each session.
- The papers are then parsed with docling and processed through the NLU pipeline into a Knowledge Base.
- The pipeline is being improved through intensive research.
- The documents are also vectorized and stored in a Vector database.
- This can then be used for the question/answer bot service.

!arxiv

Download papers from <https://arxiv.org/> based on a search criteria for analysis.



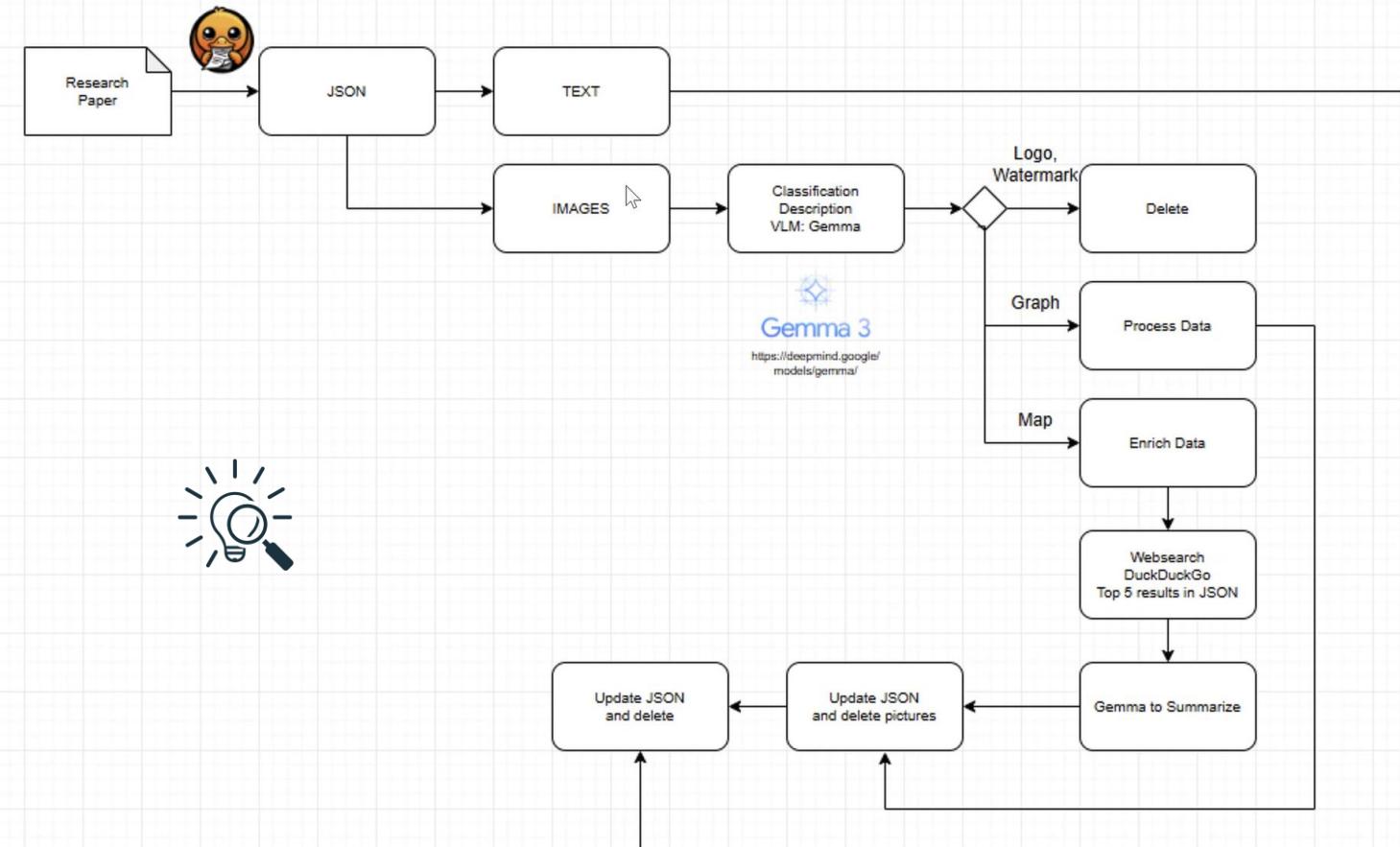
Live Demo



# Research Net

## Visual Interpreter:

- Research into understanding diagrams, charts, graphs in the papers downloaded.
- Initial work has been in progress with a Northwestern capstone team: Hongyu, Fares and Fei.
- State of Art: Some of the properties from the graph may be processed with Gemma 3. To be determined the stability of this prompting system and hallucinations.
- Report from the capstone will be released after the end of the capstone.
- Docling is expected to publish Plotting interpretation capabilities next month. This will be investigated and research in this field with various models and tools is ongoing.



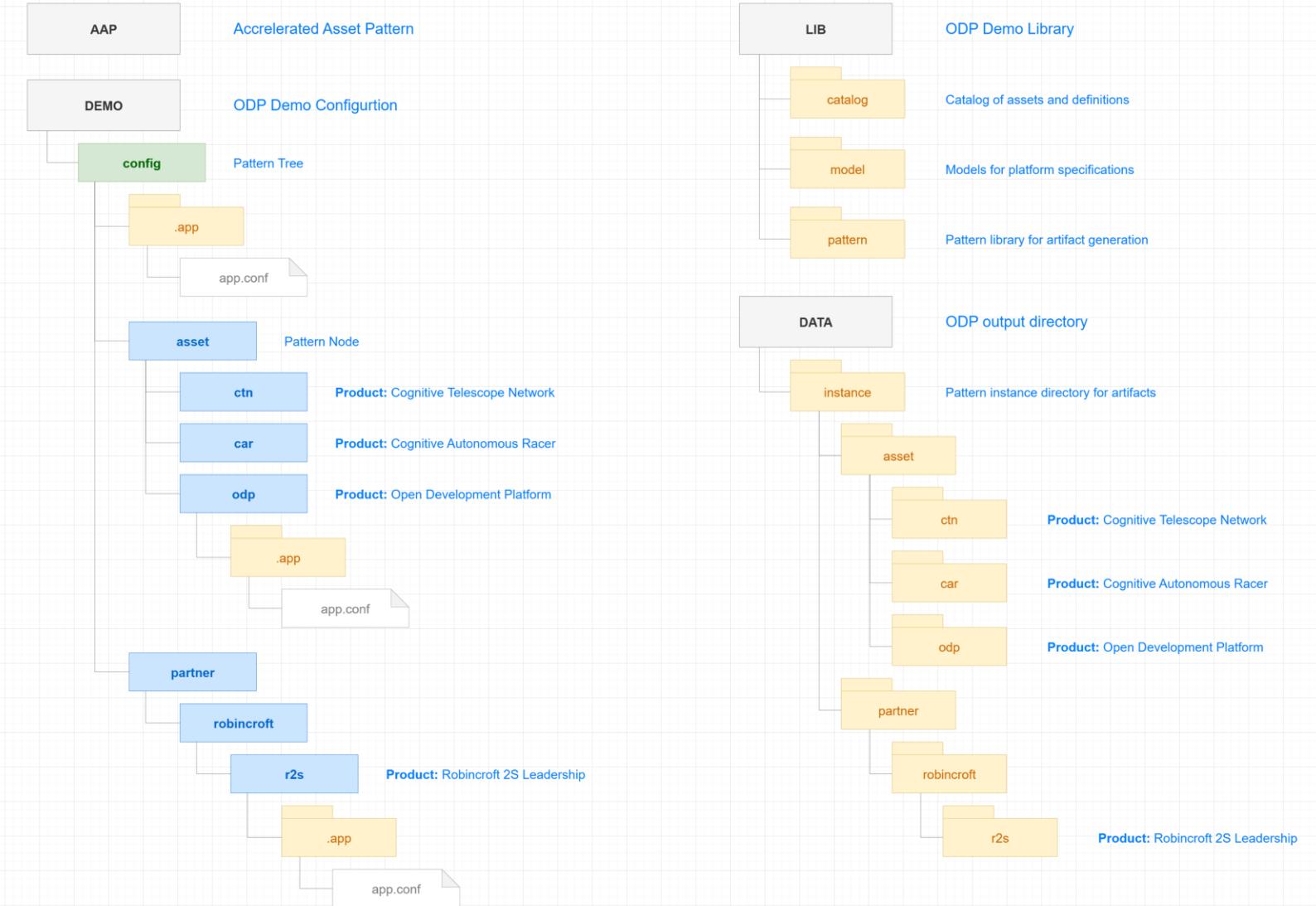
N Northwestern  
University



## Pattern Tree Processing:

- **Accelerated Asset Pattern:** This is base library that provides the platform functionality.
- **DEMO/config:** Configuration for the pattern tree.
- **LIB/catalog:** Catalog for events, exceptions, SQL, REST, etc.
- **LIB/model:** Pattern models defined in the specifications as XSD.
- **LIB/pattern:** Pattern definitions for all products to be generated.
- **DATA-instance:** Directory where the generated pattern instances are stored.
- **PROJECTS/odp:** Cloned project instances placed in the individual directories, that may then be imported into Eclipse or VS Code and also run from there.

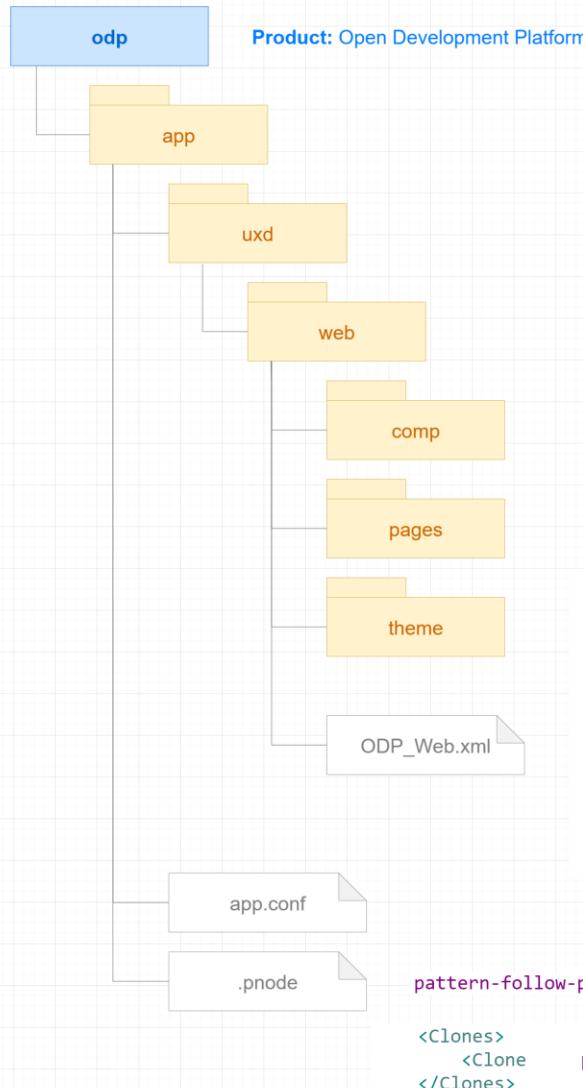
**!ptree** Process the Pattern Tree for all the products.





## Pattern Tree Processing:

- The application pattern generation is switched to the pattern recursion path from the application node level.
- And a clone is created into the projects folder to avoid any dependencies in the building and the deployment of the applications.
- The web pattern is processed for specific patterns by turning off recursive processing of the pattern files.
- Images are copied over the src directory.



Live Demo



## UX Design Pattern:

- The standard ODP Pattern is based on best elements from REACT, Vite, Carbon Desing System, Tailwind CSS and Shadcn components.
- Support for the standard and custom color palettes through tailwind classes.
- The 2x-grid concept is adopted from Carbon Design System.
- Vite provides the dev and test environments.
- The base Shadcn components are extended to ODB components that may also be extended for any customized projects.

<https://react.dev/>

<https://vite.dev/>

<https://carbondesignsystem.com/elements/2x-grid/overview/>

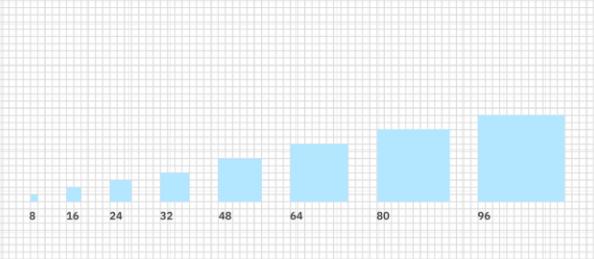
<https://tailwindcss.com/docs/colors>

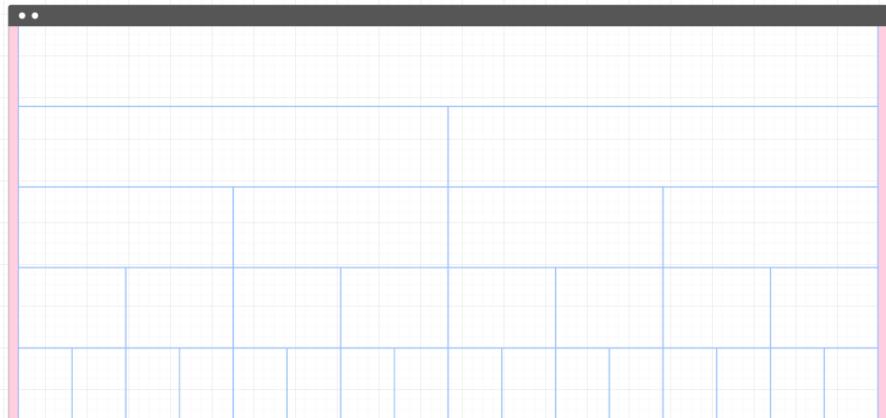
<https://ui.shadcn.com/>

Breakpoint	Value (px/rem)	Columns	Size (%)	Size	Padding	Margin
Small	320 / 20	4	25%	80 px 16 px	0	
Medium	672 / 42	8	12.5%	80 px 16 px	16 px	
Large	1056 / 66	16	6.25%	64 px 16 px	16 px	
X-Large	1312 / 82	16	6.25%	80 px 16 px	16 px	
Max	1584 / 99	16	6.25%	96 px 16 px	24 px	

Sizing scale (px) Mini units

8	1x
16	2x
24	3x
32	4x
48	6x
64	8x
80	10x





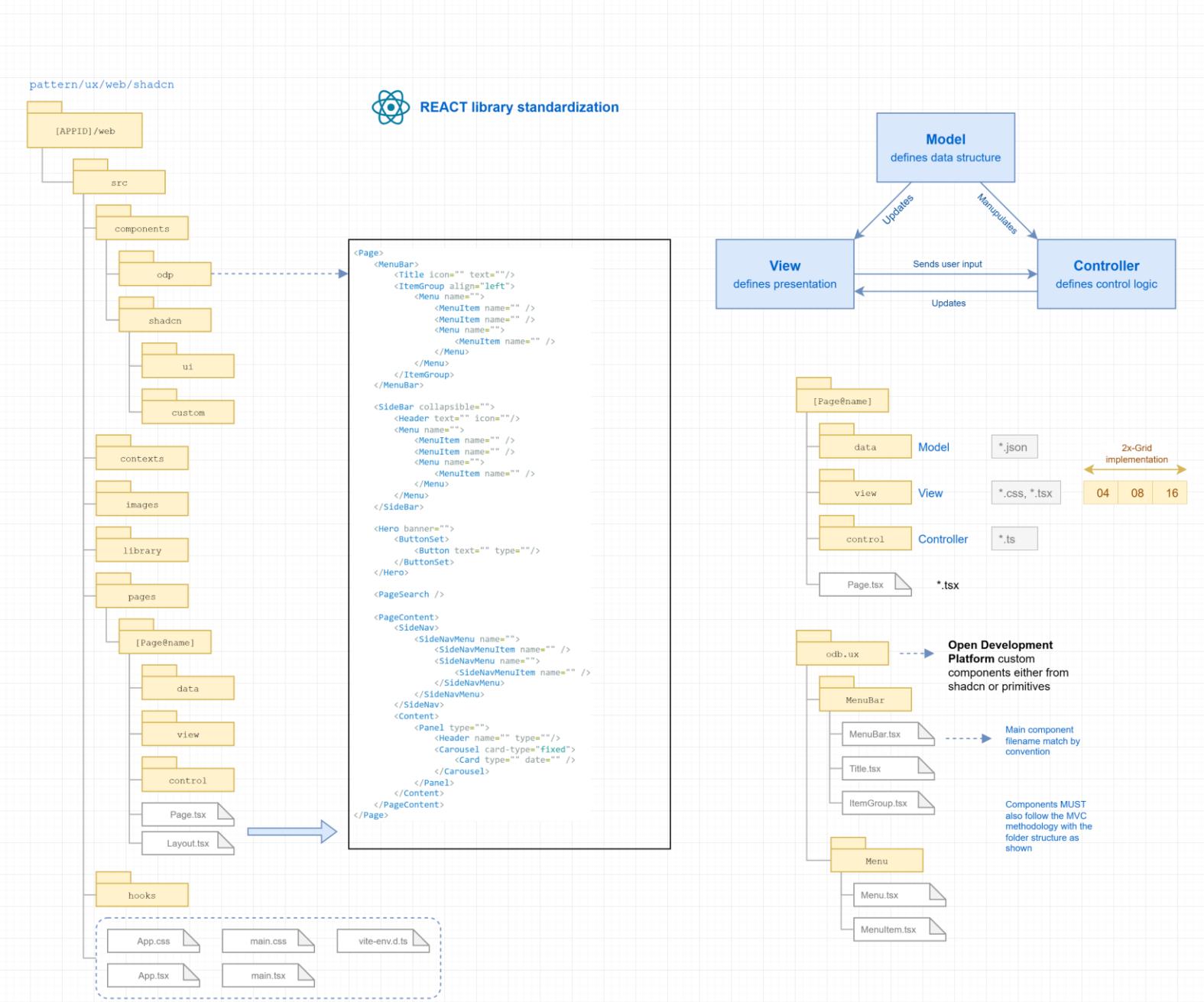
An illustration of a mobile application interface showing a 2x-grid layout. The screen is divided into four main sections by a horizontal and vertical grid. The top section is further divided into two columns. The bottom section is divided into two columns and three rows. The entire layout is framed by a thick black border, representing the device screen.

Open Development Platform: Web Design Standard



## UX web folder specification:

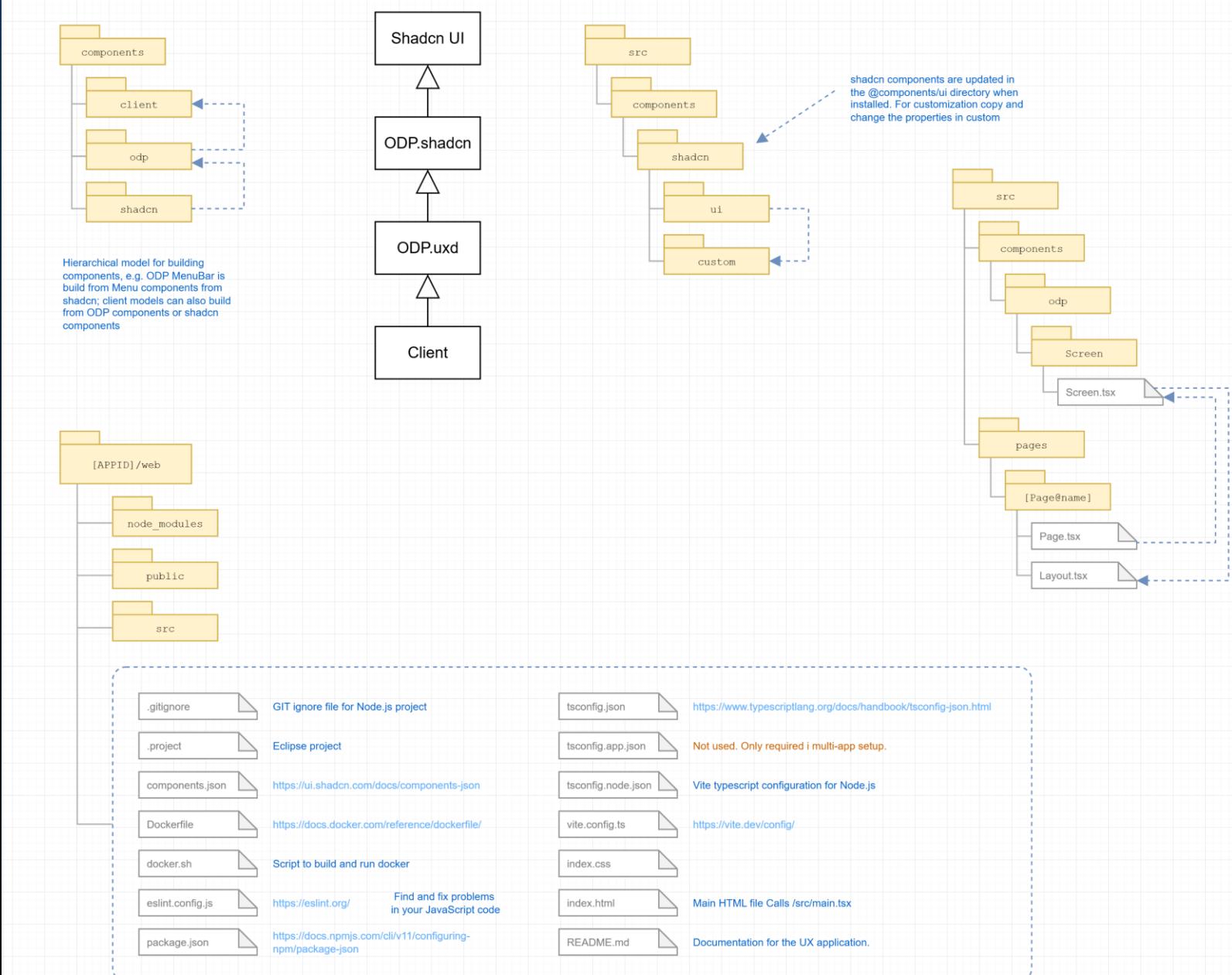
- The folder structure is standardized across multiple design systems so as to support different patterns.
- For example, standard components from shadcn ui components are customized locally but may need to be over-written.
- Follows the Model-View-Comtroller (MVC) Design Pattern for Node.js designed by ODP.
- Robust UX Code that follows MVC and can be controlled through Pattern Engineering.





