



SaaS Model for KMAP

Iqbal Hossain, PhD

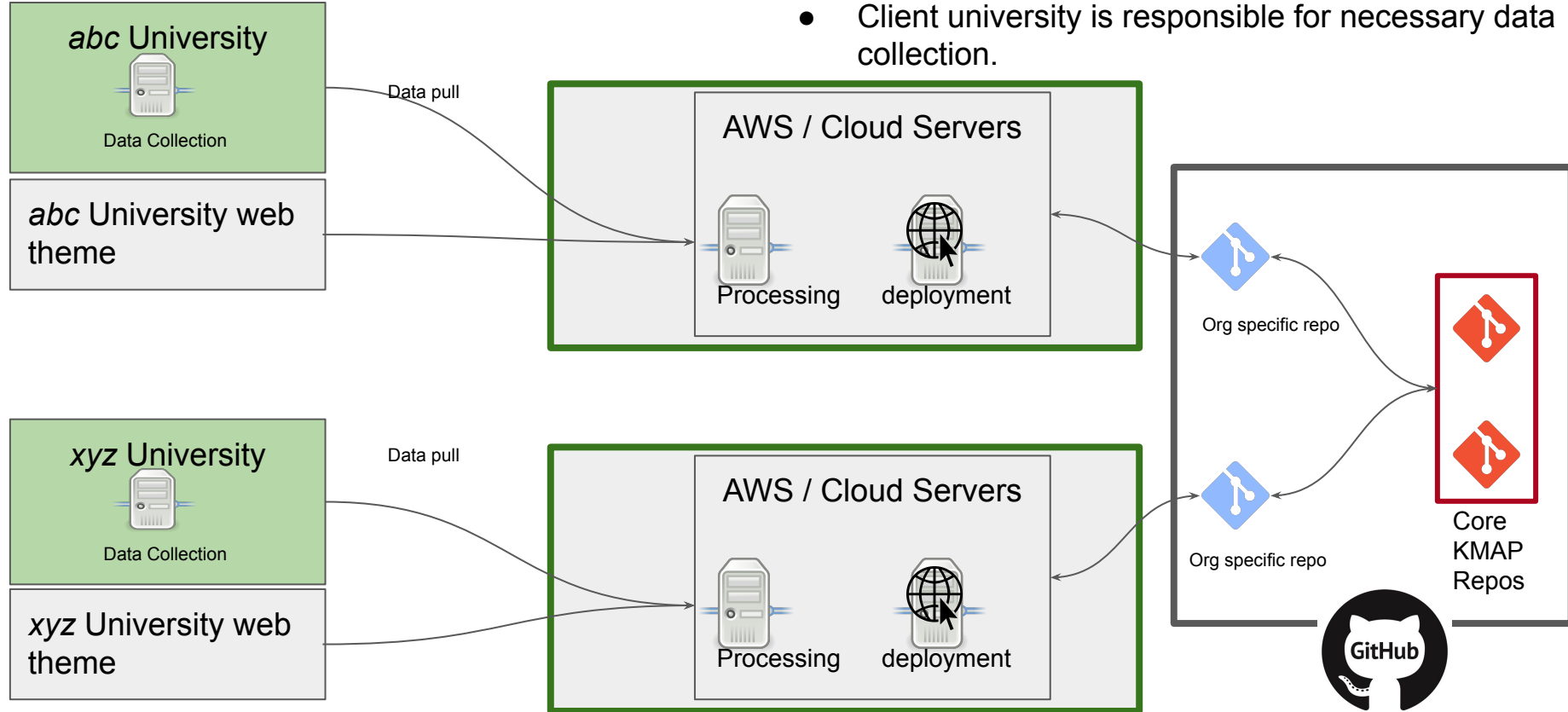
Director, Research Data Science
University of Arizona



