Applications and impacts of the BrAPI project on plant breeding

What is the Breeding API (BrAPI)?

BrAPI

What is the BrAPI?

BrAPI is a …

Standardized

RESTful

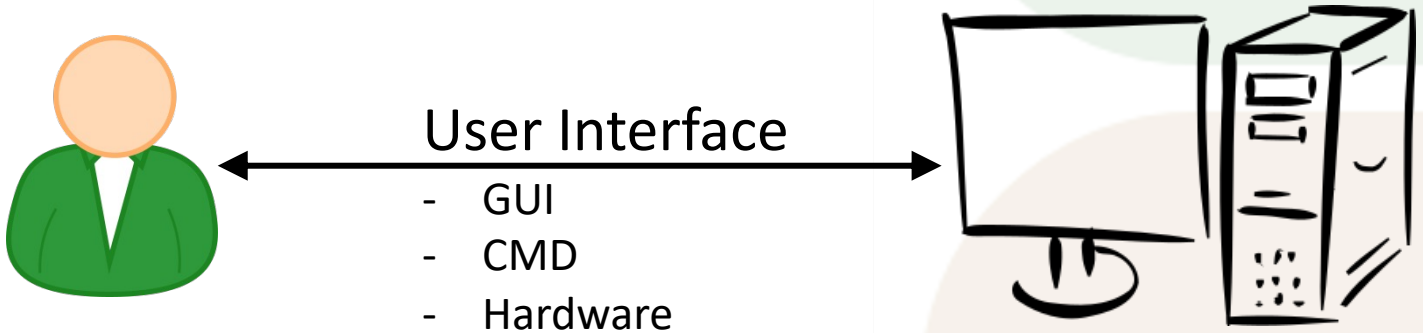
Web Service

API

Specification

…for communicating plant breeding data

API – Application Programing Interface



User Interface

- GUI
- CMD
- Hardware

Application Programing Interface

- Web Service
- Local Messaging Service
- Job Queue
- Language Library

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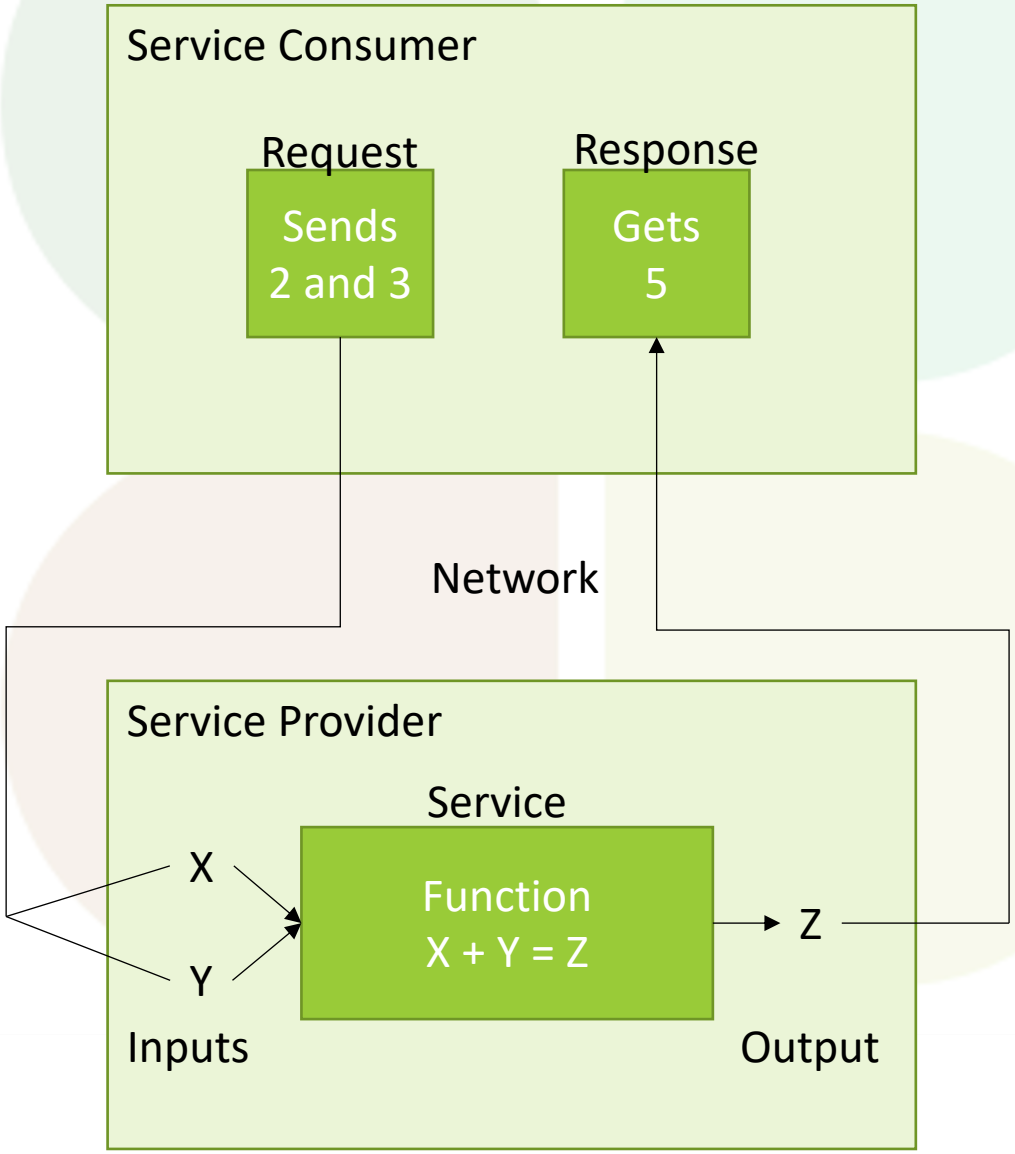
Web Service