## UX web folder to follow Object Oriented Programming (OOP) concepts:

- Inheritance and polymorphism are concepts rooted in developing strong code-bases.
- Departure from the Class structure in the REACT programs creates the inability to use OOP paradigm.
- However, with Vortex Pattern Engineering in hierarchical processing, this is still possible by organizing code into the ODP standards.





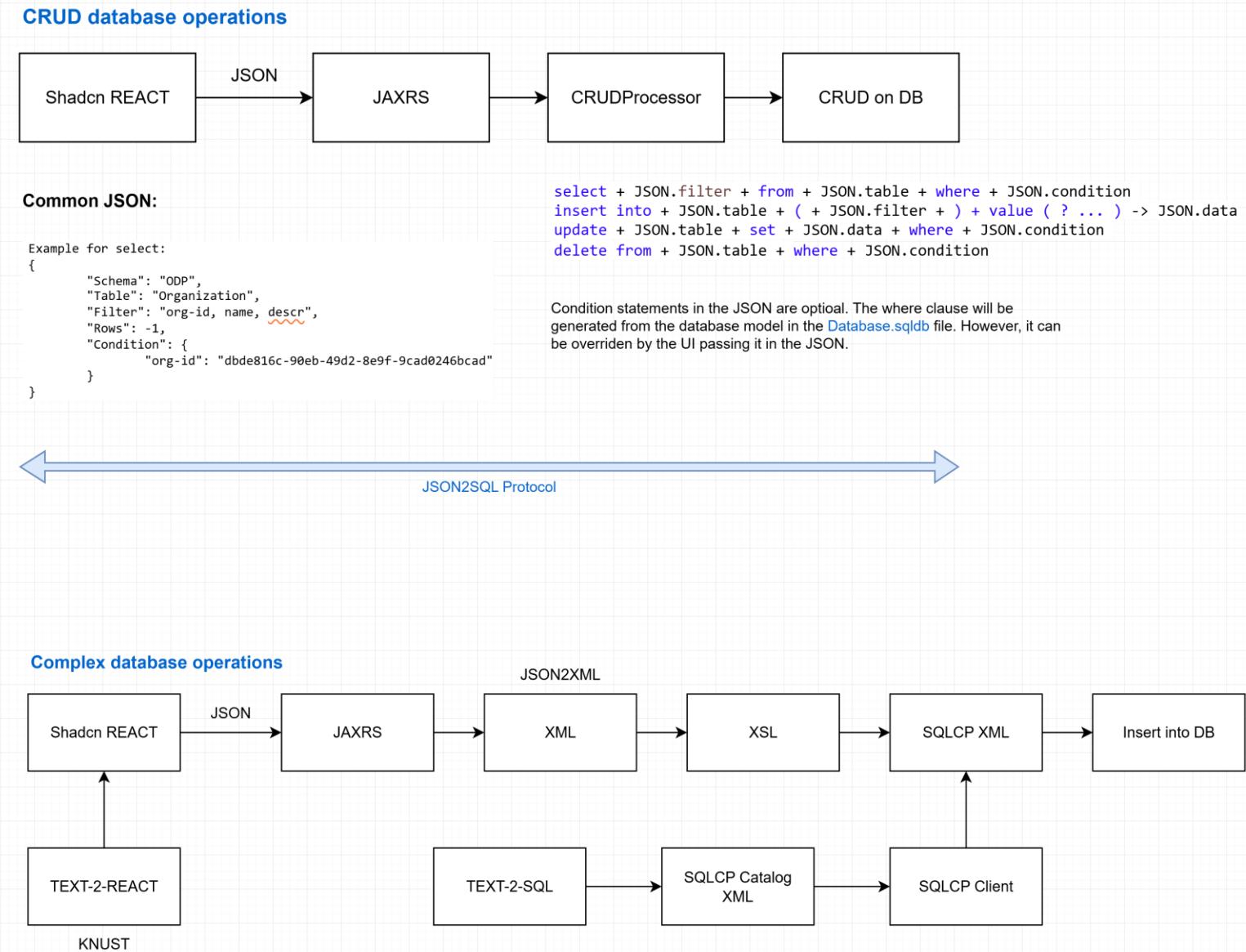
## REST API specification:

- Most of the spaghetti network processing for Microservices based on REST API arises from poor design of APIs.
- ODP standardizes the protocol: JSON2SQL that connects the UX to the REST API to the backend database.
- This simplifies and data transfer process with Filters, Conditions and Validations with consistency in the calls:

GET, POST, PUT, DELETE

Mapping them to the SQL operations.

- This makes CRUD simple and flexible.
- Complex database operations can also be simplified by adding mapping with XSL.

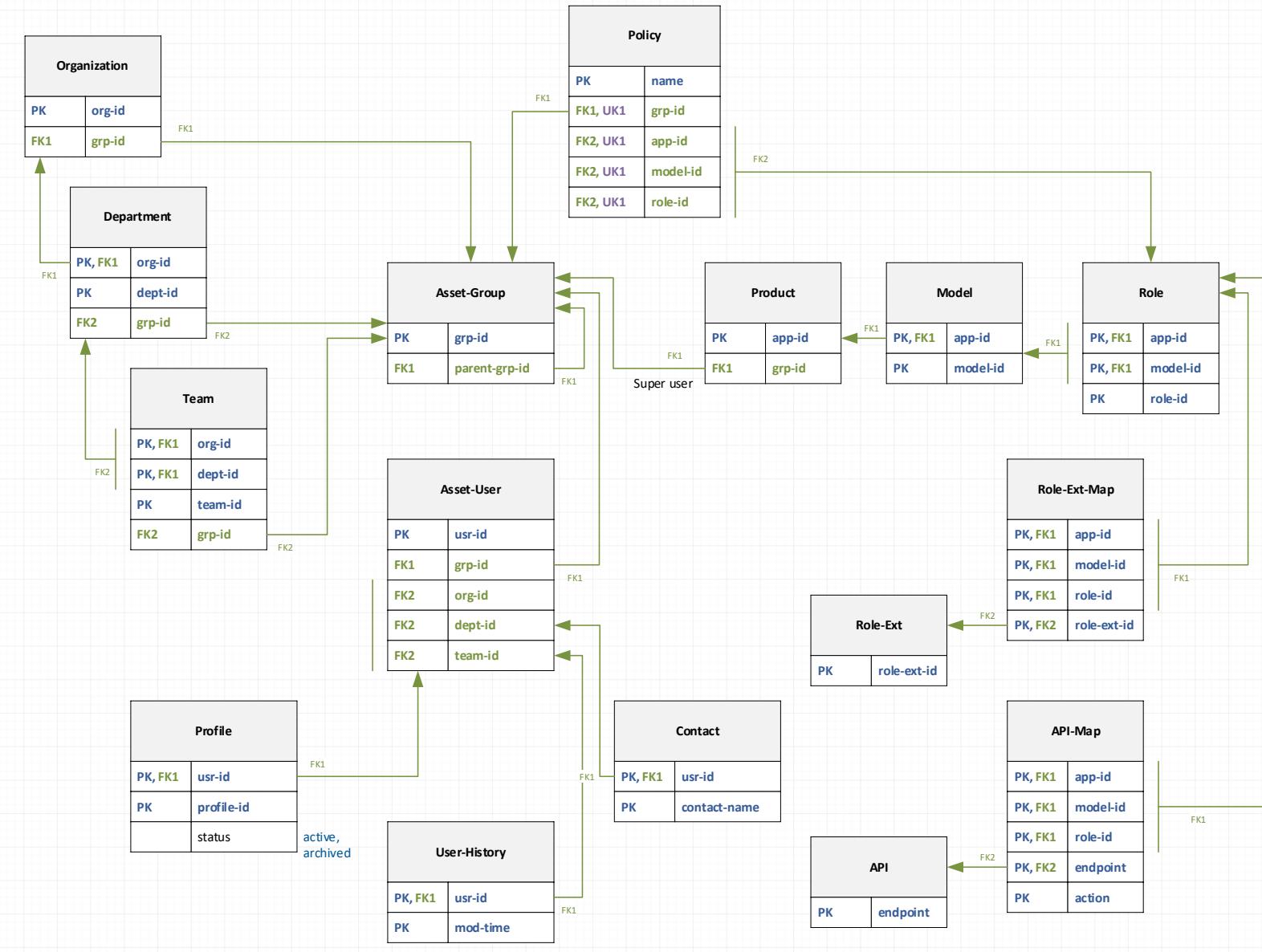


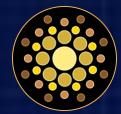


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## Database specification:

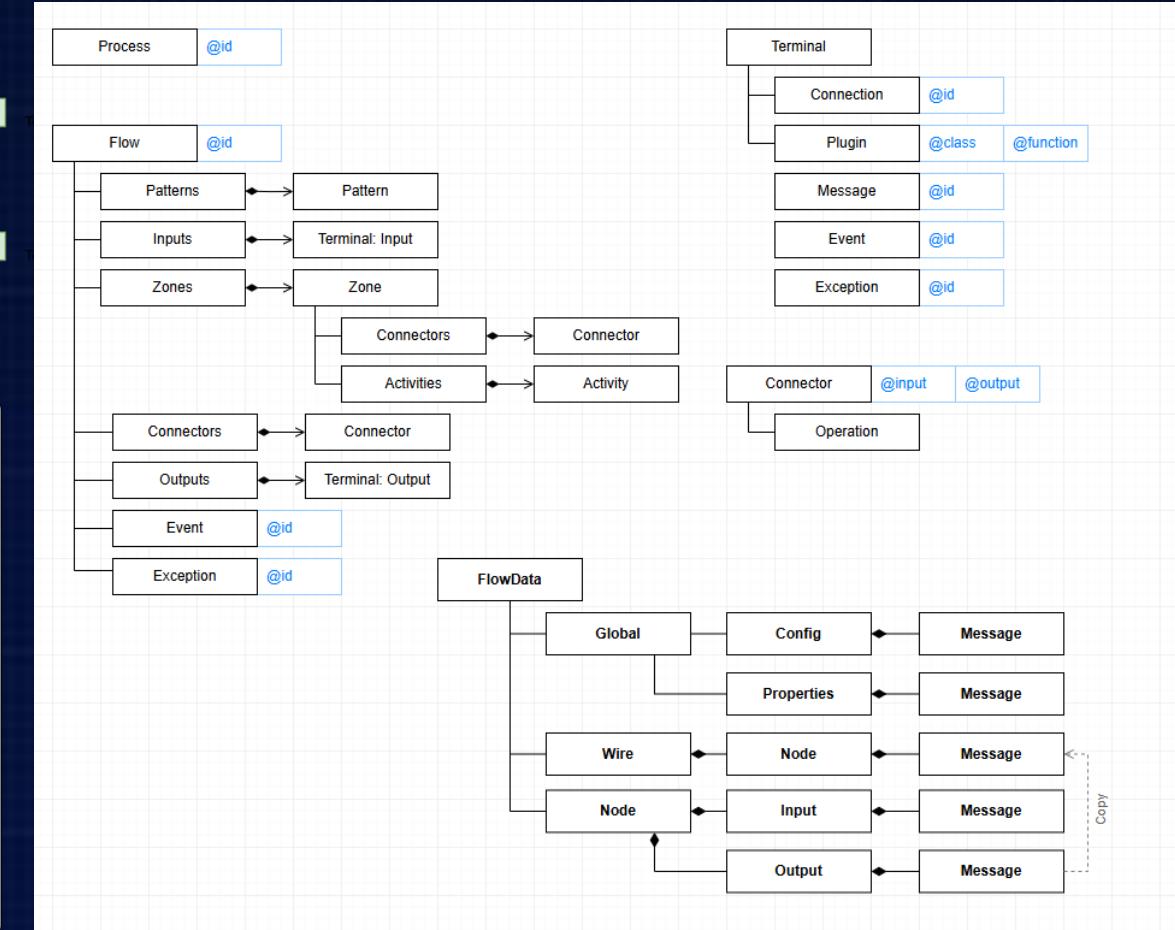
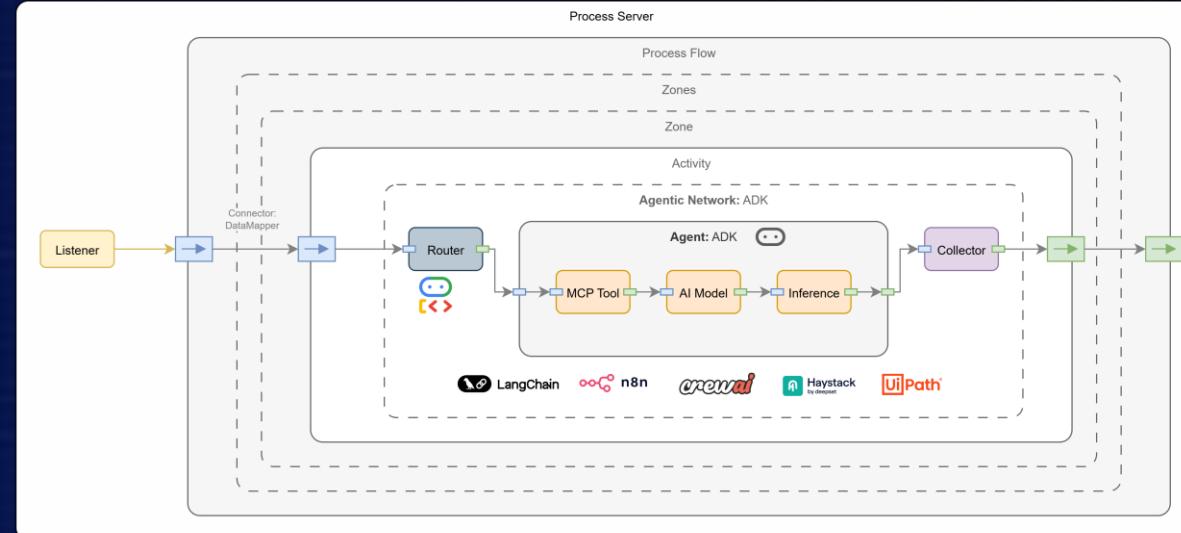
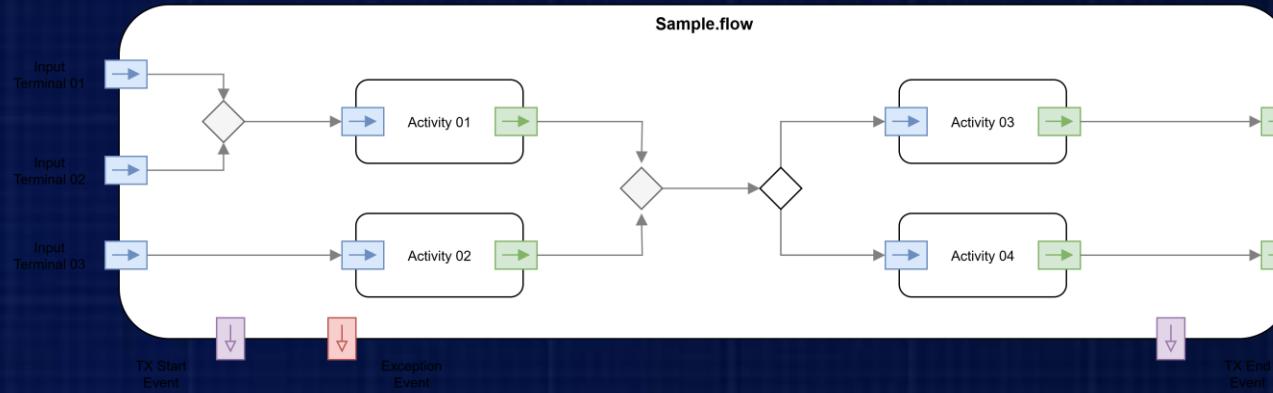
- **Authentication: Roles**
  - Diagram derives the team and profile structure with associated product and models
    - Focuses on the user and role authentication through policies assigned
    - The roles are further activated through the API and role mapping for further action/triggers
  - Plan and Pricing Model (not shown) is built into the system for each deployment uses the environment, and specifies applicable discounts.
  - Dynamic Form help capturing comprehensive user profile and processing human interactions.
  - Service Plan provides licensing and project management, mapping resources to client project needs and deliverables, etc.





# Research Net

# AGENTS AS PART OF YOUR BUSINESS PROCESS

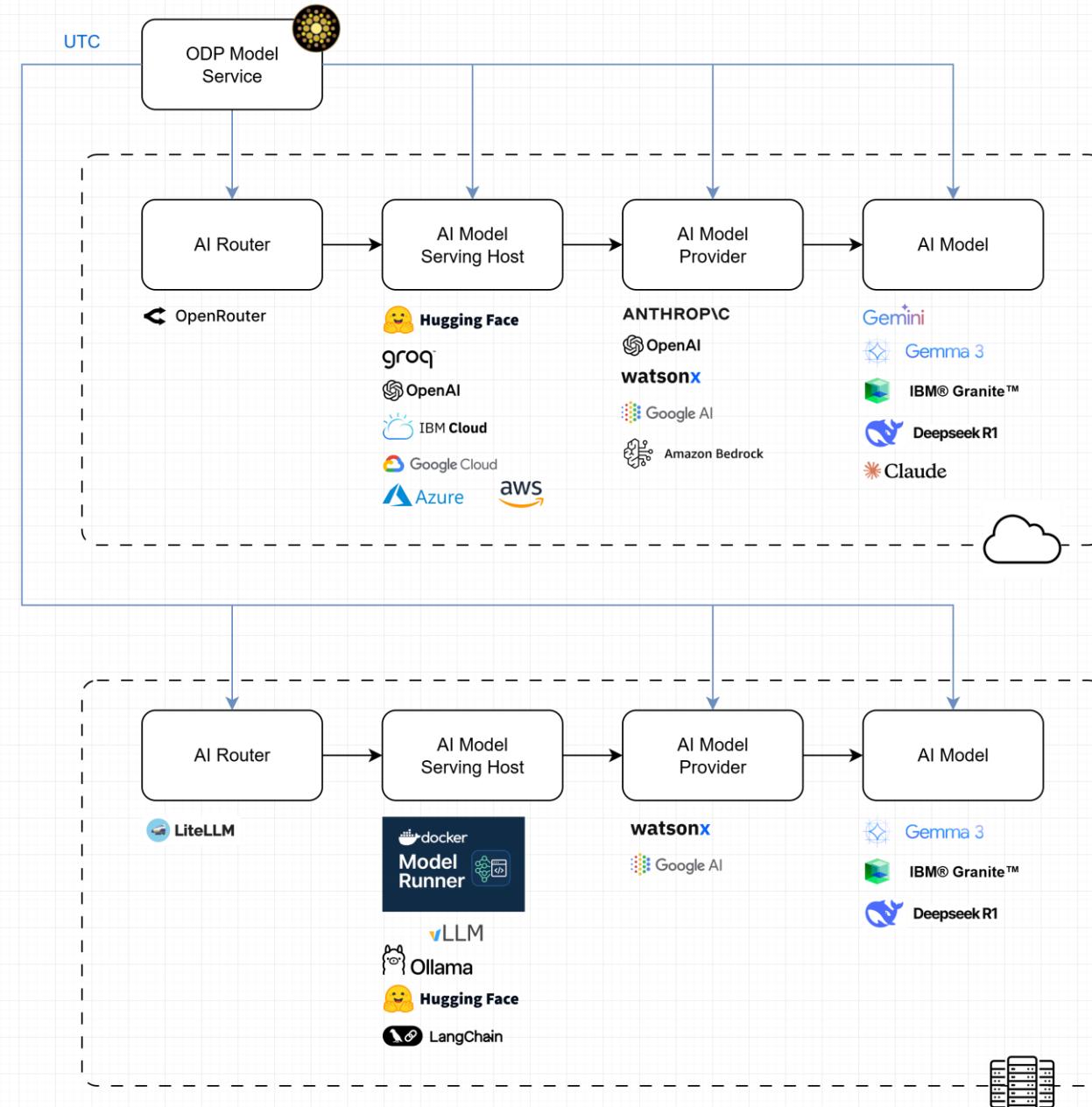




# Research Net

## Hybrid Model Deployments:

- New tools are evolving to support the abstraction of hybrid model deployments.
- Based on our research, this is the current state of the art deployment model:
  - **AI Router:** routes to a set of options where models are hosted.
  - **AI Model Serving Host:** hosts where models are running.
  - **AI Model Provider:** the organization that builds, trains and publishes the AI models.
  - **AI Model:** the model that is called.
- The diagram shows options available on the cloud as well on-prem. It does not necessarily mean all products support each other but merely options at each level.
- **ODP Model Service** is abstracted and designed to support all the hybrid architecture components directly.