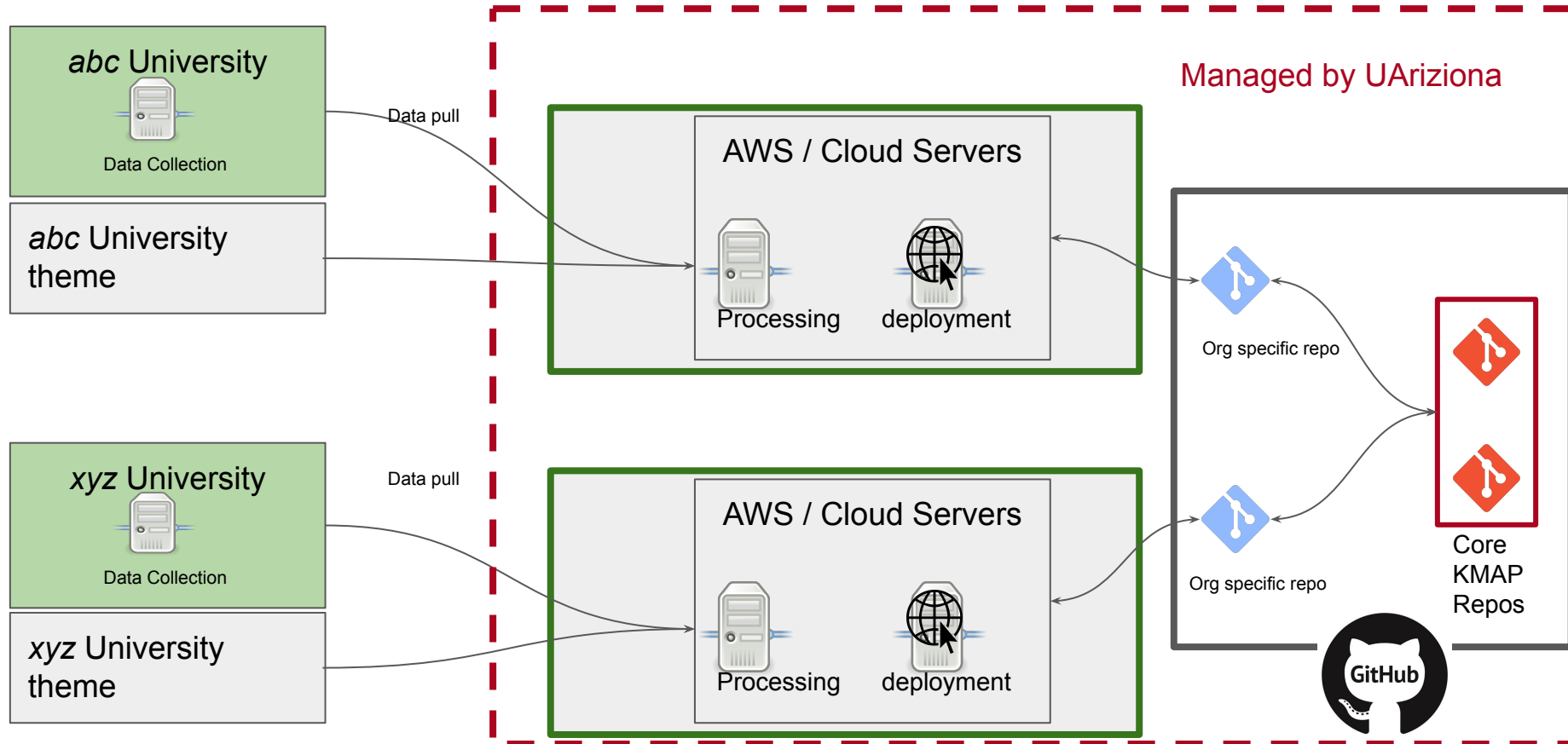
Architecture

High Level Architecture

- Data stored and processed in a dedicated server
- KMAP instances only access core kmap repos, not data of other KMAP instances
- Client university is responsible for necessary data collection.



High Level Architecture





Data



Data: what and why?

What?	Why?
-------	------

Minimal KMAP

Current Employee	To keep the KMAP uptodate; display, basic node in the map
Awards/Grants	network extractions, expertise extraction, display, search engine
Proposals	network extractions, search engine, expertise extraction,
Publications	network extractions, expertise extraction, display, search engine

Advanced KMAP

To enhance
matching,
connection,
profiling

Proposals, grants abstract	expertise extraction, search engine
Courses	expertise extraction, search engine
Published Book	expertise extraction, search engine, display
Citations/ H-index	display
Profile/CV/ Personal Website	expertise extraction, search engine
ORCID	Pull more data, display
Patents/ Intellectual property (IP)/ Disclosure	Network extractions, expertise extraction, search engine, display
Innovation/Startups	Network extractions, expertise extraction, search engine, display
News media/research story	Network extractions, expertise extraction, search engine, display
Prize/reward	display
Faculty research plan, on going projects, future plan	expertise extraction, search engine