- A Service Provider contains some Service with well defined Inputs and Outputs
- A Service Consumer sends a request to the Service Provider with the Input data, and waits for a response
- The Service performs some Function on the Input data
- The Service Provider sends the Output data as a Response back to the Service Consumer



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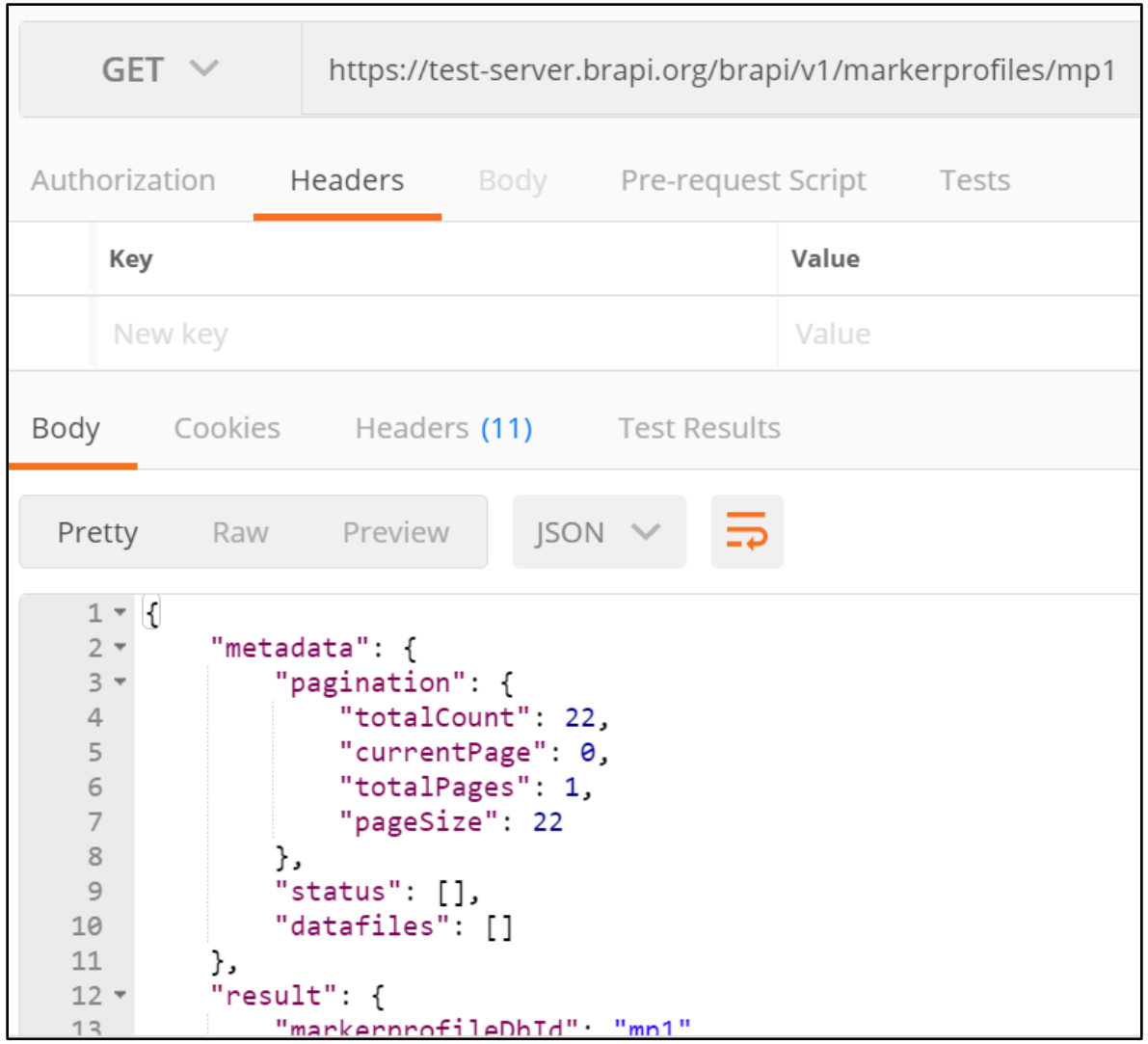
REST - Representational State Transfer