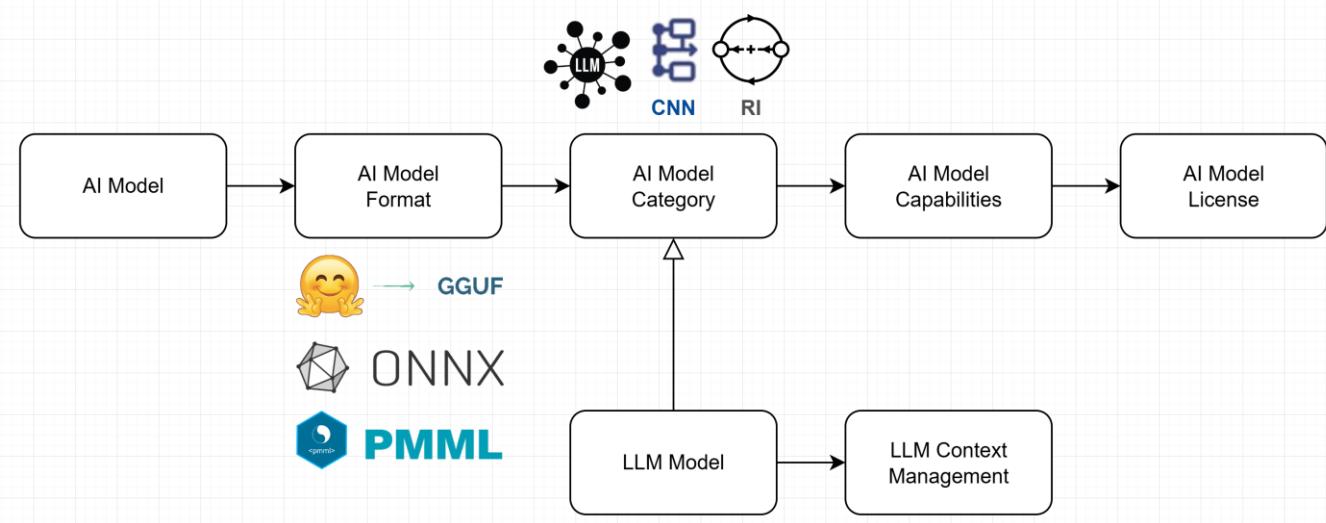




# Research Net

## AI Model Features:

- It is important to know the different model features that may affect how you architect the solution:
  - **AI Model:** the model that is used.
  - **AI Model Format:** the format of the model file.
  - **AI Model Category:** what type of model algorithm – LLM, CNN, RI, etc. The categories may have sub-categories.
  - **AI Model Capabilities:** what types of features the model supports.
  - **AI Model License:** how and what exact license agreement the model follows.
  - **LLM Model:** LLM is a AI Model Category.
  - **LLM Content Management:** extending the model context window.



## Scaling Models:



**KEDA** is a [Kubernetes-based Event Driven Autoscaler](#). With KEDA, you can drive the scaling of any container in Kubernetes based on the number of events needing to be processed.



Kubernetes [Horizontal Pod Autoscaler \(HPA\)](#) has revolutionized how we manage workloads by automatically scaling deployments/statefulset pods up or down based on the average CPU utilization, average memory utilization or any other custom metric you specify to match demand.



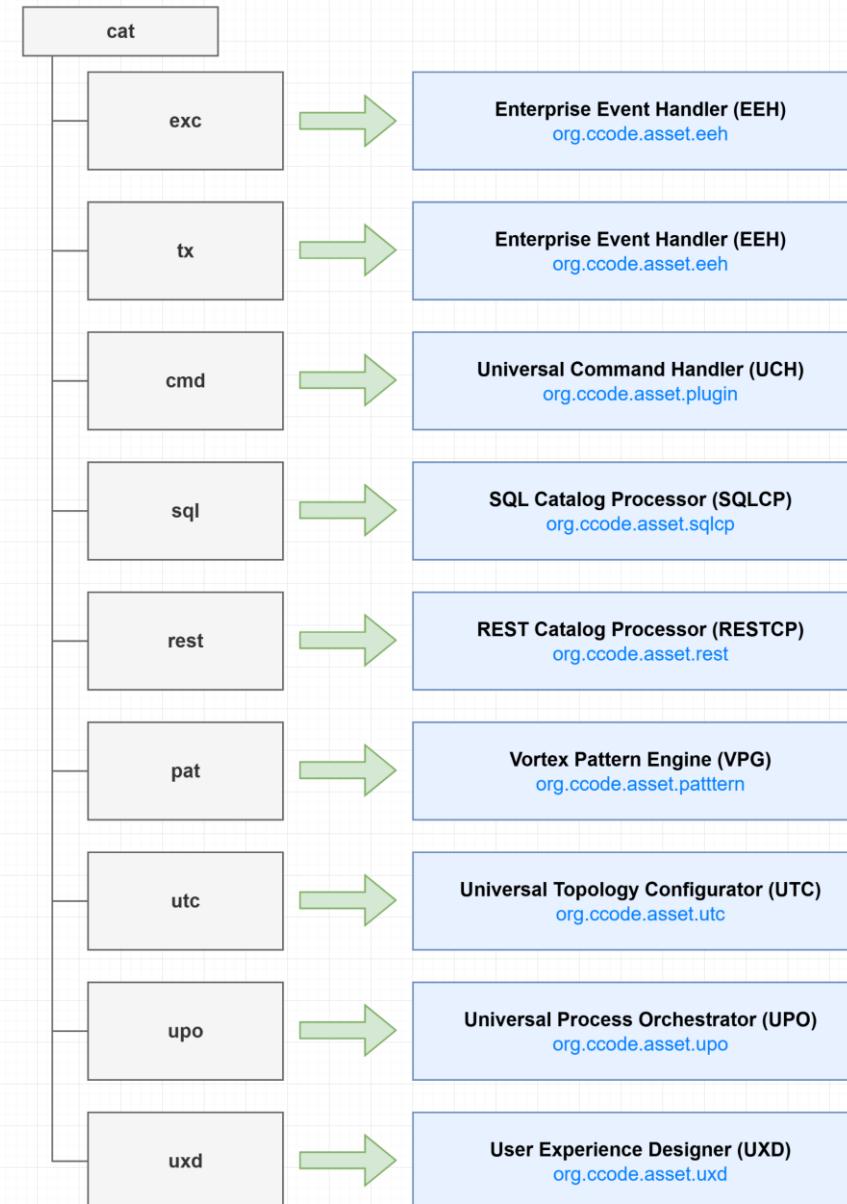
Kubernetes [Horizontal Pod Autoscaler \(HPA\)](#) has revolutionized how we manage workloads by automatically scaling deployments/statefulset pods up or down based on the average CPU utilization, average memory utilization or any other custom metric you specify to match demand.



# Research Net

## ODP Libraries:

- Diagram shows some of the main assets, modules and specifications packaged in ODP:
  - **EEH**: events and exception for observability and transactions.
  - **ETR**: test automation.
  - **UTC**: deployment automation with command designer.
  - **VPG**: pattern engineering.
  - **UPO**: process engineering including agents and frameworks.
  - **UXD**: designing user experience.
  - **SQLCP**: database handling.
  - **RESTCP**: Rest API handling.

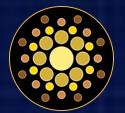




## Product Research Services

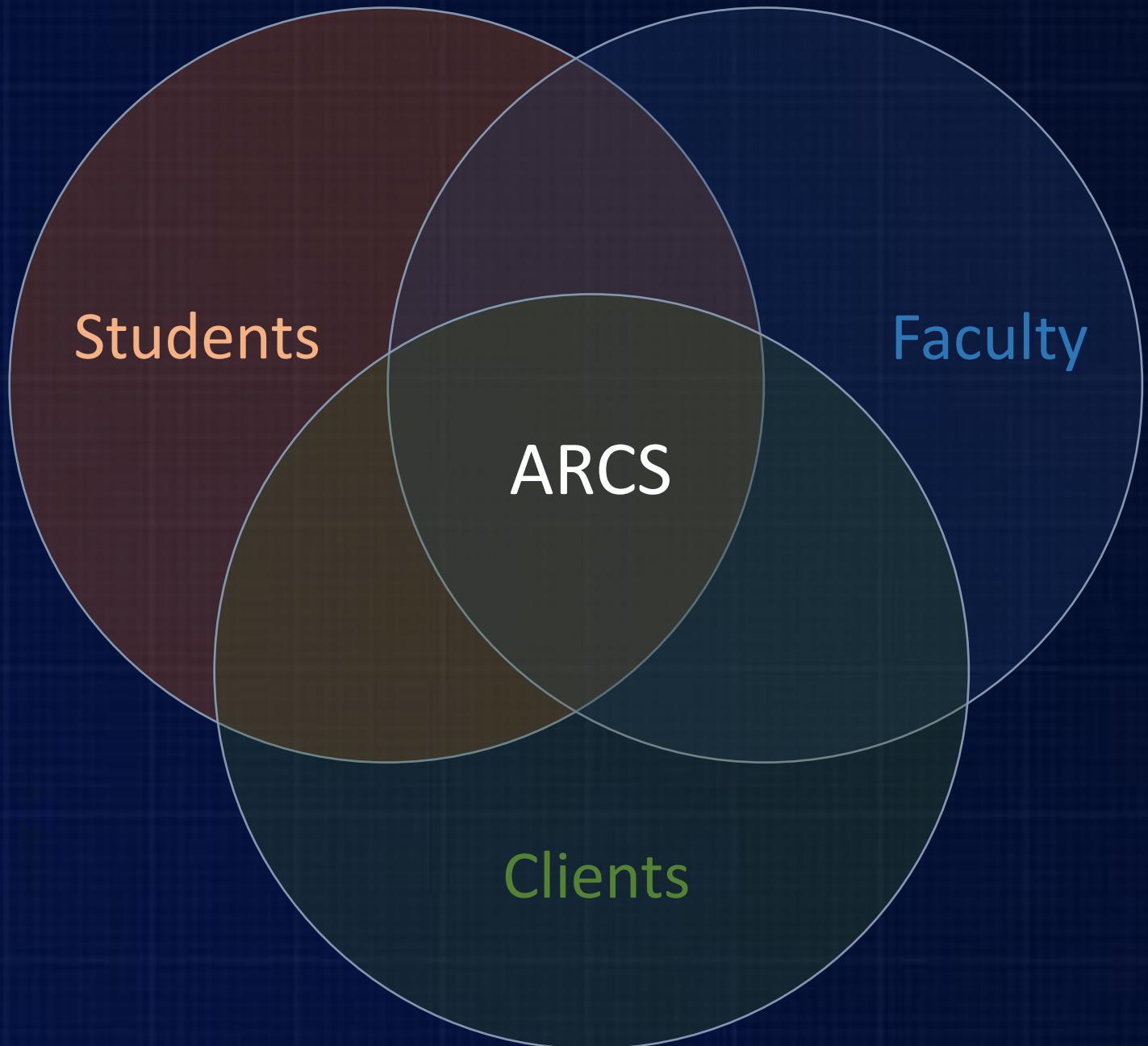
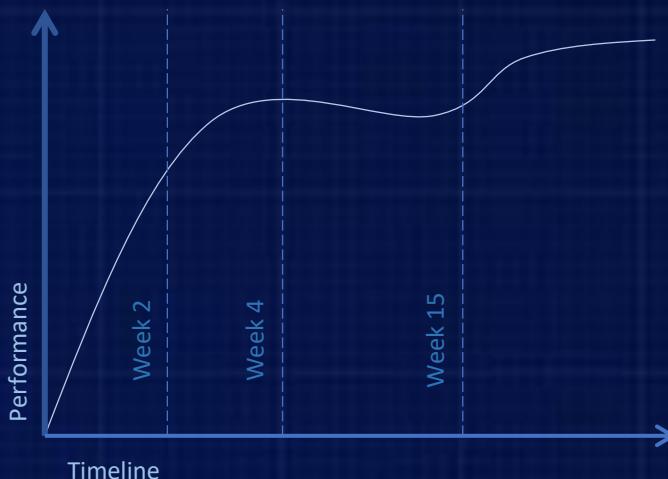
- Connect with Universities and Research organizations to find relevant research in the areas of interest to suggest product strategies
- Brainstorm and apply Design Thinking principles to Architect innovative solutions for customers with our experts
- Help build customer products on the Open Development Platform or on the Cloud
- Long-term support for the complete lifecycle of the product using automation





## Academic Research Client Services:

- Students selected based on merit into the pools after the completion of one or more Open Projects
- Students acquire knowledge and expertise on technology and products from Open Projects and ready to deliver

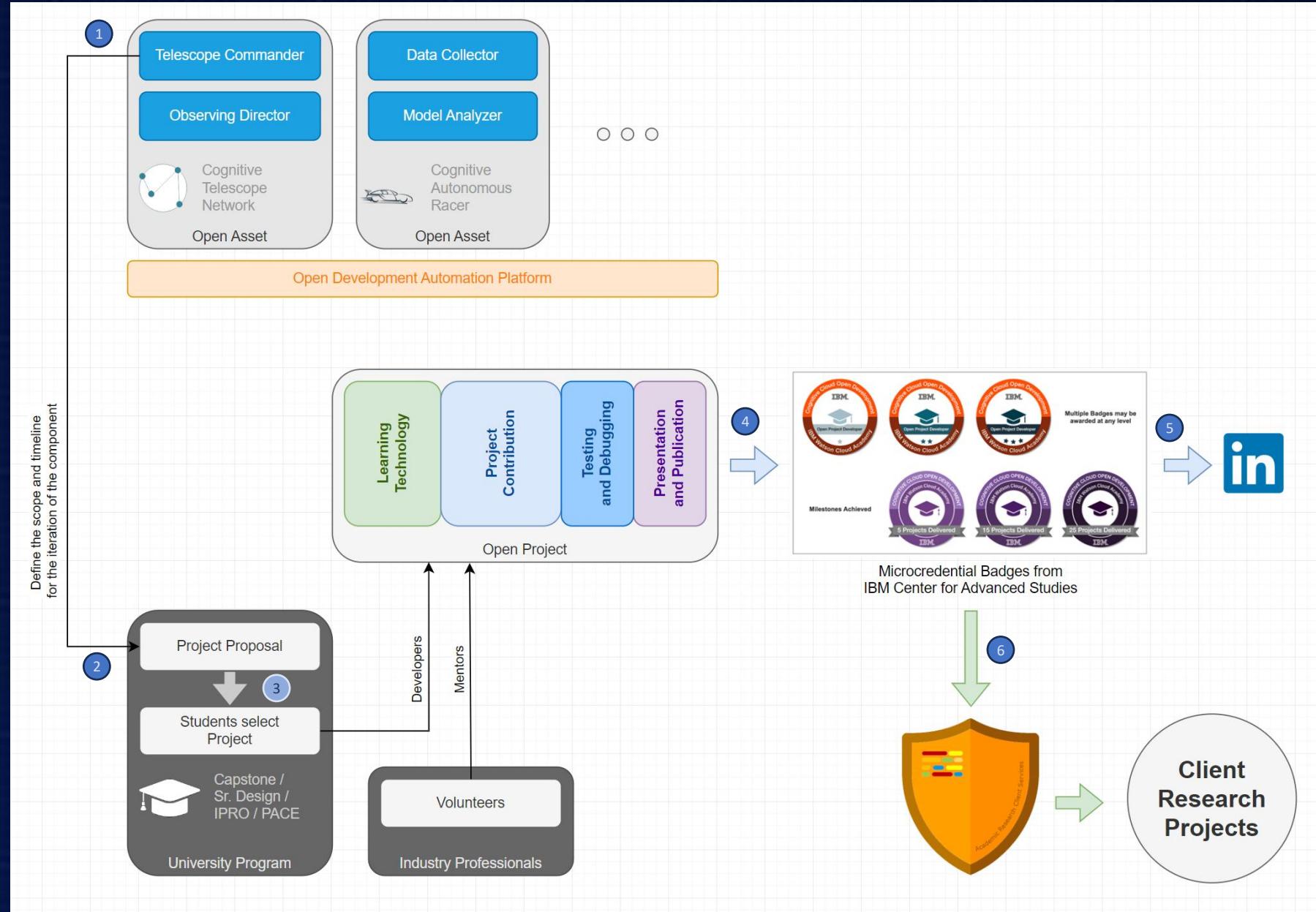


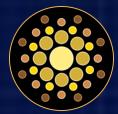


# Research Net

## Journey to ARCS:

- 1 An iteration of one component of an Open Asset project is defined for a capstone program
  - 2 The proposal is worked on by the university professor and product architect, scope and timelines defined
  - 3 Students pick the project they would like to work on and university defines the team
  - 4 Students learn the technology and contribute to the project and receive credits after final presentation and publication
  - 5 Share their experience on LinkedIn and resume with mentor references
  - 6 Selected few will be certified for the ARCS program to work on client research projects with guidance from ODP

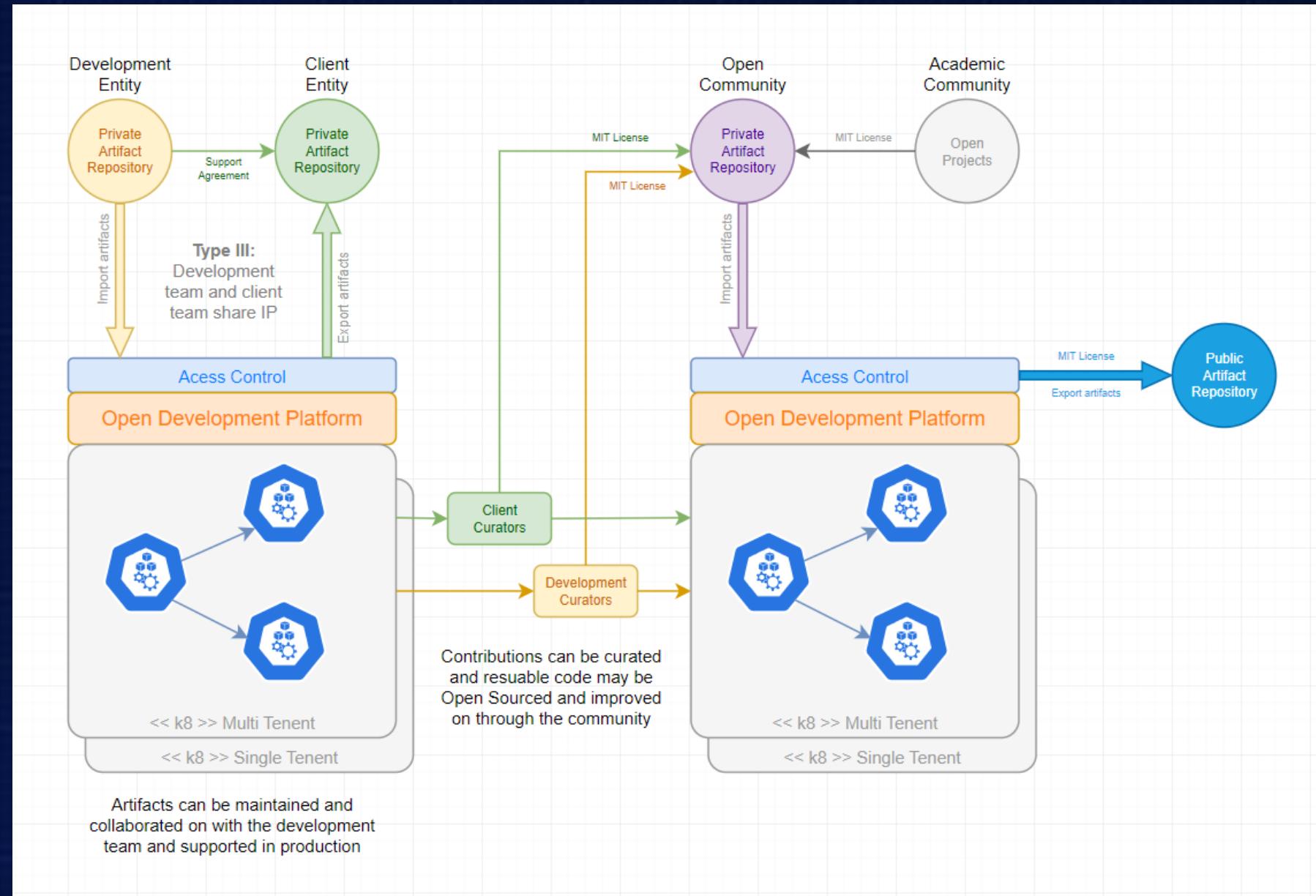


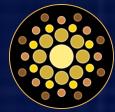


# Research Net

## Shared IP Model:

- Development entity and the Client entity shares the IP developed during the engagement
- Easy extend maintenance contracts for deployed code
- Possibility of Contributions to Open Source
- Easily collaborate with academic institutes on joint research and patents