Detail field list will be provided; All data elements tied with the organization's unique key



Ownership

Element	Ownership
Raw data	client / xxx university
All analysis, collaboration network, output from the data	client / xxx university
All source code of KMAP (including implementation of new features)	UA KMAP
Servers in cloud	UA KMAP



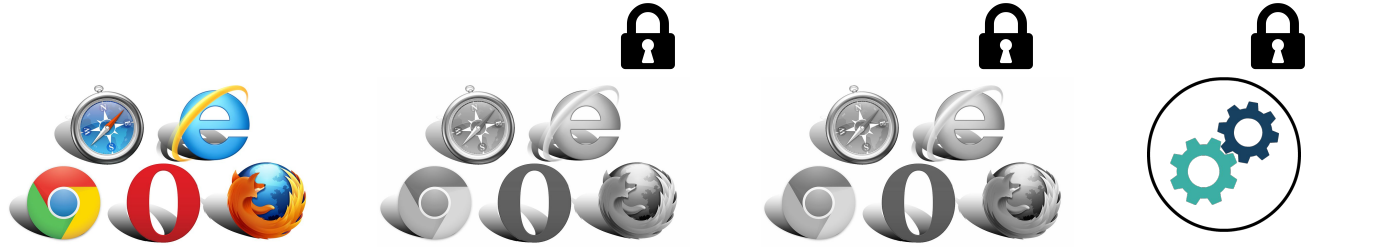
Data privacy and restriction

- UA KMAP does not use the client's data, results outputs other than the client's KMAP.
- KMAP collects and stores various statistics to monitor and improve the system.



User and Feature

KMAP Access



Public Interface
(open to internet)

Internal
Dashboard of
every researchers

Admin Dashboard
and reporting

API
Application
programming
Interface



System Access



Public Interface (open to internet)

- Interactive map including zooming, panning, and navigation
- Search by research interest, keywords, large technical paragraphs
- Network exploration
- Researchers profile view
- More..



Researchers Internal Dashboard

- Add/update personal data
- Personal research knowledge graph
- Add/update missing connections



Admin Dashboard

- Various statistics, growth, and trends



API

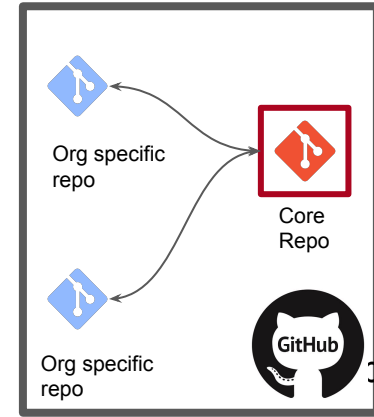
- KMAP data, results, etc can be accessible through api
- Client can use api to build/integrate their internal system

Core Component/model of KMAP

- Word Research Topics network
 - build by KMAP research using millions of researcher's research interest
- Researcher's signature model
 - An NLP model build using publicly available data
- Expert matching approach
 - Using full text indexing for every researcher
 - A custom score on matching called information bucketing
 - Used topics relations extended neighborhood search
- Network Discovery and Map generation process
 - Knowledge graph generation (connecting all unstructured data)
 - Clustering, and Optimized researcher's position in map layout
- Interface and visualization module
 - Map visualization interactive interface

KMAP instance creating effort

- Code generalization
 - Separation of UA specific rules, variables, settings, text
- Data alignment
 - Map all the data fields
- Adjust settings
 - Tune settings, parameters for the new instance
- Server environment ready
 - Applications, packages, databases installation and configuration
- Rebuild network and map
- Test
 - Test functionalities of the new system
- Native branding
 - Change color, theme to match client's native look
- Integrate client's user authentication (SSO, optional)





Additional data/feature/api Request

- Accepting new / custom feature request;
 - Examples: adding new layer of at the map, requesting new visualization, adding new dataset, reporting, etc.
- Data API
 - New endpoints can be created based on requirement



Cost and Time

Cost (non-profit approach)

- One time charge
 - 2nd instance (6 month salary of a data/software engineer, \$60K)
- Hardware Cost
 - Depends on provider (AWS EC2 \$200 * 12= \$2400)
 - Can be used the client university's internal server infrastructure
- Yearly KMAP Maintenance (core version upgrade + 2 times data refresh)
 - \$10K (from the 2nd year)
- New features, adding dataset, api endpoints, reporting request
 - Quotated case by case