- REST is an architecture design for creating Web Services using the well known HTTP standard
- Requests are made with URLs
- Data is represented with JSON

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Standardized Specification

BrAPI has defined a Standardized set of data model structures to communicate the basic information of plant breeding

BrAPI is a technical Specification which software developers can easily turn into code which communicates using the Standard.

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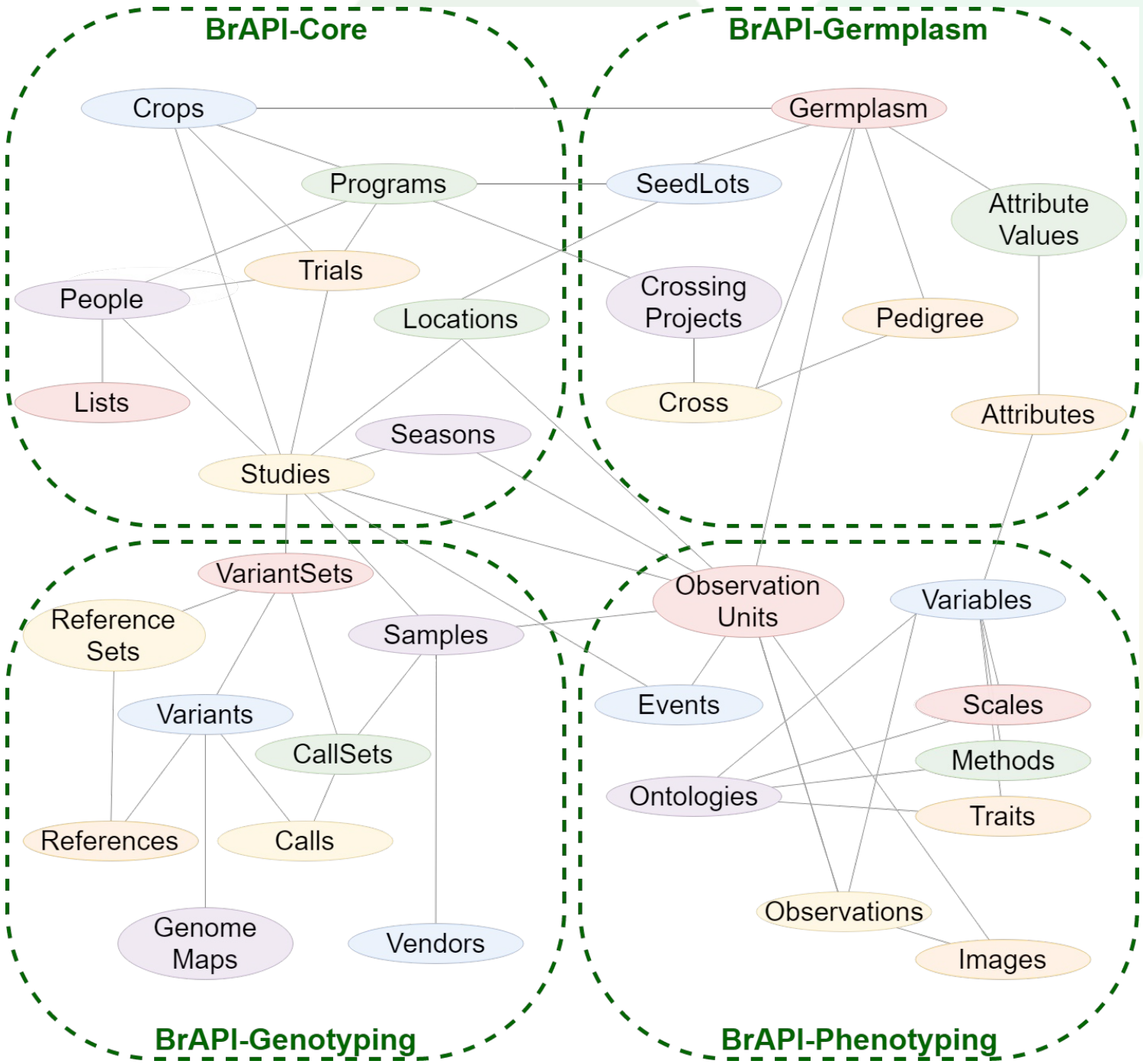
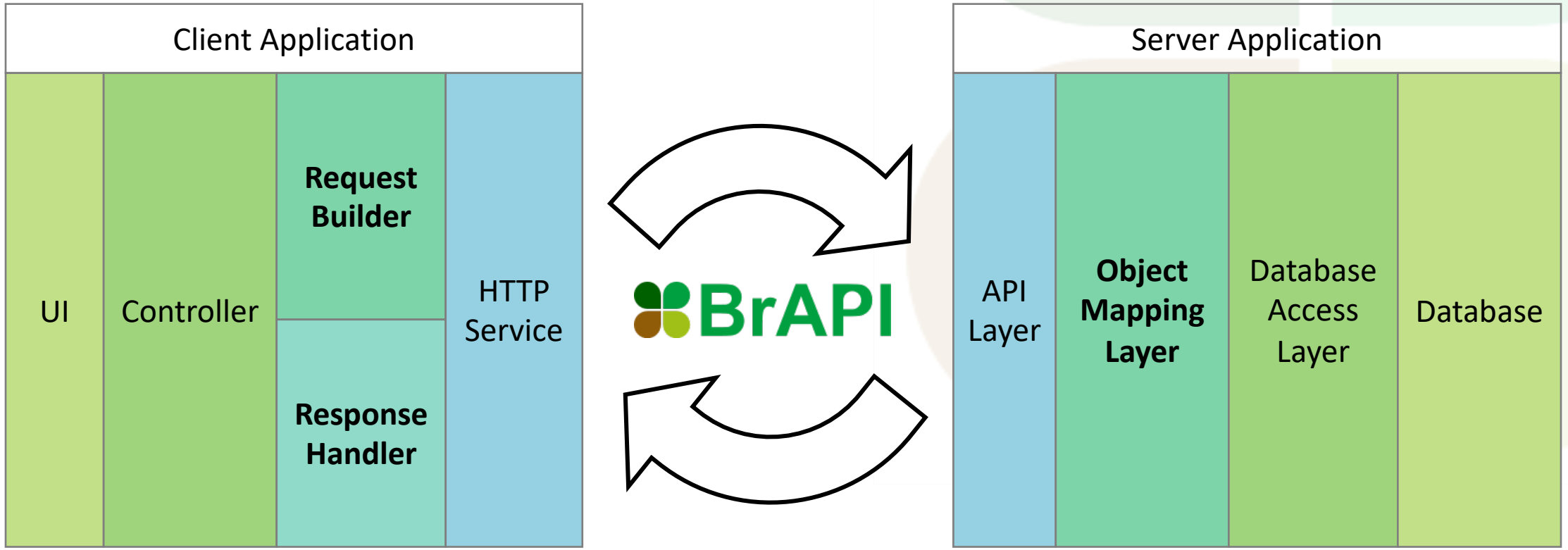
BrAPI Domains

The BrAPI Data Model defines the data and metadata required for any generic breeding trials. The data models are designed to be easily interpreted by a computer in any programing language.