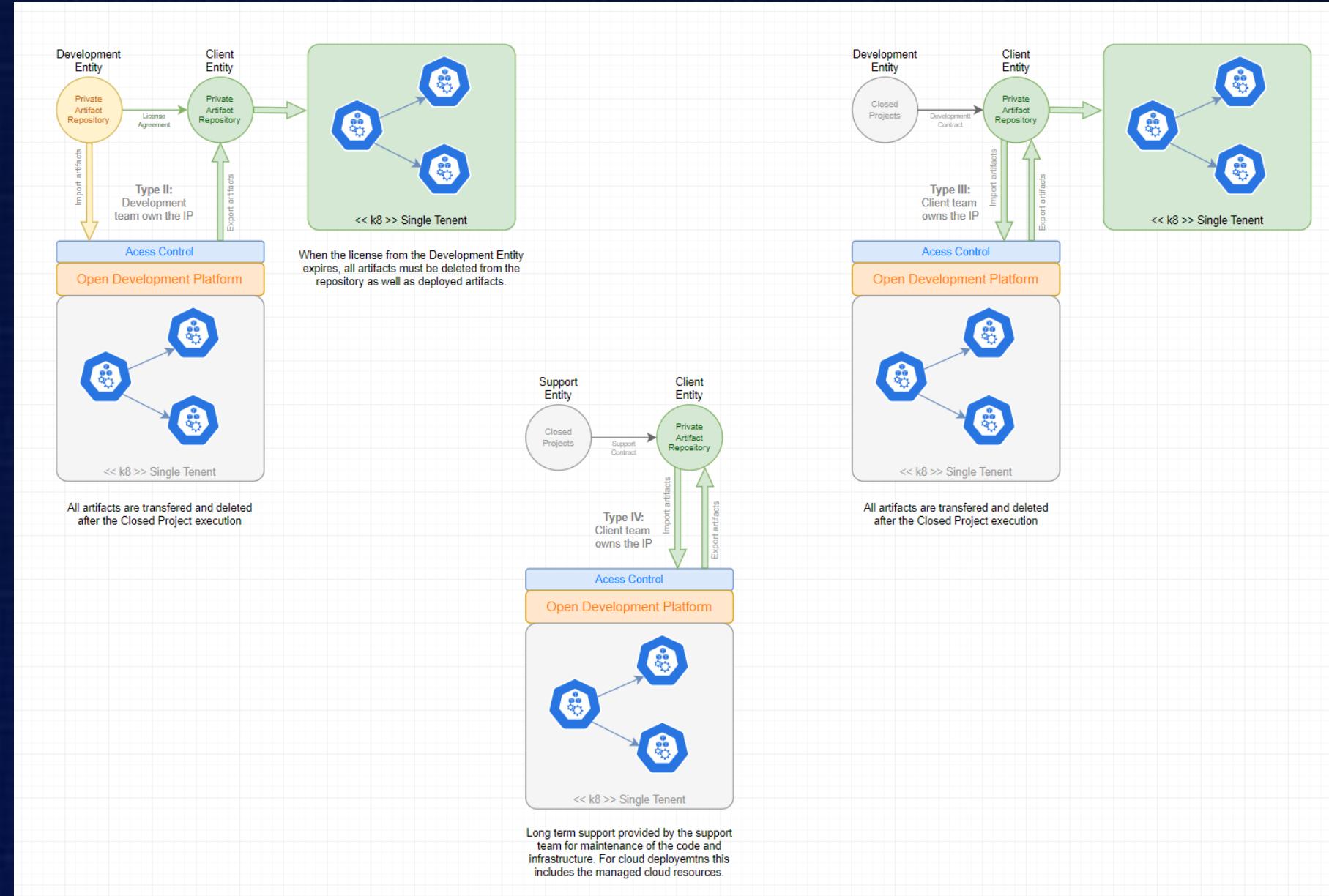




# Research Net

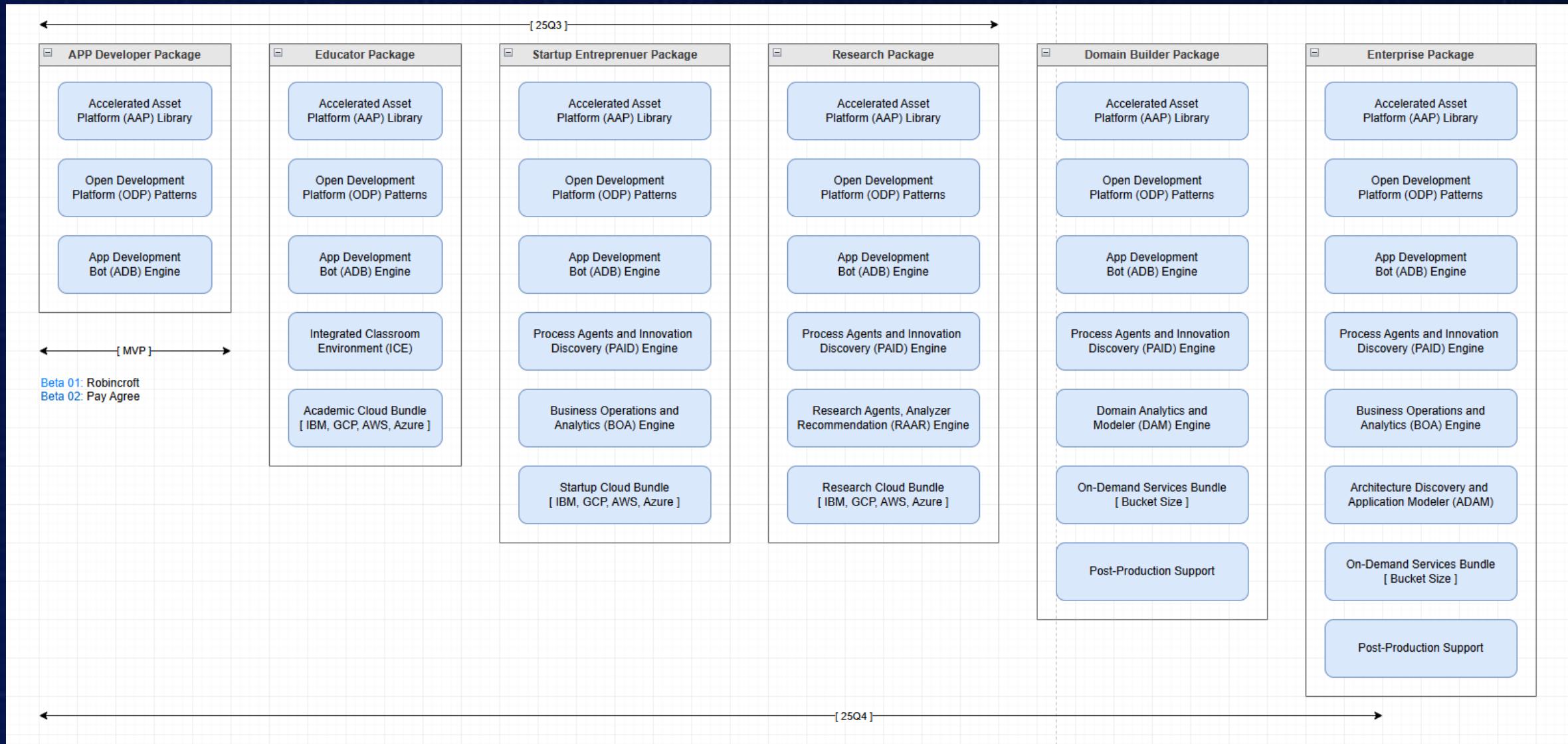
## Sole Proprietary IP Model:

- One of 2 entities own the IP developed during the engagement
- Long term support contracts and SLA's can be maintained with appropriate access controls
- Entities can be corporations or any research, academic or non-profit organization





# Research Net



# Team: MVP OPEN DEVELOPMENT TEAM



**Andres Alejandro** has almost 8 years of experience in IT, beginning my career at IBM as a student. He started as a database support specialist, transitioned into Python development, and eventually moved into full-stack development. His recent work has focused on modernizing legacy mainframe systems by developing new user interfaces with improved user experiences. Currently, he serves as an expert developer at IBM and am an active member of the Technical Eminence Council in Guadalajara, Mexico. He is an advocate for the adoption and enhancement of WCA and WX4C technologies, collaborating closely with the Watson team to improve support and code generation capabilities. Adres hold 3 patents and have authored 3 publications with IBM. He is the mentor for the Open Development Platform and Heads Center for Advanced Studies for Mexico.



**Muhammad Misbahuddin** is a data analytics leader with over a decade of experience driving digital transformation and pre-sales strategy across global enterprises. With a unique blend of technical fluency and business insight, he leads cross-functional teams that architect intelligent solutions and deliver data-powered decisions at scale specializing in SAP and Microsoft data platforms, Muhammad is a catalyst for stakeholder engagement and strategic execution. His passion for mentorship has shaped the journeys of over 100 aspiring analysts through cohort-based bootcamps. He's also a proud contributor to Techstars-backed startup ecosystems, championing innovation through accelerator programs and design thinking workshops.



**Diptam Mukhopadhyay** is a senior CSE student at Techno International New Town. He is an aspiring software engineer with a strong passion for backend technology and AI. Diptam was a finalist for Smart India Hackathon-2023, showcasing his problem-solving and development skills. He has actively worked on various projects, incorporating technologies like Python, JS, Natural Language Processing (NLP), and Java. With over two years of experience in open development, Diptam has been a key contributor to the release of researchnet.ai. He is also the editor for the ODP Blog this month.



**Vishnu Thampuran** is a graduate computer science student at Illinois Institute of Technology with a strong background in AI, machine learning, and data systems. His experience spans autonomous systems, computational neuroscience, sustainability analytics, and generative AI applications, with roles in both industry and research. At Research Net, Vishnu contributed to the platform's backend development and core data science helping make research smarter and more scalable.



**Hari Krishna** is a Masters student of Computer Science at University of Illinois Chicago. He has more than 2 years of experience as a Full Stack Software Engineer. He has built scalable enterprise applications at Wipro Technologies and specializes in Java, C#, SQL, Azure, React, Python, .NET, and Spring Boot, with strong foundations in data structures, REST API design and AI.



# Team: MVP OPEN DEVELOPMENT TEAM



**Abhi Majumdar** is a sophomore at the UHigh school at the University of Chicago. Abhi has been taking advanced Computer Science lessons at the school and have already completed the Python Course and moving on to Java in the next year. He has been actively contributing to the Open Development Platform by publishing blogs and contributing to various Python and Java experiments with the cutting-edge AI Agent technologies for the MVP release.



**Aditya Ratnawat** is a Junior at Adlai E. Stevenson High School. With a passion for Computer Science and Business, he has completed a variety of courses in schools of such interest, such as AP CSA. Pursuing his passion outside of school as well, he is working on ML and Finance Certifications. He had been helping the Open Development Platform team for their MVP release and building the website.



UHigh  
University of Chicago



Stevenson High  
School



**University of Chicago**

The University of Chicago (UChicago, Chicago, or UChi) is a private research university in Chicago, Illinois, United States. Its main campus is in the...

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**Northwestern University**

Northwestern University (NU) is a private research university in Evanston, Illinois, United States. Established in 1851 to serve the historic...

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**Illinois Institute of Technology**

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**University of Illinois Urbana-Champaign**

The University of Illinois Urbana-Champaign is a public land-grant research university in the Champaign-Urbana metropolitan area, Illinois, United...

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**North Carolina State University**

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**Macquarie University**

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**Kwame Nkrumah University of Science and Technology**

North Carolina State University is a public land-grant research university in Raleigh, North Carolina, United States. Founded in 1887 and pa...

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**Harvard University**

Harvard University is a private Ivy League research university in Cambridge, Massachusetts, United States. Founded in 1636 as New College, and lat...

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Partner:

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**Nahel Gandhi**

Founder, CEO  
Parinamas LLC.

**Parinamas**

<https://parinamas.com/>



**Laszlo Gonc**

Founder, CEO,  
Next Era TG LLC.

**NEXTERA**  
TRANSFORMATION GROUP

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**Rikhi Pal Singh**

President  
Sachhsoft Inc.

**SACHHSOFT**

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**Nachiket Patel**

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**DIGICORP**

<https://www.digi-corp.com/>



**Carlos Cardoso**

Operations Director  
Programmers Inc.

**Programmers**  
Beyond IT

<https://www.programmersinc.com/>



**Nitin Uchil**

Founder, CEO,  
Numorpho Cybernetic Sys. LLC



<https://www.linkedin.com/company/numorpho/>



**Ishan Vyas**

Co-Founder, CEO,  
Citrusbug Technolabs

**Citrusbug**  
Technolabs

<https://citrusbug.com/>

Partner:

# RESEARCH NET SERVICES NETWORK



**Narotam Gediya**

Founder, CEO  
Black Kite Tech Pvt. Ltd.



<https://blackkitetechnologies.com/>



**Dnyanesh Gangamwar**

Founder, CEO,  
Amazatic Solutions LLP.



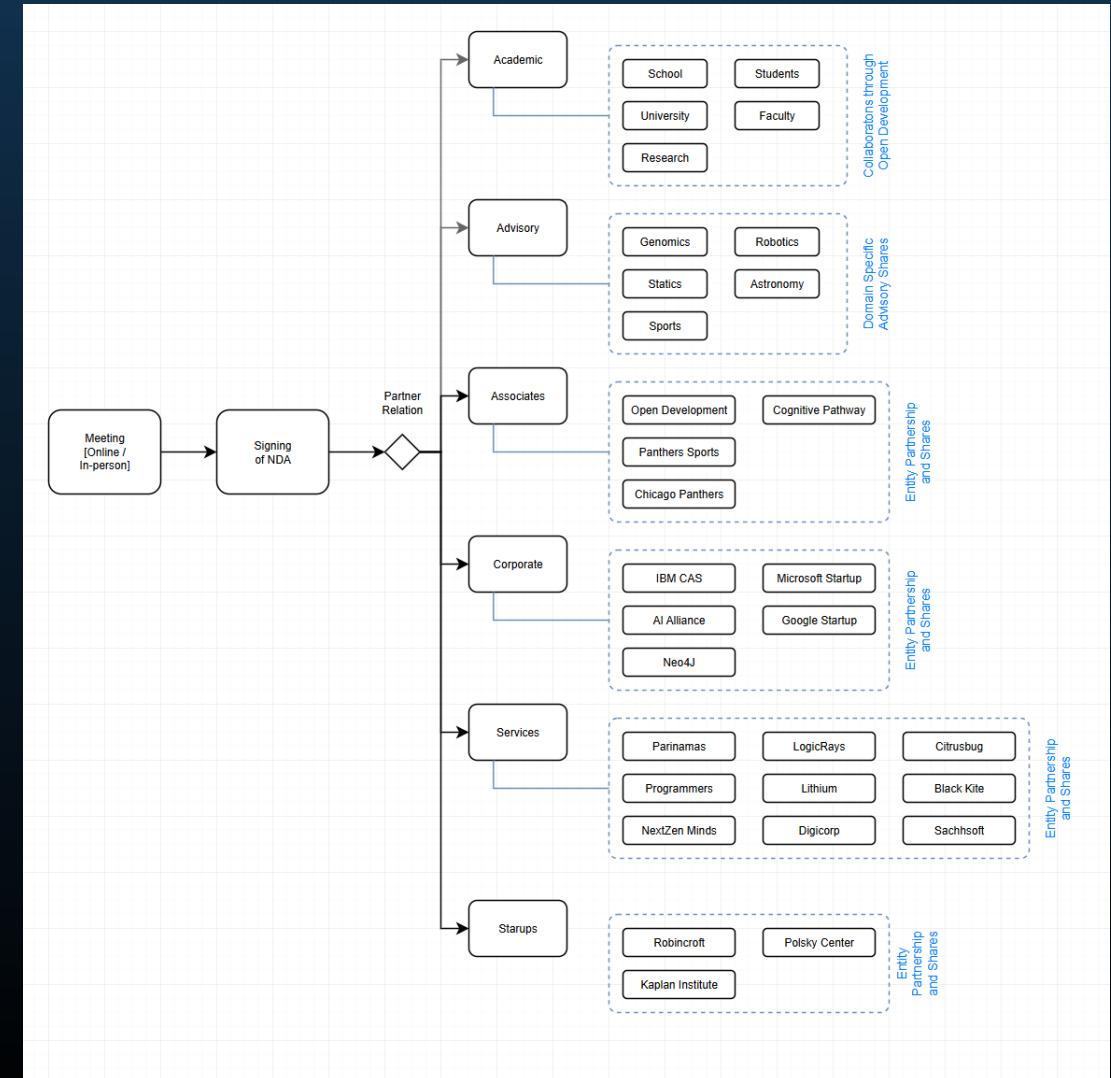
<https://amazatic.com/>

**Ravi Arvind Wanage**

Chief Growth Officer,  
NextZen Minds Pvt. Ltd.



<https://www.nzminds.com/>



Partner:

## ROBINCROFT

<https://robincroftconsulting.co.uk/index.html>



**Paul Chapman** is a highly experienced Executive level leader within FTSE companies with a passion for delivering results, building successful teams, self-improvement and continuous learning. Having worked extensively within banking, finance and property industries Paul has a rich depth of experience and learning of the advantages available to aspiring individuals and companies from investment in leadership development and training. Having walked the path himself, Paul combines empathy and a deep understanding of executive pressures with a commitment to developing high performance.



**Andy Siddall** transitioned from running his own events business to pursue professional cricket coaching in 2004, gaining international experience across education and professional talent development environments. Over 18 years in leadership roles, including elite talent pathways, he's built deep expertise in personal development, performance and leadership. His journey gives him a unique perspective and drive to help leaders avoid both personal failure and derailment, and organisational silos and underperformance — building the skills required for success.



Through **performance coaching** we help individuals, teams & organisations solve problems, helping leaders to address issues that impact teamwork, organisational health, silos, employee engagement, direction, strategy & performance.



Partner:

SYNTAR.AI: CODERA



GenRAIT  
eVive  
Micro-mobility Pvt Ltd

Dr. Santanu Das  
Founder, CEO  
GenRAIT Inc,  
eVive Micromobility  
Syntar AI

Santanu Das is the cofounder of GenRAIT Inc., a biotech/genomics startup accelerating scientific discovery, and eVive Micromobility Pvt Ltd, focused on delivering better green mobility solutions. He brings vision to life through sharp technical insight and decisive leadership. He is a ex-NASA scientist, where he mined vast pools of data to support missions advancing our understanding of the cosmos. He has since held pivotal roles at data giants like Verizon, Cisco, and Palo Alto Networks, leading the development and deployment of cutting-edge AI/ML products. With a detail-oriented mindset tuned not only to solving problems but anticipating them. Santanu thrives in high-stakes environments with precision and impact coming up with innovative ideas to solve problems.

AI Driven product development with ODP integration

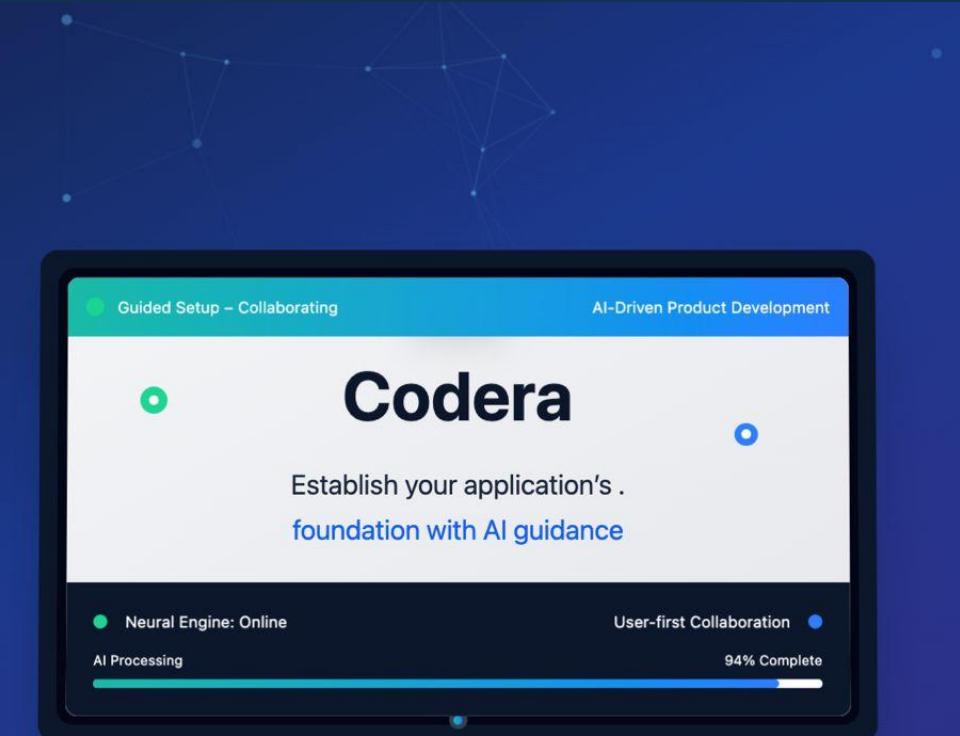
Live Demo 

Syntar AI

Build with AI, Own Every Decision.  
Empowering confident, collaborative choices.

- Cut development time with consistent, high-quality delivery.
- Double productivity through smart automation with full user control.
- Reduce costly rework using standardized guardrails and flexible workflows.

Start Building Together



Partner:

# COGNITIVE PATHWAY EXTREME



**Dr. Arvind Kumar** is a computational neuroscientist specializing in the dynamics and information processing of neuronal networks. Their research focuses on uncovering how network connectivity and dynamics influence the transfer of information between brain regions, how neuronal and synaptic properties interact with network structures to shape activity, and how external stimulation can be used to control these dynamics. By integrating analytical methods from statistical mechanics, probability theory, graph theory, and control systems with large-scale neural simulations, He aims to build mathematical models of brain disorders such as Parkinson's disease, epilepsy, and anxiety. Their ultimate goal is to develop a theoretical framework for understanding disease-related brain activity and to design novel, stimulation-based strategies for therapeutic intervention.



**Dr. Abid Ali** has worked in data and analytics for many years building some of the largest data solutions around the world across various industries. His focus has been data engineering, data architecture, data security, ethics, and privacy. He has had a successful career in corporate sector and now teaches in the data science graduate programs of Northwestern University and University of Chicago. He has taught in Columbia University in the past. He regularly speaks on panels and delivers guest lectures on similar topics at various universities including Harvard. He is a serial and social entrepreneur and has co-founded a few start-ups over the years in data and AI space. He has been advising several start-ups as well.



**Dr. Daria Tsoupikova** is a Professor in the School of Design and the Electronic Visualization Laboratory and the founder of the Computer Science and Design (CS+DES) program at the University of Illinois Chicago. She is a second wave VR artist/researcher and has been creating VR creative applications and networked tele-immersive multi-user real-time VR exhibitions for VR projection systems, such as Cave Automatic Virtual Environment (CAVE) and CAVE2 for over 20 years. These works investigate computational creativity to design real life applications that advance healthcare, education and social change. Tsoupikova's work has been exhibited and published by Springer, Leonardo, SIGGRAPH, IEEE VR, IEEE VIS, ISEA and funded by the NSF, NEA, NIDRR and the Department of Education.



**Dr. Jeff Nyhoff** is a seasoned interdisciplinary educator with over 20 years of experience integrating computing across the curriculum. Often describing himself as more of a "computer liberal artist" than a traditional computer scientist, he bridges computing with the arts, humanities, and social sciences. His teaching frequently incorporates digital media and draws on theatre and performance theory to explore both the practice of programming and the performative nature of graphical user interfaces. He is a published author on the "Processing" programming environment and collaborates with Daria Tsoupikova at the University of Illinois – Chicago to design immersive experiences in CAVE environments, blending augmented and virtual reality with embodied presence.



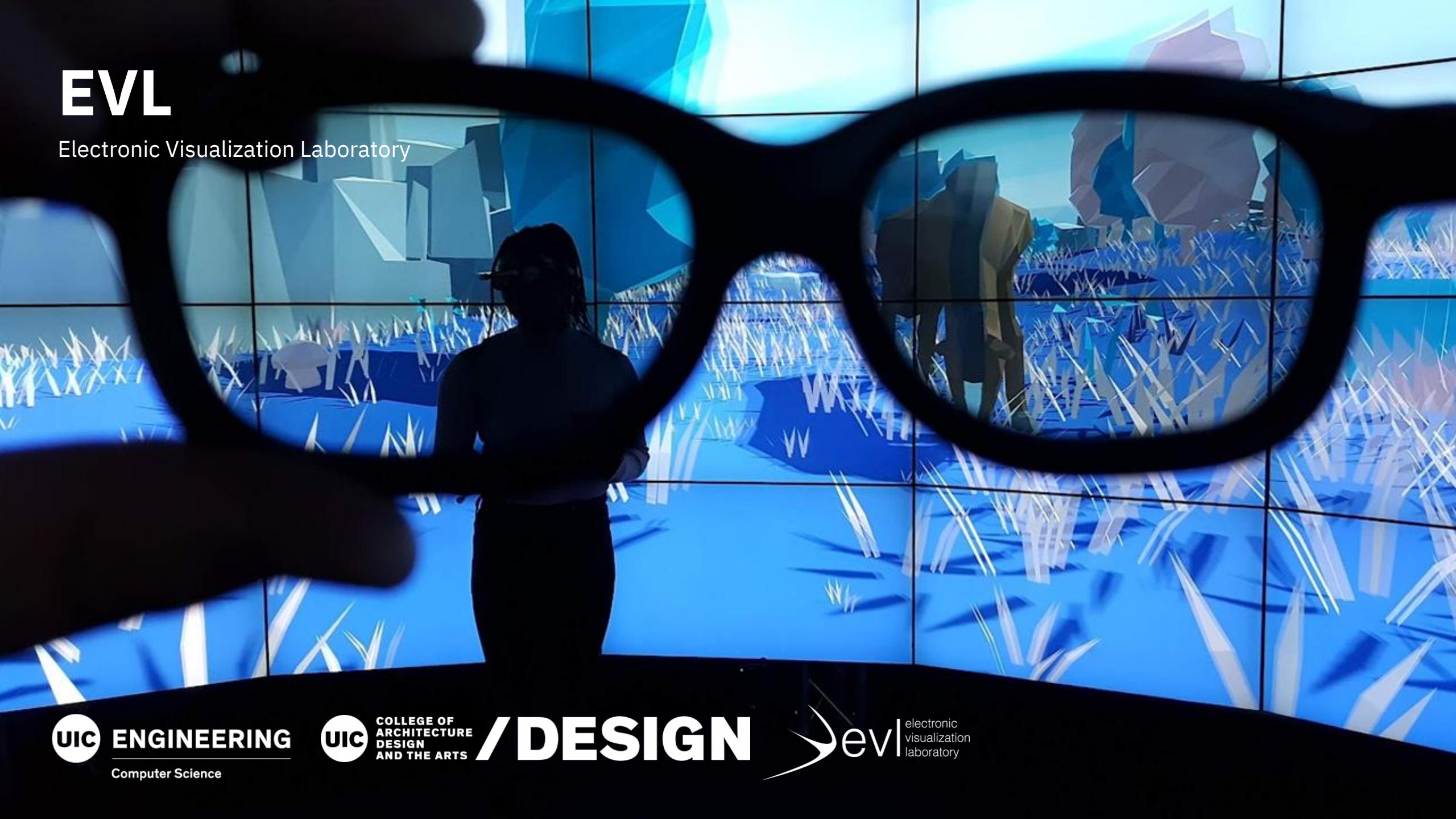
**Arunava Majumdar**  
Founder, CEO  
Research Net.ai Inc.  
Open Development  
Platform LLC.



**Dr. Santanu Das**  
Founder, CEO  
GenRAIT Inc,  
eVive Micromobility

# EVL

Electronic Visualization Laboratory





**UIC** ENGINEERING  
Computer Science



COLLEGE OF  
ARCHITECTURE  
DESIGN  
AND THE ARTS

/DESIGN

evl  
electronic  
visualization  
laboratory

# Electronic Visualization Laboratory (EVL) 1973-2023+

50 years of Design/Art/Science collaboration at UIC

EVL specializes in **collaborative visualization**, virtual reality, visual data science, and advanced computing and networking infrastructure. The distributed computing/visualization, the advancement of tools, software and techniques for collaboration over high-speed, experimental networks, the design of tools and techniques for real-time and interactive visualizations are some of the many areas of expertise offered by the EVL.

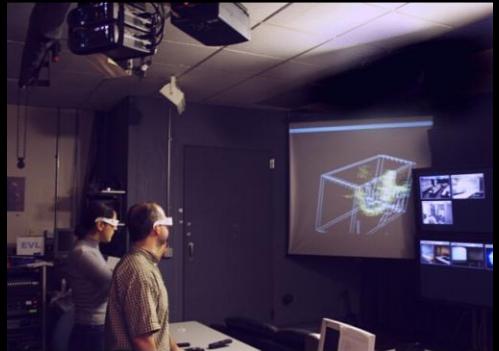
Some of EVL's most notable projects are the **Sayre Glove** (1976), **Star Wars Animation** (1976), **CAVE** (1992), **CAVE2** (2012), **COMPaaS** (2018), **SAGE3** (2020).



PARIS (1998)



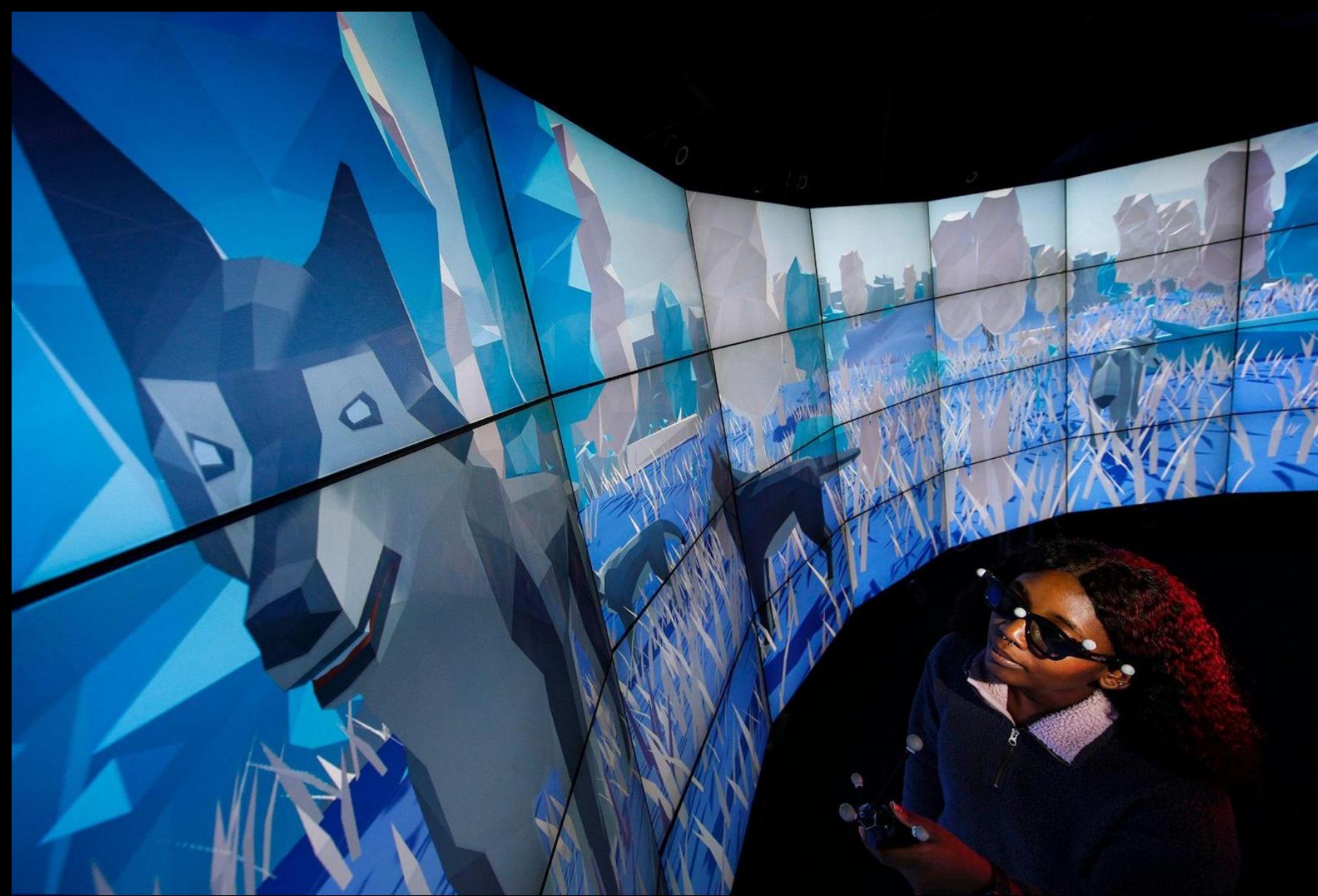
Varrier (2003)



Geowall( 2006)



CAVE (1992)



Creative Coding + Theater + Design  
IBM / Argonne /

Theory and practice of designing and developing virtual reality (VR) projects using the Unity game engine +foundational creative coding techniques. Students will explore the history of VR in art and science, and engage with immersive design through 3D interaction, typography, and theater using advanced technologies like the CAVE2 VR environment at UIC's Electronic Visualization Laboratory (EVL).

CS/DES 427/DES350/450:  
**Creative Coding**

Startup Collaboration:

**ILLINOIS  
TECH**





Startup Collaboration:

**POLSKY**

Center for Entrepreneurship and Innovation

THE UNIVERSITY OF CHICAGO



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KATHIE SWEET

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Humanities



## Ubuntu Changemakers





HIGH PERFORMANCE PROGRAM

ADELAIDE AUSTRALIA





# Genomics Research



**Dr. Michael Bouzinier**  
Senior Research Software Engineer



**HARVARD**  
University Research Computing  
and Data Services

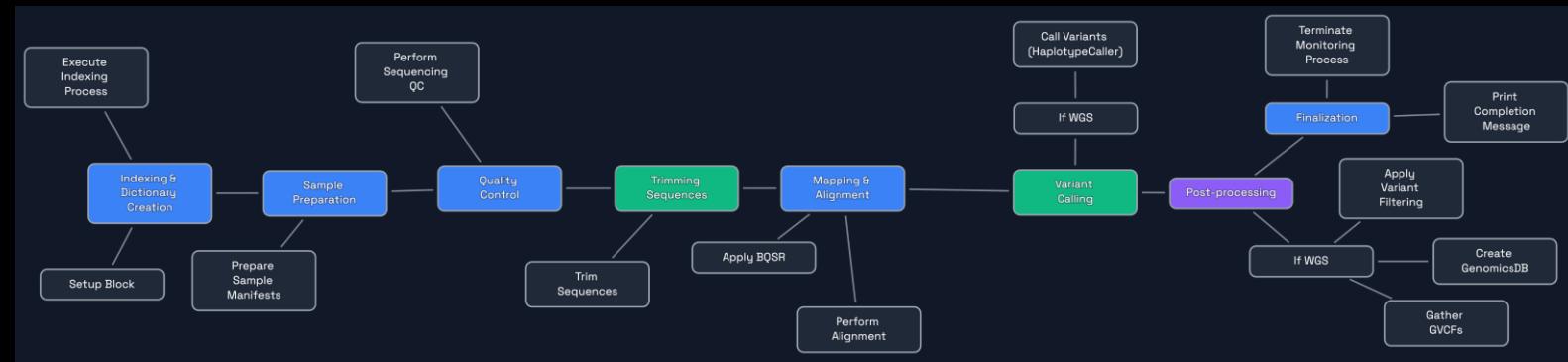
In collaboration with:



<https://forome.org/>



<https://www.genrait.com/>



**Forome** Frontend: Anfisa 0.10.0 Backend: Anfisa 0.7.8

**Datasets** :

Name	Created at
PGP3140_HL_GENES	Feb.21, 2025
<b>XL_PGP3140_HL_GENES</b>	Feb.21, 2025

**XL\_PGP3140\_HL\_GENES**

**Start with**

Whole genome/exome

Existing candidates are unavailable

**General**

- Info
- Dataset Overview
- SvABA Report
- Callability Analysis
- Genes with Uncallable Regions
- Full Callability Report (alphabetically by genes)
- QC reports
- Ancestry PCA Plot
- QC Report
- Coverage Histograms

**Info**

Name	XL_PGP3140_HL_GENES
Kind	xl
Variants	2592
Created At	2025-02-22T01:27:11.000Z

**Annotation sources versions**

Anfisa Load	Anfisa 0.7.8
GERP	hg19.GERP_scores



## Robotics Research

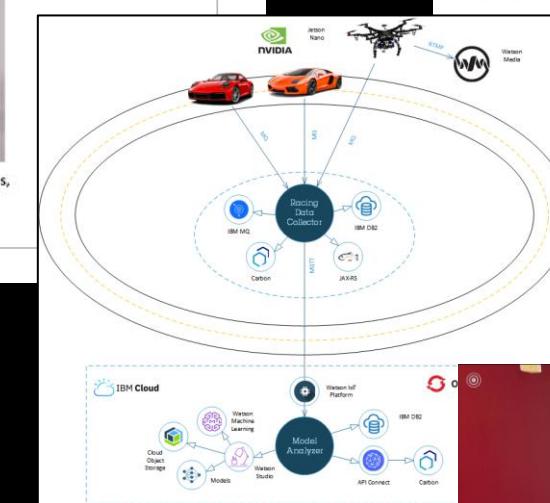
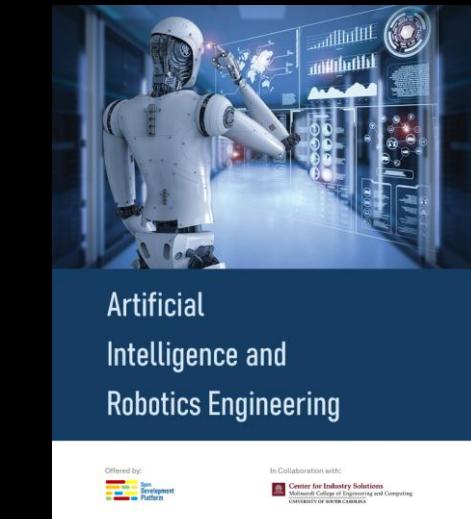
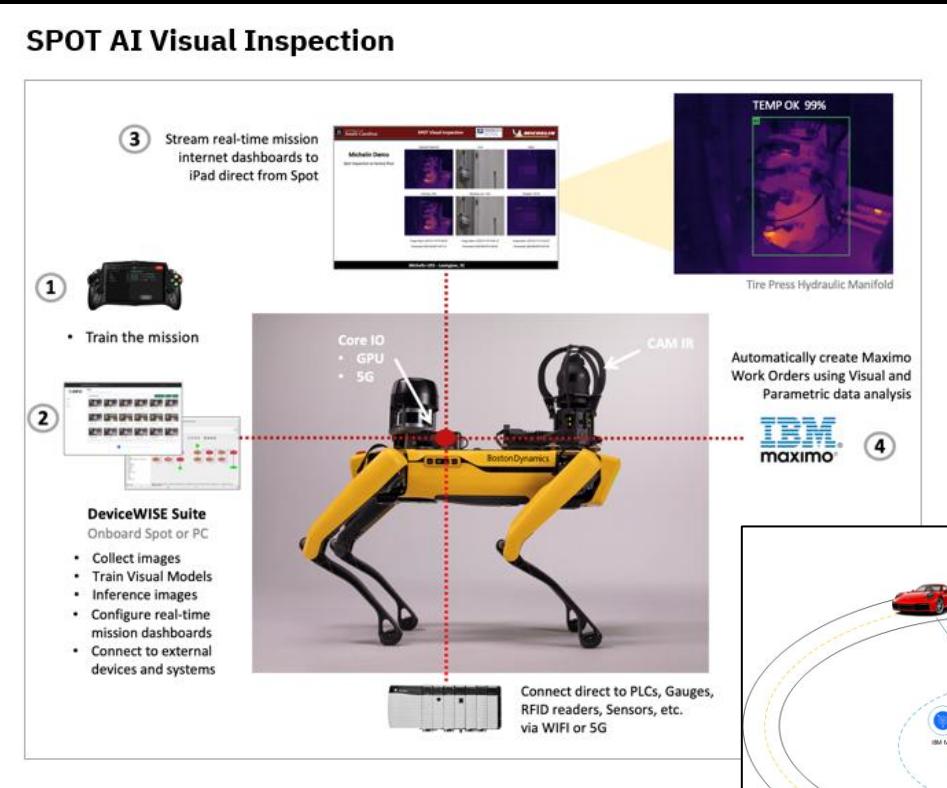


Dr. Noble Anumbe  
Senior Program Manager, Engineering and Emerging Technologies



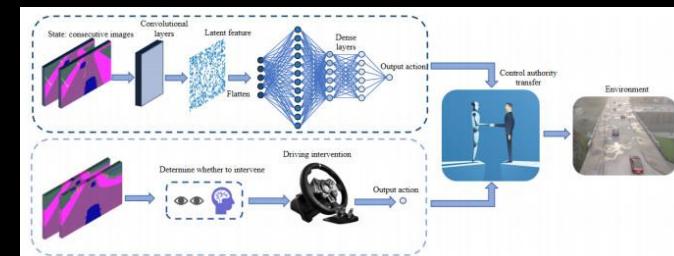
UNIVERSITY OF  
South Carolina

In collaboration with:



THE UNIVERSITY OF CHICAGO  
DATA SCIENCE INSTITUTE

NC STATE UNIVERSITY

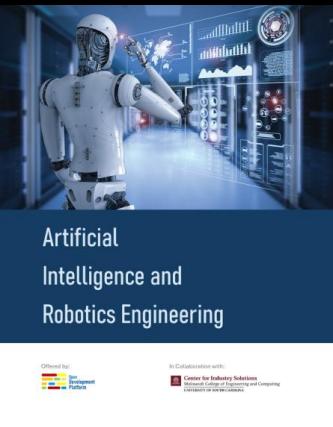


MACQUARIE University SYDNEY - AUSTRALIA

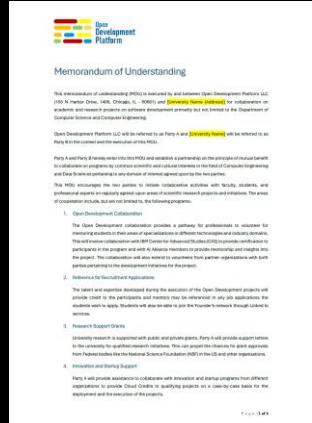
## COLLABORATION WITH KING SAUD UNIVERSITY

# Proposal to work with SDAIA and King Saud University on Open and Client Projects:

- Students will work on Open Source projects from the Open Development Platform to gain knowledge and expertise – there is no cost associated with this.
  - Students will earn IBM CAS certificates while getting university credit for the project upon completion.
  - Faculty-driven AI Courses will be offered on-line at a cost based on the number of modules and credit hours awarded for the course. This will be decided with the university faculty. There may be additional cost associated with the hardware and cloud deployments for these courses, e.g. Robotics Course
  - Once the students are selected for the ARCS program and a client project is selected by SDAIA, a T&M contract will be executed based on the hourly rates of the architect, project management, faculty and students for a specific SOW and requirements.



Open Development Platform King Saud University will sign a Memorandum of Understanding to get started on the student projects and build the pipeline for client research projects in the future.