Typical Request/Response Loop



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Why do we need BrAPI?

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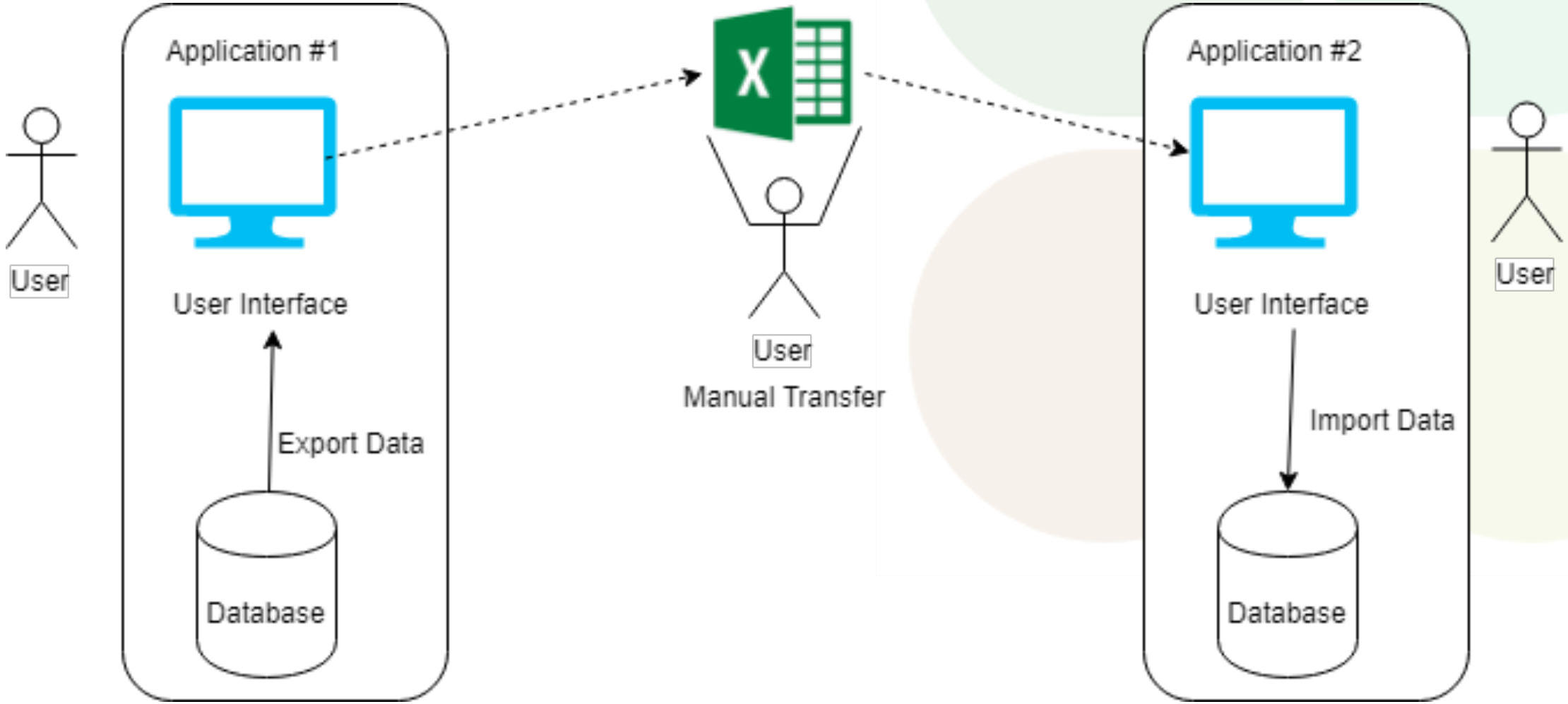
Manual Interoperability