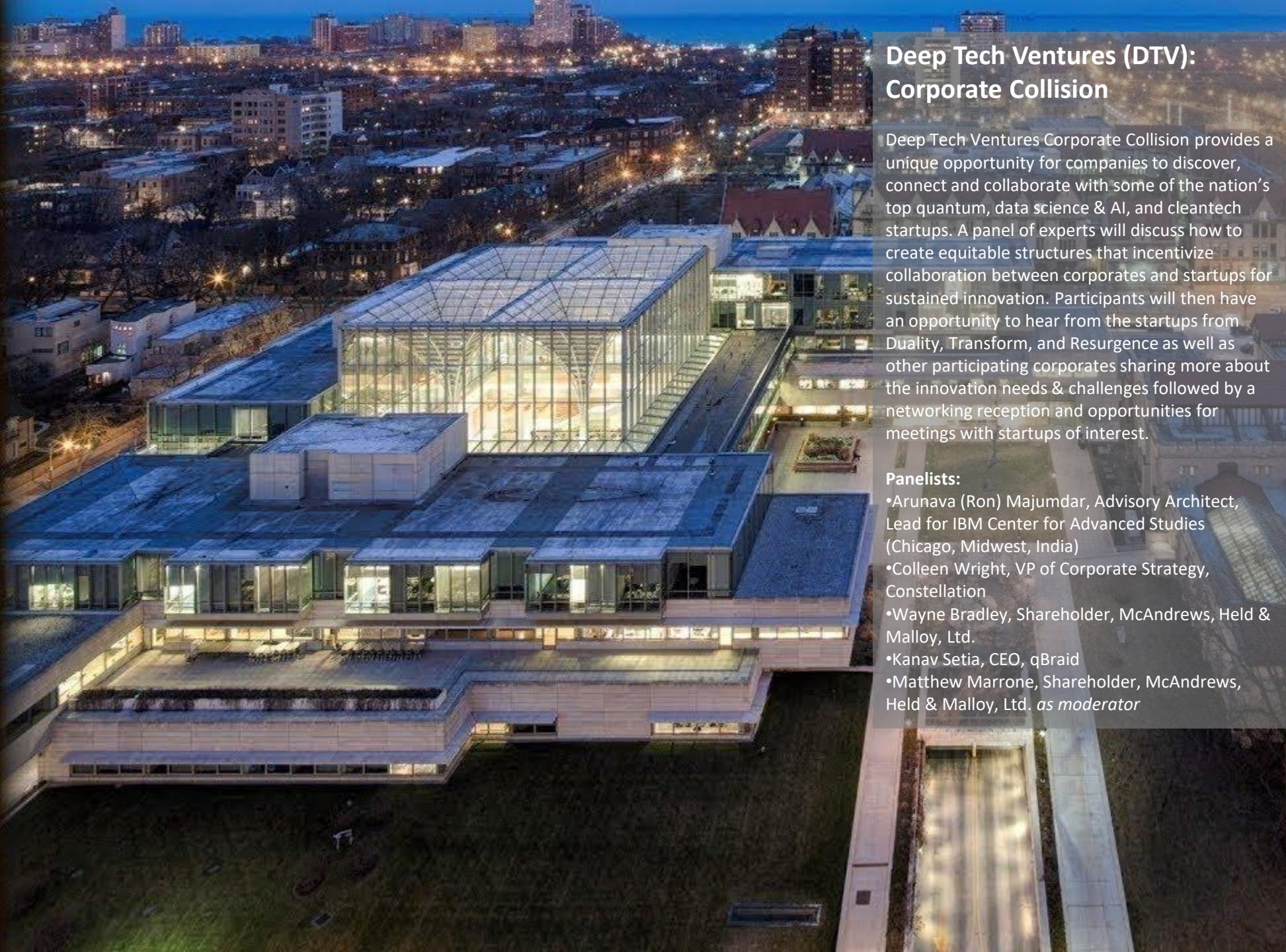


# Deep Tech Ventures (DTV): Corporate Collision

April 9<sup>th</sup>, 2024

Collaborating with IBM on Startups and Academia

Arunava Majumdar



## Deep Tech Ventures (DTV): Corporate Collision

Deep Tech Ventures Corporate Collision provides a unique opportunity for companies to discover, connect and collaborate with some of the nation's top quantum, data science & AI, and cleantech startups. A panel of experts will discuss how to create equitable structures that incentivize collaboration between corporates and startups for sustained innovation. Participants will then have an opportunity to hear from the startups from Duality, Transform, and Resurgence as well as other participating corporates sharing more about the innovation needs & challenges followed by a networking reception and opportunities for meetings with startups of interest.

### Panelists:

- Arunava (Ron) Majumdar, Advisory Architect, Lead for IBM Center for Advanced Studies (Chicago, Midwest, India)
- Colleen Wright, VP of Corporate Strategy, Constellation
- Wayne Bradley, Shareholder, McAndrews, Held & Malloy, Ltd.
- Kanav Setia, CEO, qBraid
- Matthew Marrone, Shareholder, McAndrews, Held & Malloy, Ltd. *as moderator*



# IBM Quantum Hackathon

in Collaboration with

## University of Illinois Urbana-Champaign

Wednesday, June 8<sup>th</sup>, 2022  
Final submission: July 6<sup>th</sup>



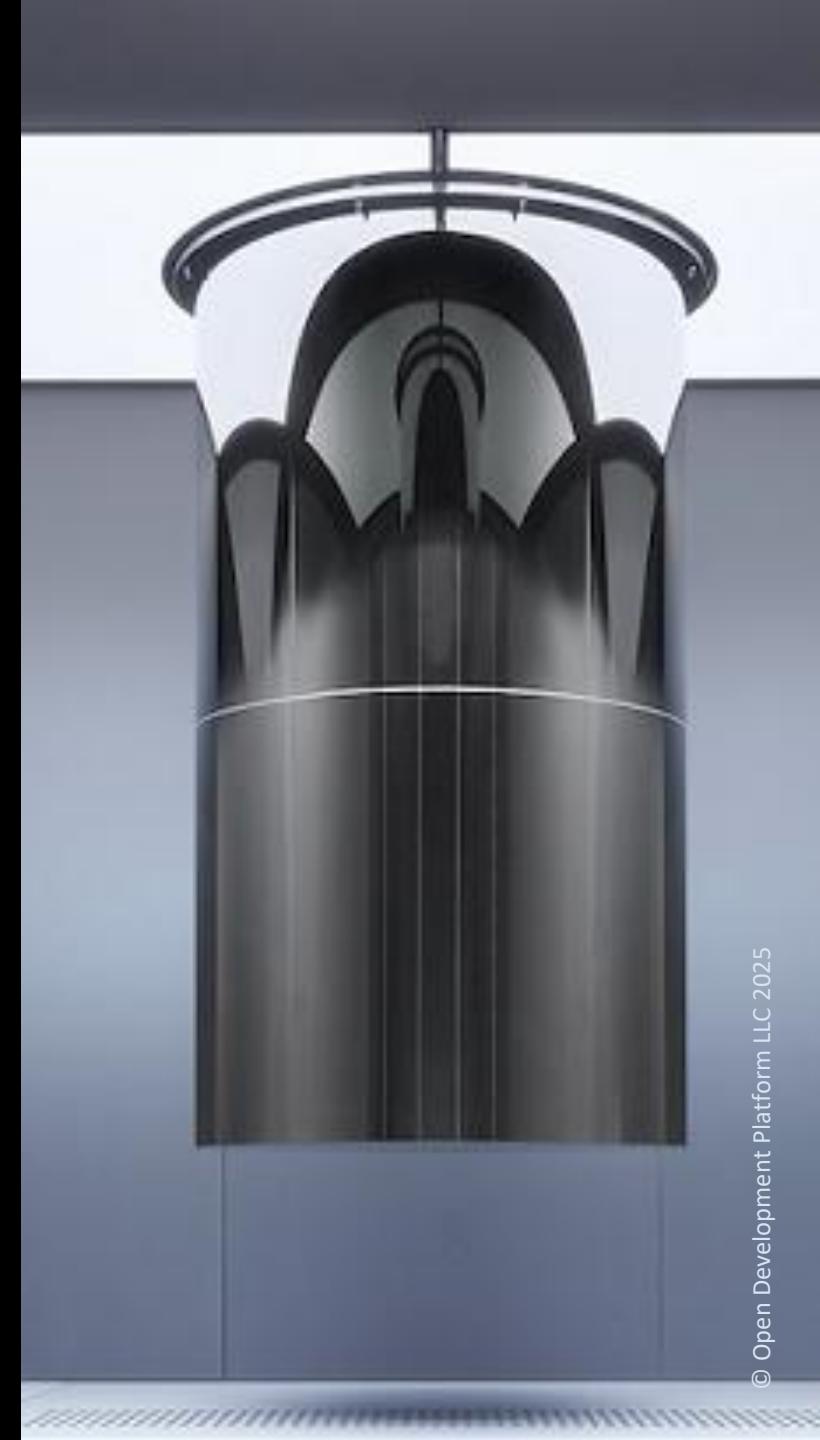
Topic: Classify the Iris Flower dataset



Open-Source Quantum Development  
**Qiskit** <https://qiskit.org/>



IBM Center for Advanced Studies  
<https://ibm.com/ibm/cas/>





Northwestern  
SCHOOL OF  
PROFESSIONAL STUDIES

# Artificial Intelligence & Election Hacking

Lunchtime Table Talks  
A MONTHLY LECTURE AND Q&A SERIES

Much has been hypothesized about the dangers of theoretical super intelligent Artificial Intelligence (AI), but little has been discussed with regard to the security implications of the AI that we currently have and will see in the very near future. Join Northwestern University School of Professional Studies (SPS) for a lunchtime table talk and panel discussion that will address the question: What is AI doing to change the world of cyber security and combat election interference threats?

Lunch is provided on a first come, first served basis.  
RSVP recommended at [sps.northwestern.edu/ltt-rsvp](http://sps.northwestern.edu/ltt-rsvp).

Open to the Northwestern University community and the general public

Monday, April 15      Noon to 1 p.m.      Wieboldt Hall, Room 704  
339 E Chicago Avenue

**Faisal Akkawi**  
Faculty Director, Master of Science in Information Systems program at SPS

**Congressman Mike Quigley**  
5<sup>th</sup> District of Illinois

**Waqas Akkawi**  
Global Chief Information Security Officer & Data Protection Officer, SIRVA Worldwide Inc.

**Ravi Mani**  
Chief Information Security Officer, Director, & IBM Distinguished Engineer, IBM Cloud and Watson Platform



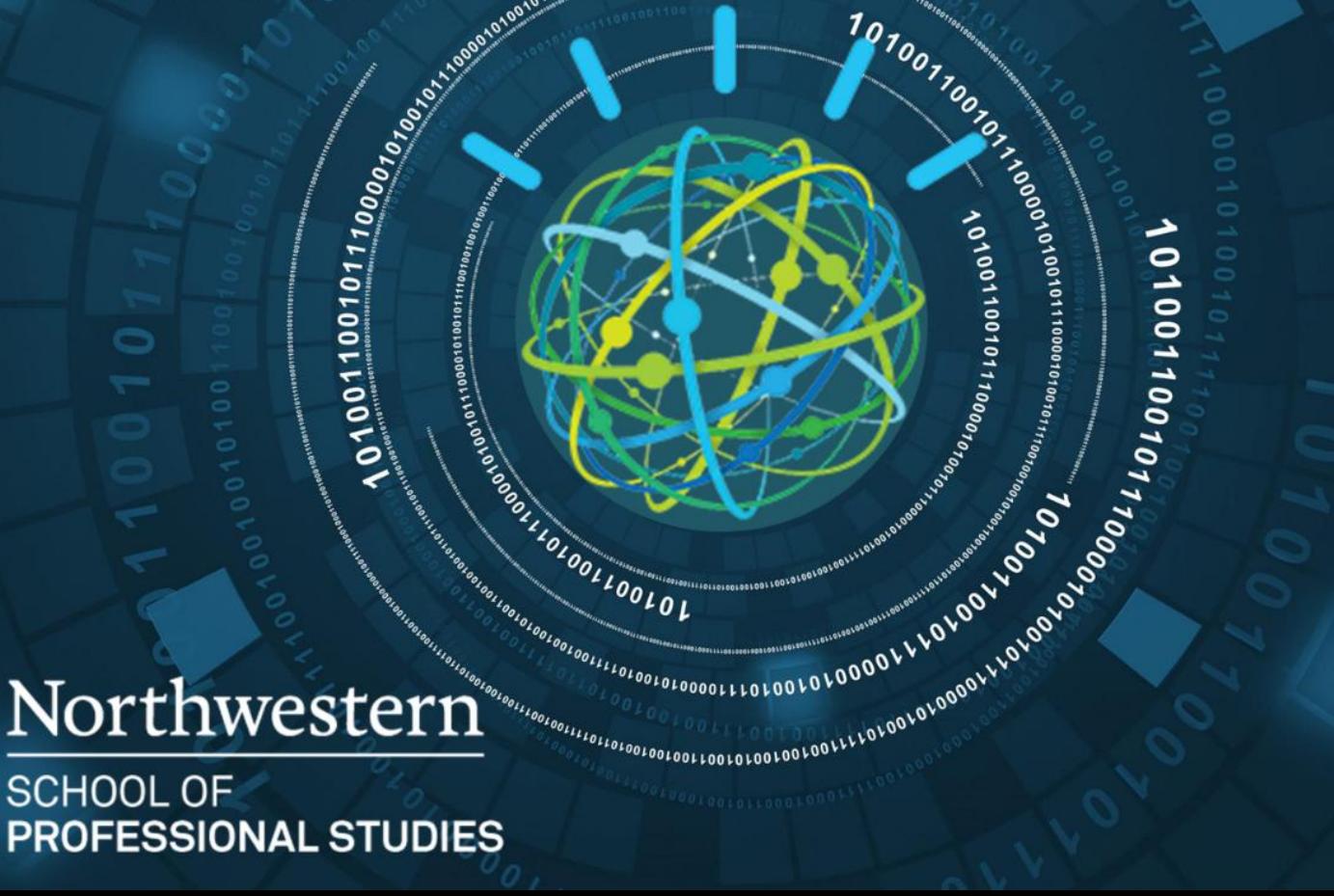
[http://ibm.biz/asset-OTX-SEC\\_2019-04-15](http://ibm.biz/asset-OTX-SEC_2019-04-15)

<http://ibm.biz/asset-event-otx-live>



# IBM Watson Bootcamp

in collaboration with



Northwestern  
SCHOOL OF  
PROFESSIONAL STUDIES

## KEYNOTE: GLOBAL SKILLS AND EFFECTS OF 5G TECHNOLOGY ON AI AND DATA SCIENCE



Dr. Faisal Akkawi, PhD  
Executive Director Information Systems Programs; School of Professional Studies  
Northwestern University

## INTRODUCTION: IBM WATSON AND CLOUD ACADEMY AND UNIVERSITY RESEARCH



Dr. Andy Rindos, PhD  
STSM, Program Director, Emerging Technology Institute; Head, Center for Advanced Studies  
IBM Watson and Cloud Platform

## CONTACT:



Arunava (Ron) Majumdar  
[arunava@us.ibm.com](mailto:arunava@us.ibm.com)  
Architect, Emerging Technology Lead Chicago CAS  
Lead Asset Portfolio Strategy  
IBM Watson and Cloud Platform

A vertical collage of 'thank you' in various languages, arranged in a grid-like pattern. The languages include Korean, German, English, French, Spanish, Italian, Portuguese, Dutch, Polish, Russian, Chinese, Japanese, and others. Each language's phrase is written in its native script or Romanized form.

# WORKING WITH UNIVERSITIES

# Collaborating with universities on Open and Closed Projects





## Identifying the University Program

Open Projects align with university programs like Senior Design, Capstone projects, etc. to invite students and faculty to participate in the Open Source projects.



## Decide on the Timeline and Iterations

Open Projects can be a one-time data science experiment to analyze specific data or a larger initiative that may be designed into components with each iteration mapped to a university project.



## Determine the Scope of the Project

Based on the university program and the timeline, a scope of the project will be determined. Certificate will be issued upon successful completion of the scope of the project.

## Closed Projects

are executed under a contract



### Acknowledge Non-Disclosure Agreement

The development of ideas and other artifacts must be protected before the formal publication of the materials. This ensures the competitive edge and marketing announcements.



### Decide on the IP and Patent Agreement

The ownership and reuse of all Intellectual Property, Patents and Copyrights delivered during the execution of the contract must be determined and signed off before the start of the project.



### Determine the Export Regulations

Every country has specific export regulations for licensed products and are subject to trade laws. For multi-nation collaborations we must ensure that all legal parameters are satisfied for IP, Labor and Data.

# Open Development Assets

Co-development of assets with Academia, Research and Partners.

Contact us

Sign up

01  
Research

02  
Technology

03  
Education

## Research

 Cognitive Telescope Network  
Automated telescopic follow-up of transient astronomical events  
*Research Asset*  
cognitive | iot | astronomy

 Cognitive Automotive Racer  
Optimization algorithms and models for autonomous cars in a racing scenario.  
*Research Asset*  
cognitive | iot | automotive

 Secured Multi-modal Manufacturing Pipeline  
Building a secured platform for manufacturing 4.0.  
*Research Asset*  
blockchain | iot | manufacturing

 Open Healthcare Platform  
Building a secured platform for healthcare using HL7 FHIR and Blockchain technology.  
*Research Asset*  
blockchain | healthcare

 Forome Genomics Platform  
Genomics platform for doing research in rare disease diagnosis and prevention.  
*Research Asset*  
cognitive | gene | healthcare

 World Peace Initiative  
Building a secured platform for supporting humanitarian crisis world-wide.  
*Research Asset*  
blockchain | iot | humanitarian

 Autonomous Ball Tracker and Predictor  
Genomics platform for doing research in rare disease diagnosis and prevention.  
*Research Asset*  
cognitive | iot | sports

## Technology

 Enterprise Event Handler  
Exception and event handling integration for the complete organization.  
*Technology Asset*  
messaging | event | integration

 Enterprise Test Robot  
Automation tool for end-to-end application testing for all phases of the development cycle.  
*Technology Asset*  
application | test | automation

 Universal Topology Configurator  
Pattern-based infrastructure design, discovery and deployment to the Cloud.  
*Technology Asset*  
infrastructure | cloud | automation

 Vortex Pattern Generator  
Generic recursive pluggable pattern generator based on Pattern Theory.  
*Technology Asset*  
application | pattern | automation

 SQL Catalog Processor  
Exception and event handling integration for the complete organization.  
*Technology Asset*  
application | database

 Cognitive Cloud Open Development  
Co-development platform for building innovative and research applications.  
*Technology Asset*  
integration | cloud | process

<https://open-development.org/asset/>



Join an existing Project



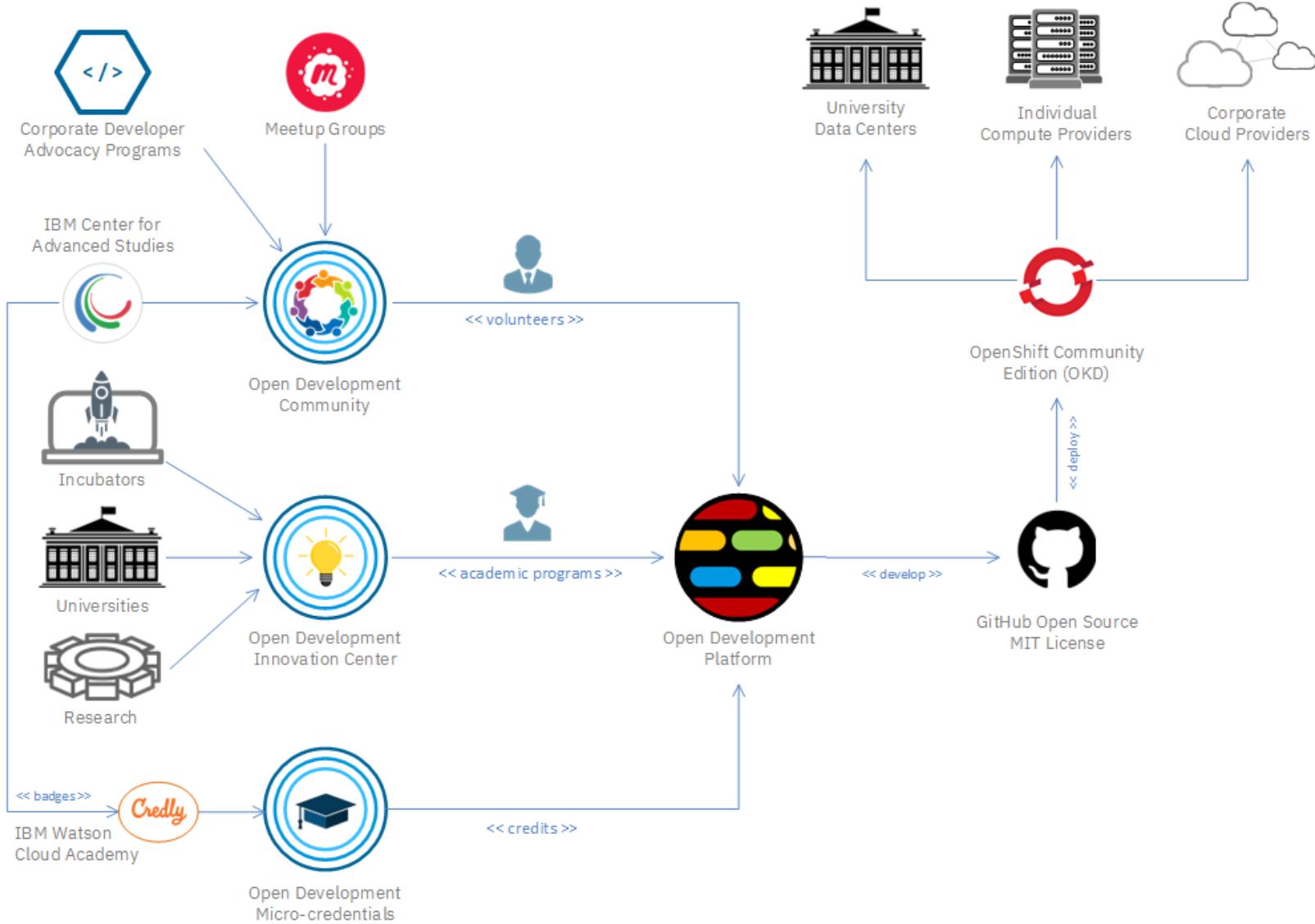
Onboard a new Project



## Start with an Idea

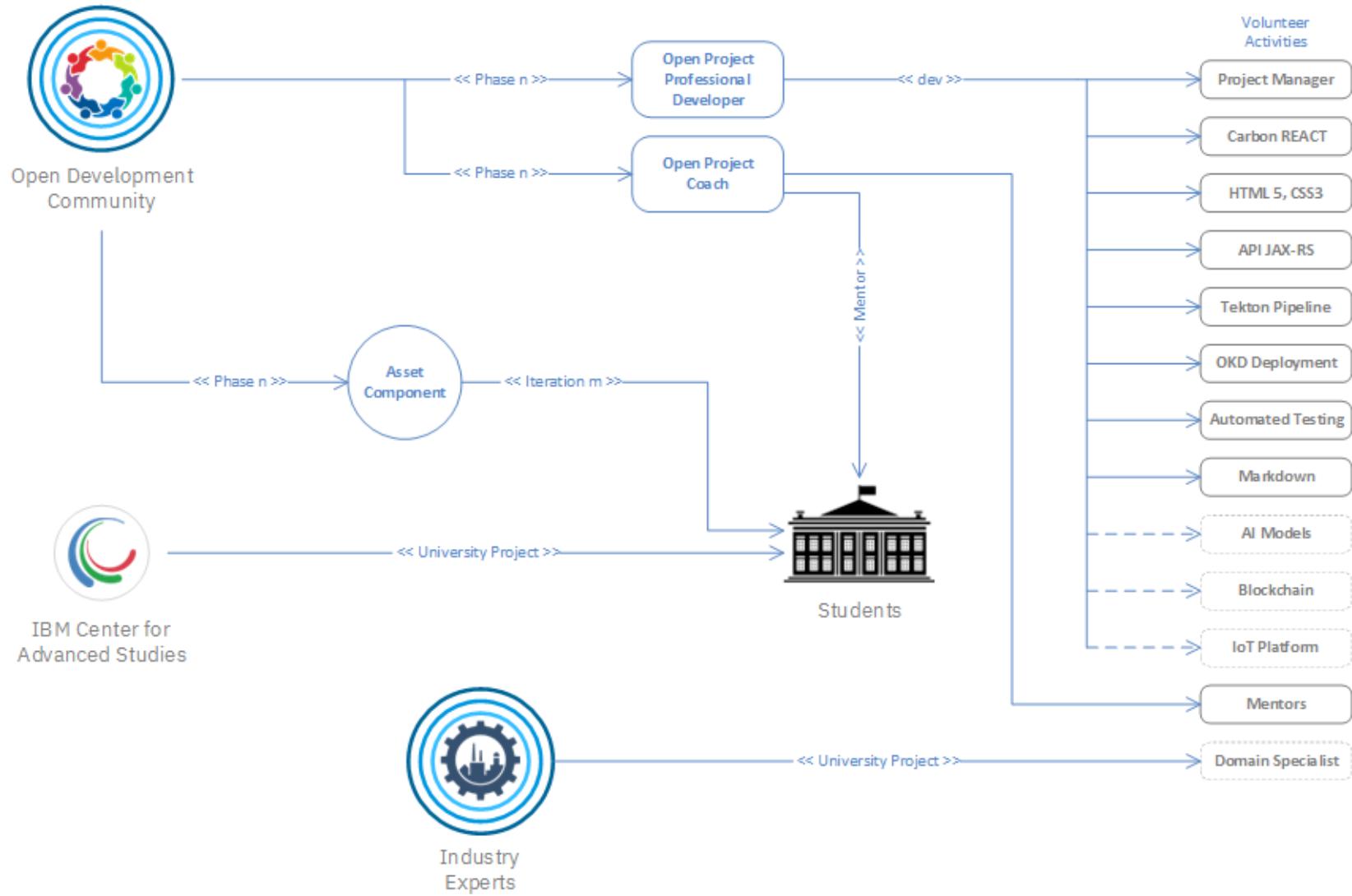
- Brainstorming and Ideation
- Design Thinking workshop
- Architecture and design
- Setup the project on the platform

# Collaboration Model

 to facilitate co-development with universities


Cognitive Cloud Open Development (**ccode**) provides a platform build for academia and research where Academics, Professionals and Partners can openly collaborate on projects under the [MIT Open Source license](#). All the artifacts and code developed can therefore be shared, published and consumed AS-IS, as long as the authors are credited and cited and linked back to the main project page on [open-development.org](https://open-development.org) site.

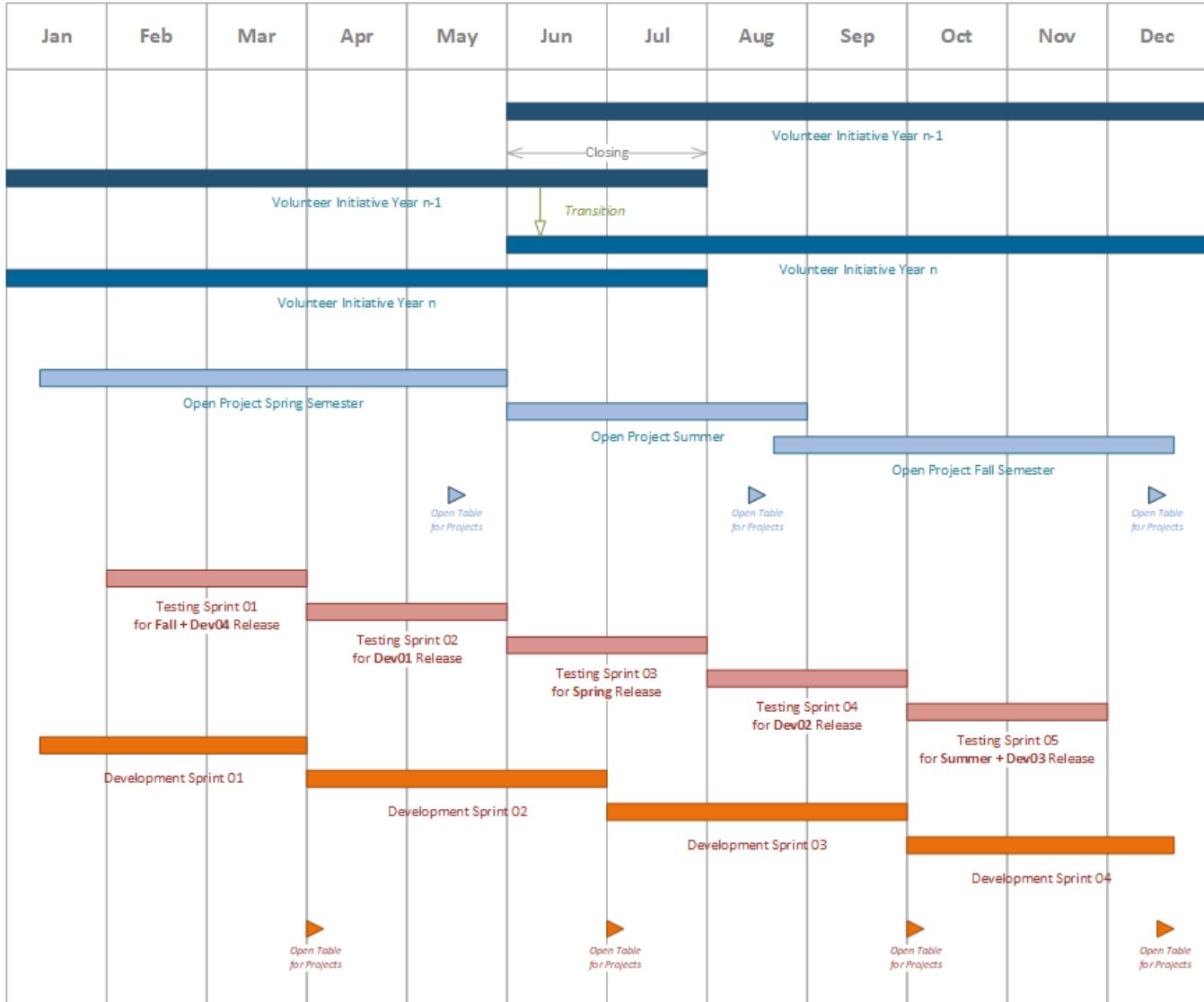
# Professional Mentors connect with students for providing expertise



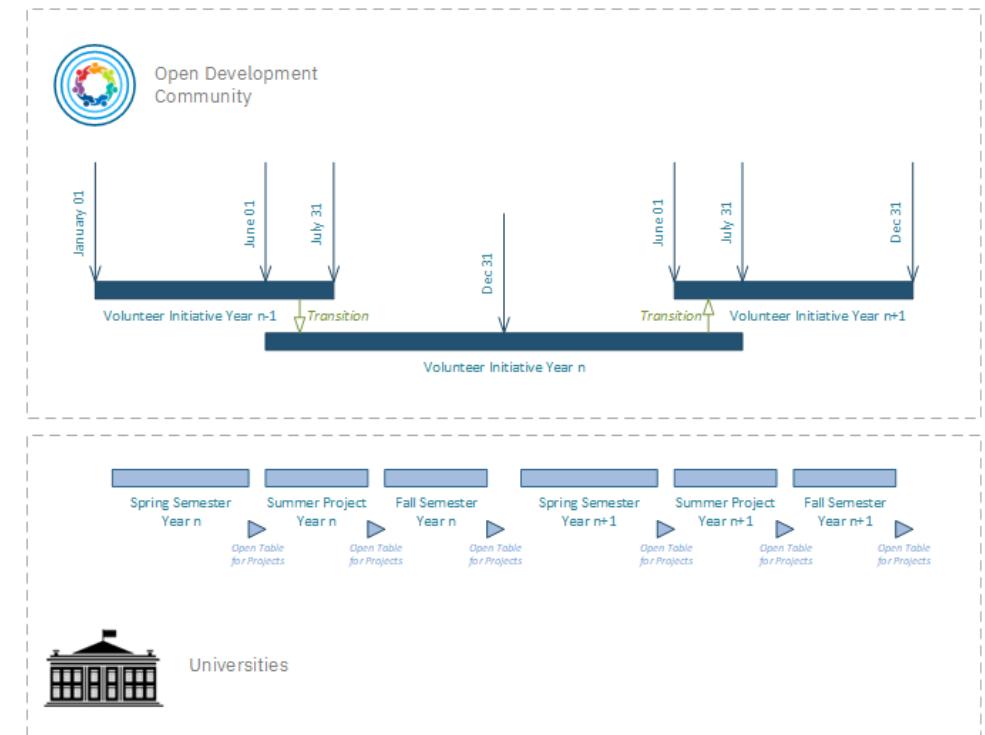
Software development and volunteering for these projects will be based on only a handful of primarily [Open Technologies](#) that can be readily available and the latest market trends. Upgrades to the software stack will be done after every academic semester to stay current and not to disrupt the development during the academic period. The technology stack is subject to changes as products evolve in the future.



## **Schedules and Plans** for Open Project release cycle

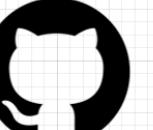


The Professional developers deliver code in four Development Sprints. The Testing Sprints are also performed by professional volunteers to certify the code and automate the testing process. The testing scripts are then integrated into the DevOps pipeline for the next release. Testing Sprints are 2 months long and take the code from prior releases of the Development and University Project Sprints. Intermediate playbacks and formal presentations on the Open Table are performed for these projects.



# Collaboration Tools

for effective communication and certification

Create	Collaboration	Develop	Deploy	Publish
Create and store documents on Cloud Drive mapped to the local laptop.	Collaborate with teammates, mentors and faculty on private channels.	Develop and share code under Open Source MIT License and manage Kanban boards.	Deploy applications on the cloud in Docker containers to a Kubernetes environment.	Publish documents and papers on the website, demos and presentations on the channel.
 <b>Google Drive</b>	 <b>Discord</b>	 <b>GitHub</b>	 <b>kubernetes</b>	 <b>YouTube</b>
<b>Open Development Platform</b>		<b>Scrum</b>		<b>Certification</b>
Provides an automation framework for co-development of code and artifacts in a completely Open Source environment with universities, researchers and professionals. It provides specifications, tools and patterns to accelerate the development and reuse of assets.		Weekly meetings with mentors and advisors to deliver project on time and address issues.		Earn Open Badges and micro-credentials for delivering the scope of the Open Project, presenting on the Open Table forum, share on Linked In and endorsements from the mentors.

# IBM watsonX Academy Open Badges Roadmap from Center for Advanced Studies

[Open Project](#) | [Open Events](#) |

## Open Project Badges

### Open Project Developer

This program is designed for University Students for collaborating with IBM on Capstone, Design or Research projects at Universities at various levels - Under-graduate, Graduate and Doctorate, Post-doctorate or Research. The student participating in the program may be awarded multiple Badges if they participate in multiple iterations of the project or different Open Project initiatives.



### Open Project STEM Developer

This program is designed for STEM Students for collaborating with IBM on either IBM Open Asset projects or School projects at various levels - Primary, Middle or High School. The student participating in the program may be awarded multiple Badges if they participate in multiple iterations of the project or different Open Project initiatives.



[https://www.credly.com/organizations/ibm/collections/ibm-open-projects/badge\\_templates](https://www.credly.com/organizations/ibm/collections/ibm-open-projects/badge_templates)



IBM Center for Advanced Studies  
<https://ibm.com/ibm/cas/>

[Open Project](#) | [Open Events](#) |

## Open Event Badges

### Open Event Presenter

This program is designed for Presenting on any topic at an Open Event - Open Table, Meetups, Hackathons, Workshops or Bootcamps. The presenter participating in the program may be awarded Badges for their first presentation and thereafter achieving milestones after delivering 5, 15 and 25 of these presentations.



### Open Event STEM Presenter

This program is designed for Presenting on any topic at an Open Event by STEM students from Primary, Middle or High schools. The presenter participating in the program may be awarded Badges for their first presentation and thereafter achieving milestones upon delivering 5, 15 and 25 of these presentations.



### Open Event Conference Presenter

This program is designed for Presenting on Open Assets at any conference. The presenter participating in the program may be awarded Badges for their first presentation and thereafter achieving milestones after delivering 5, 15 and 25 of these presentations.



### Open Event Research Presenter

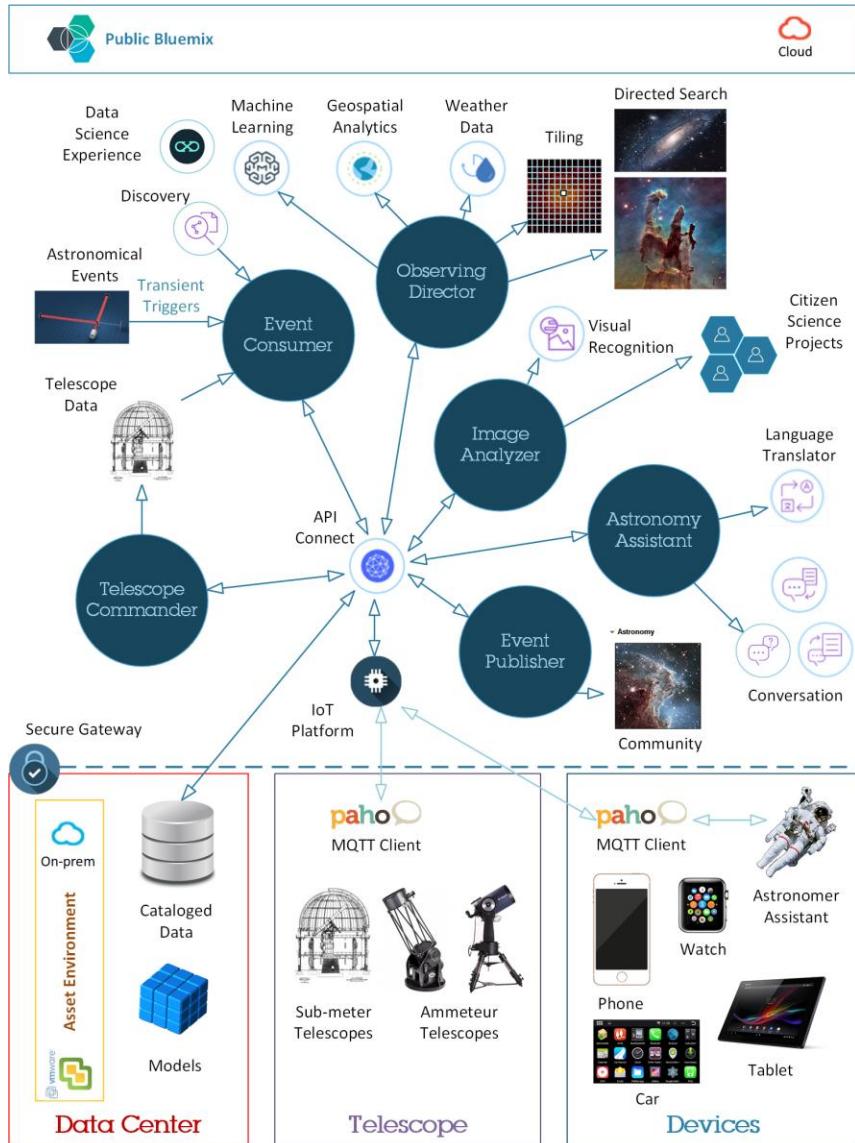
This program is designed for Presenting on Open Assets at any Research convention. The presenter participating in the program may be awarded Badges for their first presentation and thereafter achieving milestones after delivering 5, 15 and 25 of these presentations.



# OPEN PROJECTS

# Cognitive Telescope Network

<https://github.com/ccode-asset/ctn>



## Gravitational Waves Detected 100 Years After Einstein's Prediction –

LIGO Opens New Window on the Universe with Observation of Gravitational Waves from Colliding Black Holes.

<https://www.ligo.caltech.edu/news/ligo20160211>

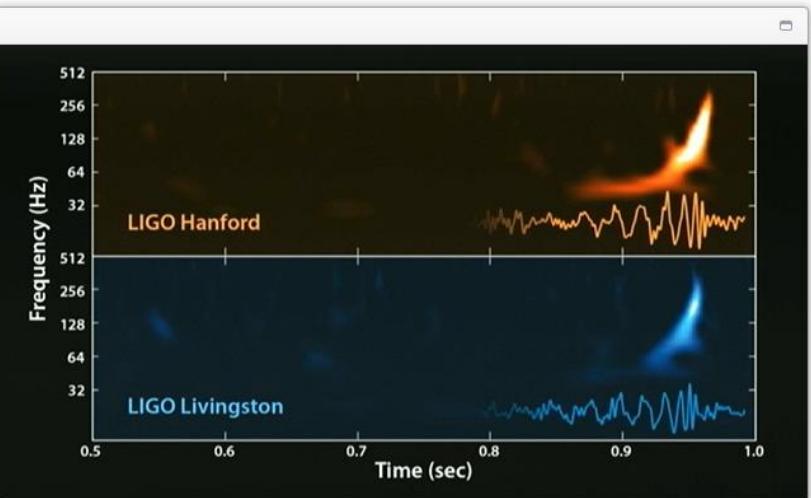
LIGO can listen to gravitational waves but cannot see the event.

- Provide identification and analysis of astronomical data from multiple sources
- Event notifications to mobile devices for building interest in the Community
- Remote control instructions to telescopes point to the specific location on the grid in the sky
- Visual Recognition integration with Zooniverse for gamification of un identified events

- LIGO data feed is parsed into canonical models and passed to the Event Analyzer
- If a Gravitational Wave event is detected, the available telescopes in the network are mapped into a grid to scan the sky
- Weather and Geospatial information is used to determine optimal coverage of the viewing area

Using multi-messenger astronomy we have eyes and ears on the transient phenomena in the Cosmos

## LIGO Update on the Search for Gravitational Waves



## Universities in the collaboration



NORTHWESTERN  
UNIVERSITY



ILLINOIS INSTITUTE  
OF TECHNOLOGY

WESTERN SYDNEY  
UNIVERSITY

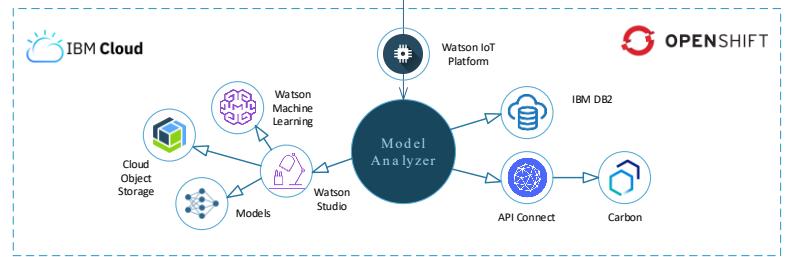
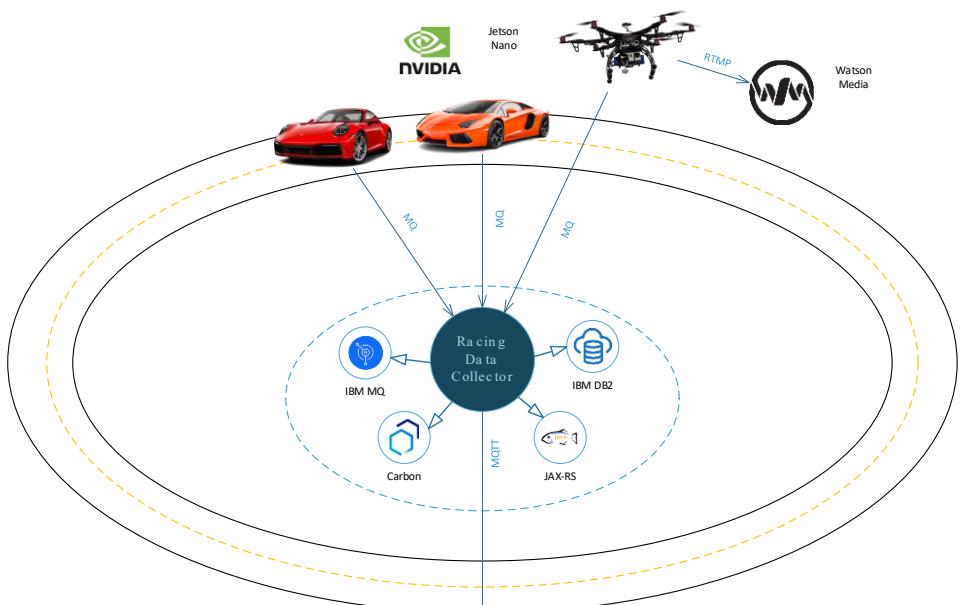
NC STATE  
UNIVERSITY

USC University of  
Southern California

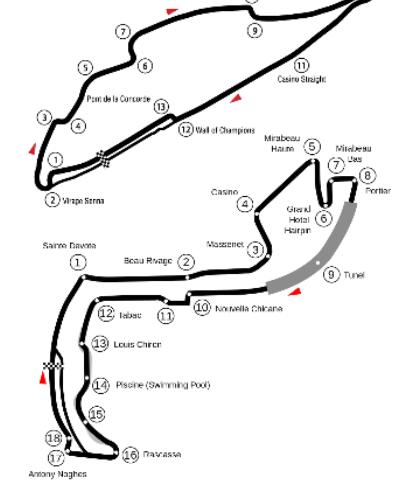
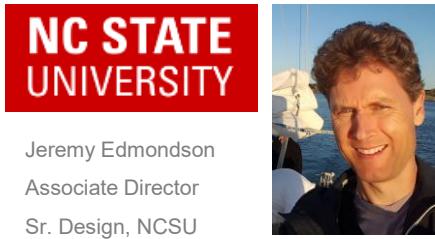
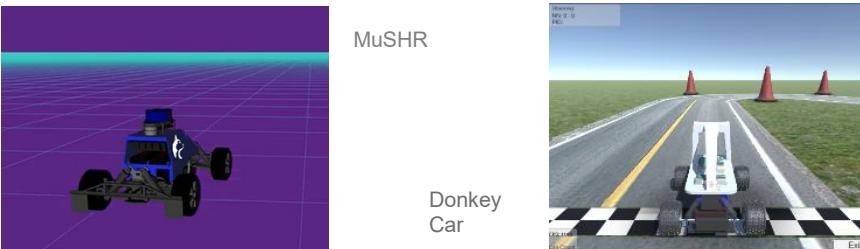
UC IRVINE

# Cognitive Autonomous Racer

<https://github.com/ccode-asset/car>

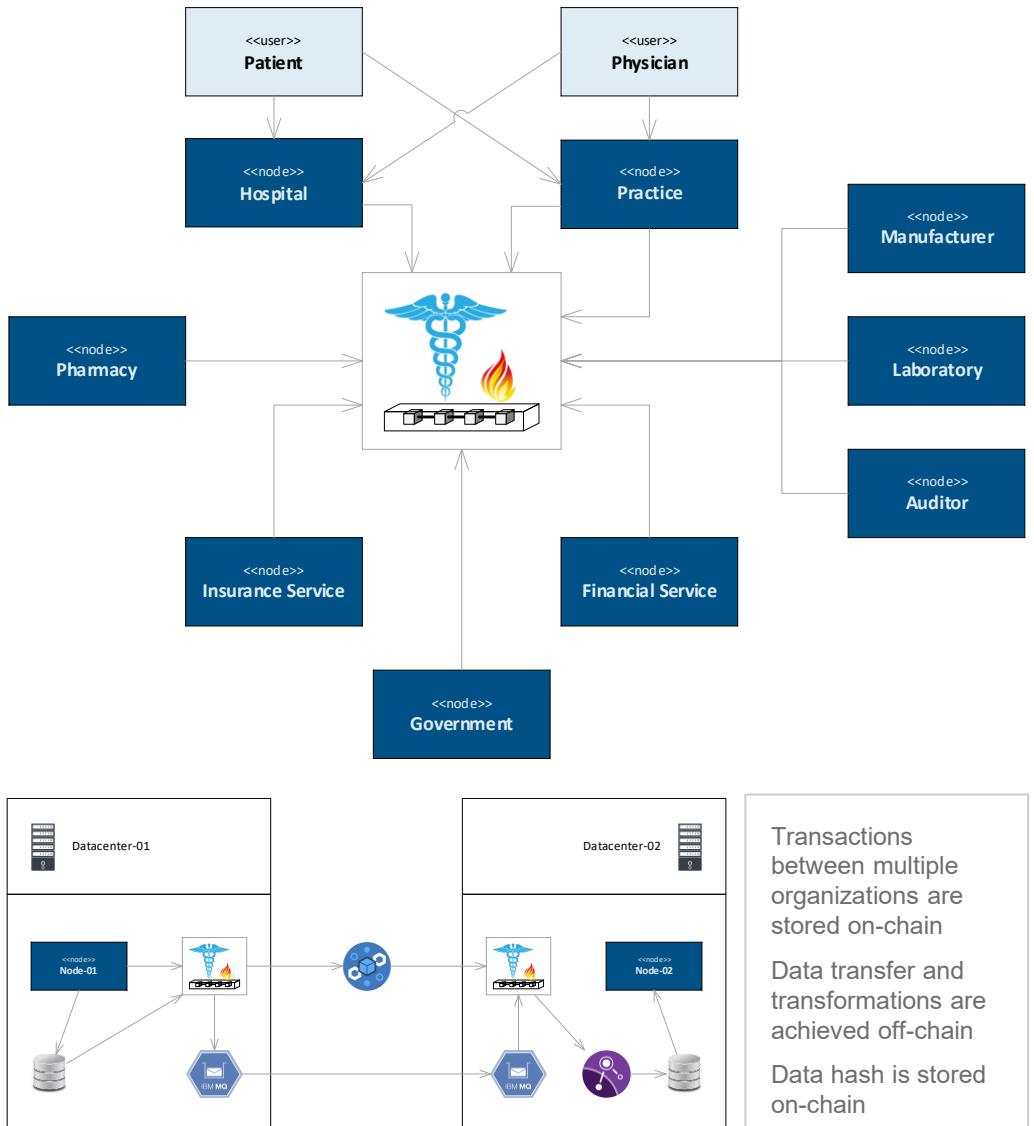


- NVIDIA Jetson Nano based model
- Tamya TT02 chassis design
- Train on multiple tracks
- Competition and challenge



# Open Healthcare Platform

<https://github.com/ccode-asset/ohp>

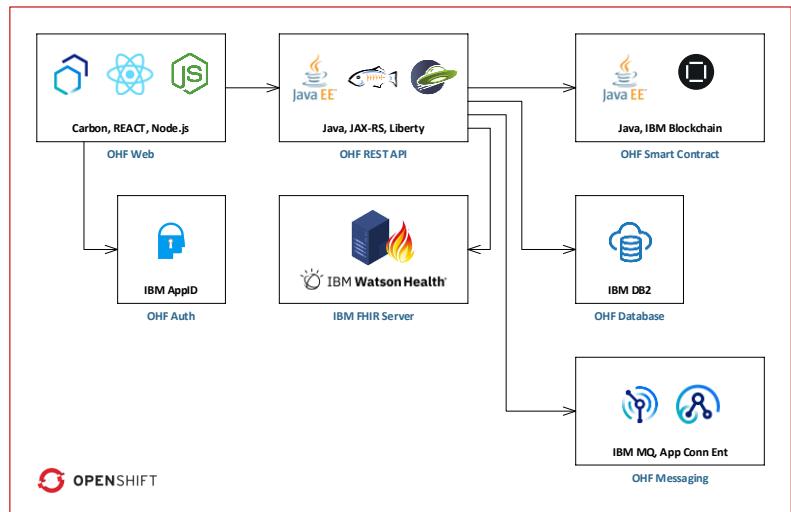


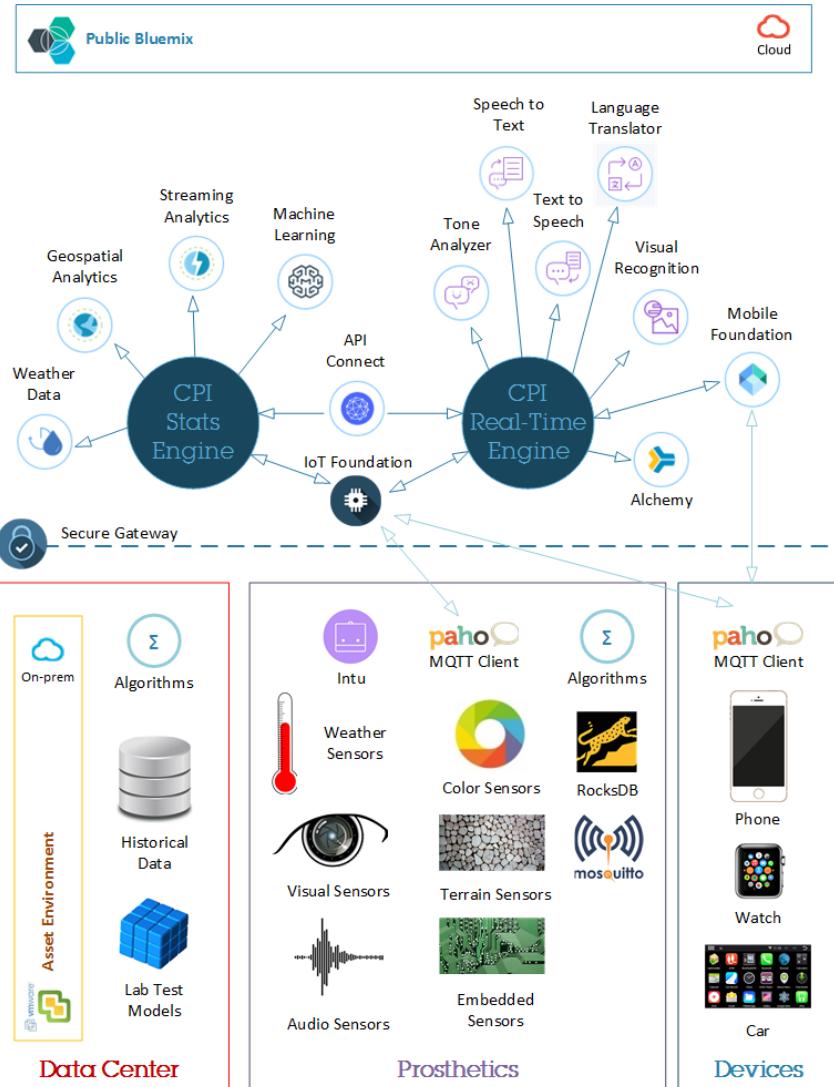
OHP provides a common framework where multiple organizations can share information in a secured manner.

The platform uses IBM Blockchain technology on the Cloud to record transactions as smart contracts.

Once recorded on to the chain these transactions cannot be repudiated.

By providing a common interface organizations can integrate with the system easily and follow the standards and regulations for the Healthcare industry.





## Google's Robots Are Learning How to Pick Things Up –

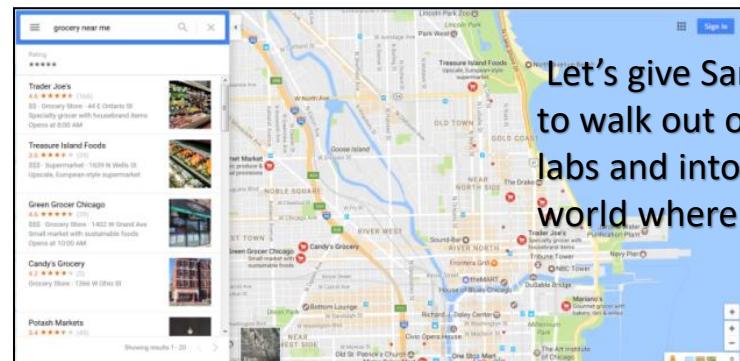
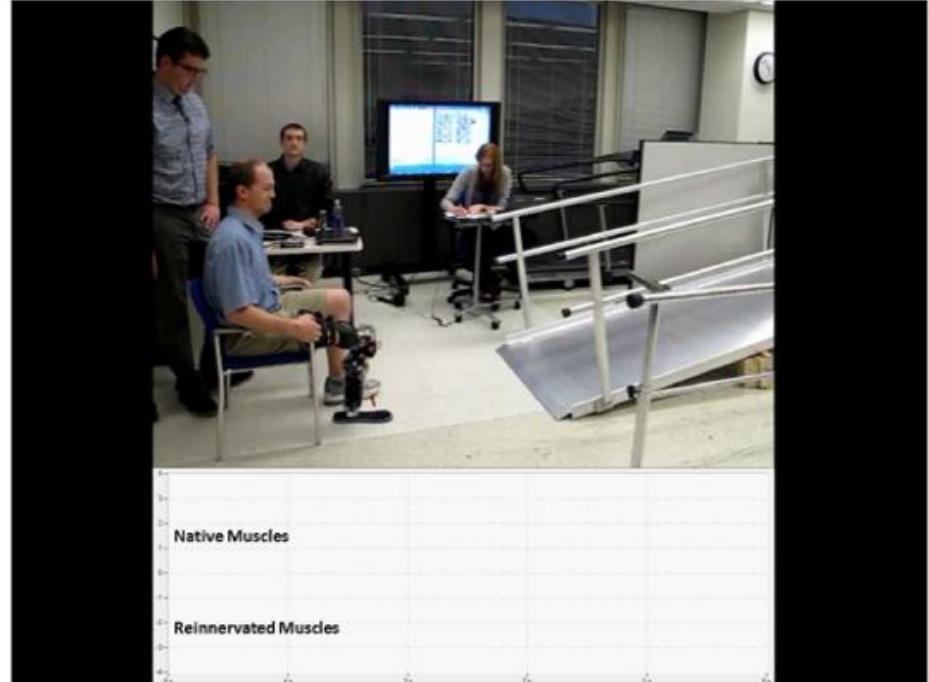
Over the course of two months, Google had its robots pickup objects 800,000 times.

2016 – Popular Science (Special Edition)

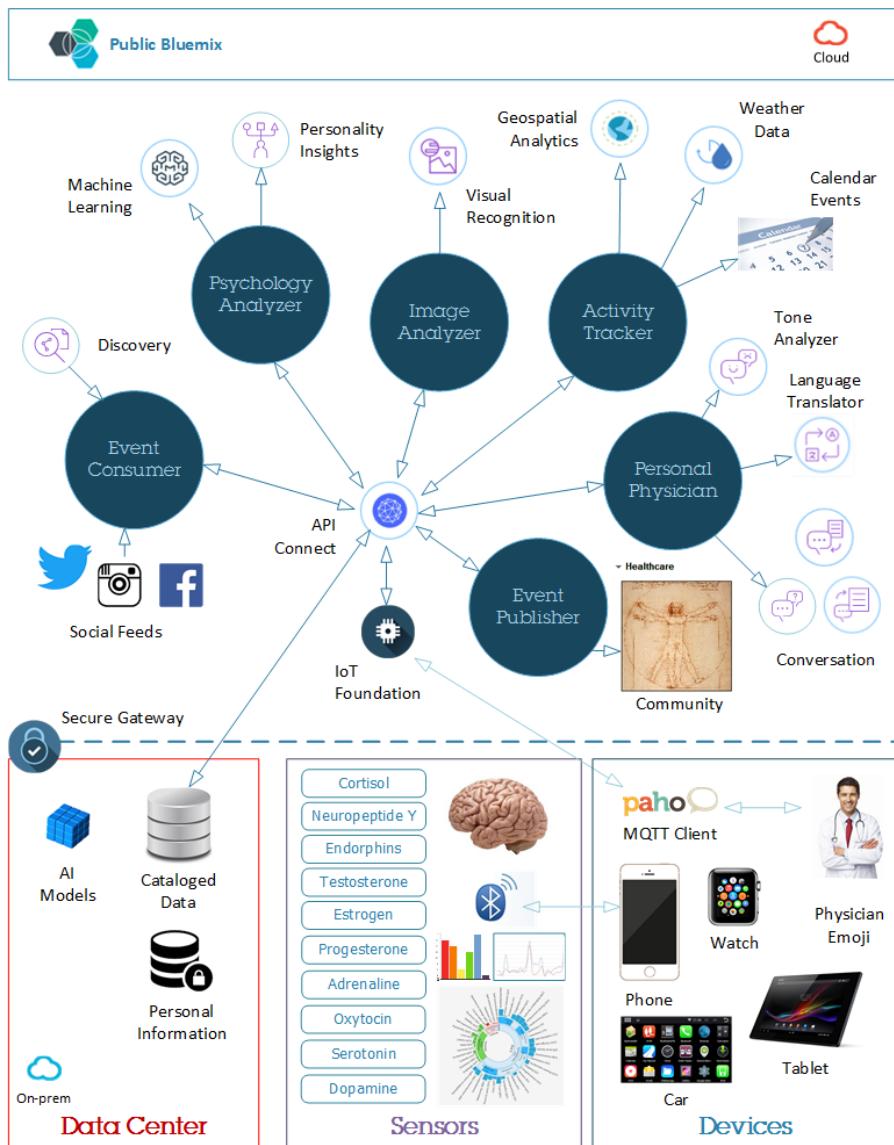
All these experiments only work well in the lab and does neither consider the multichannel feedback proposed in our solution nor the real-time analysis.

- Provide multi-channel analysis to tune prosthetics based on known datasets
- Provide meaningful interface to the patient
- Improve Lab Models and algorithms

- Sam searches for a grocery store
- Macro predictions based on weather and geolocation asynchronously communicated to the prosthetics
- Sam decides to meet his friend in the park full of grass not concrete
- Micro predictions fine tune prosthetics based on analysis of sensor data



Let's give Sam the ability to walk out of the RIC labs and into the real world where he lives.



## MPTP Lesions and Dopaminergic Drugs Alter Eye Blink Rate in African Green Monkeys –

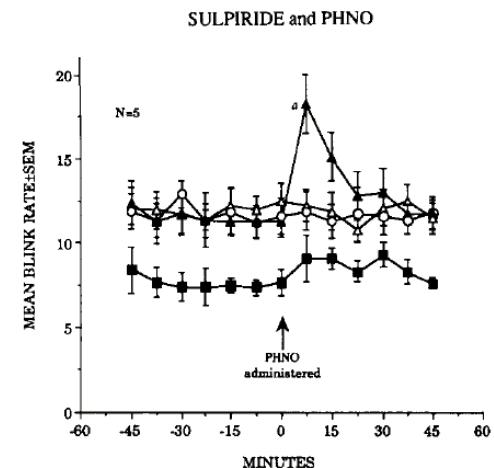
Research for non-invasive dopamine analysis.

<https://www.ncbi.nlm.nih.gov/pubmed/1678527>

## Dopamine And Neural Activity (DANA) –

System for near-simultaneous measurement of dopamine release and activity from multiple neurons

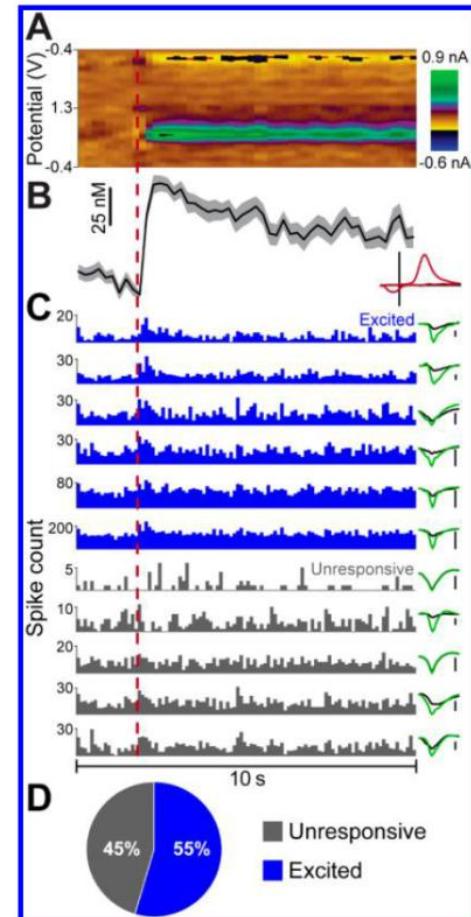
<http://pubs.acs.org/doi/abs/10.1021/acs.analchem.6b03642>



Lawrence-Redmond experiment

- Bio-sensor data analysis from multiple sensors
- Co-relation and analysis of multiple neuro, electro and chemical transmitters for mood and behavioral changes of an individual
- Determining the level of pleasure / sadness based on the hormonal changes
- User response analysis based on tonal variations, heart rate, activities in the calendar, geolocation, weather, etc.
- User profile based alerts for monitoring patients based on their specific thresholds and notify physicians / emergency personnel of their condition
- Build an ecosystem of healthcare professionals and researchers to collaborate on Balanced Lifestyle

- API for communication between components
- IoT for sensor data communication
- Watson Machine Learning, Personality Insights, Tone Analyzer, etc.



NSF BRAIN EAGER (DBI-1450767) grant

DANA – Parent KL, Hill DF, Crown LM, Wiegand J-P, Gies KF, Miller MA, et al. (2017): Platform to Enable Combined Measurement of Dopamine and Neural Activity. Anal Chem. acs.analchem.6b03642



No matter how complex your data environment, we can handle it with precision, speed, and accuracy.

- Scalability**: Gain enterprise-wide data lineage, even in complex environments with an extensive tech stack.
- Granularity**: Get the desired view of your data pipeline by visualizing different levels of detail.
- Informed Decision-Making**: Trust the data you are using is accurate. Data lineage enables users to understand processed data by viewing how it has been transformed.
- Proactive Change Control & Impact Analysis**: Become more efficient at understanding how IT changes impact the data pipeline (e.g. reporting, BI, compliance chains).
- Risk Mitigation**: Leverage code-level lineage to avoid issues resulting from incomplete, inaccurate, and outdated information in your data pipelines.
- Open Standards**: Future proof and enrich your metadata by using the open standards to capture and share information directly to where the user needs it.

# BUILD PRODUCTS WITH ACADEMIC RESEARCH



**Charles University**  
Prague, Czech Republic



IBM Manta Data Lineage provides complete visibility into your data flows through automated lineage mapping. By identifying potential risks and supporting compliance, data lineage gives you control over your data ecosystem, enabling you to adopt AI responsibly and maintain data integrity across all systems.

Open Manta  
Whitepaper

[https://portal.manta.io/wp-content/uploads/2021/11/WhitePaper-OpenManta\\_11.12.2020\\_01.pdf](https://portal.manta.io/wp-content/uploads/2021/11/WhitePaper-OpenManta_11.12.2020_01.pdf)

- 1 Harvest Lineage
  - 2 Lineage Semantics
  - 3 Lineage Customization
  - 4 Activate Lineage
- 