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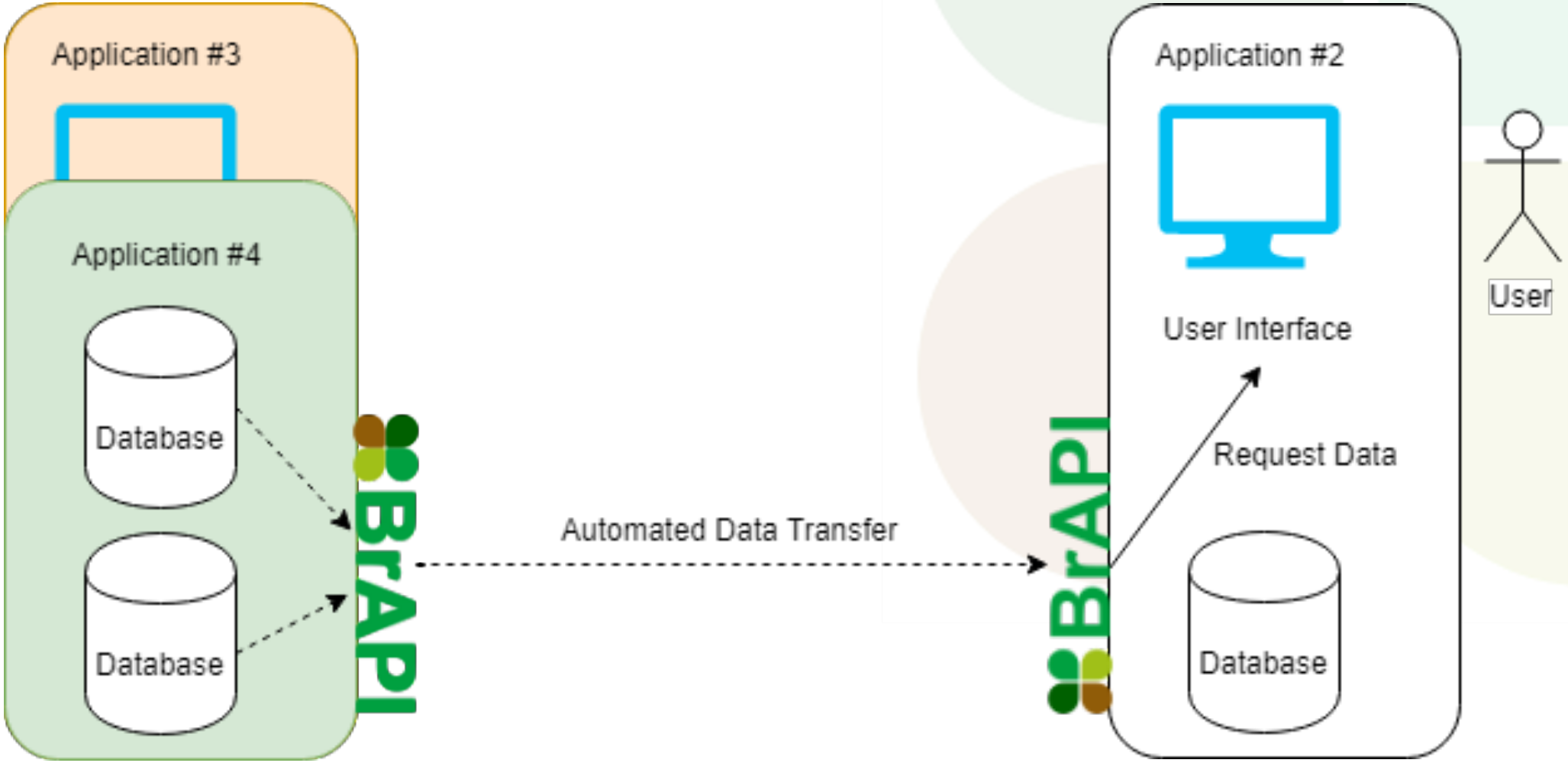
Automated and Standardized Interoperability



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Who is in the BrAPI Community?

Who is in the BrAPI Community?

37+ registered partner organizations

250+ plant breeders, software developers, data managers, and other expert scientists

6 Elected members of the Advisory Board, managing the long term goals of the project

BrAPI

Breeding Insight
Cornell University Founded A.D. 1865
elixir
Earlham Institute
The James Hutton Institute
PHENOME Réseau Français Phénomique végétale FPPN
INRA Science & Impact
Wageningen University & Research
EMPHASIS
IPK Gatersleben
URGI
Agronomix Software
Bioversity International
DivSeek Canada
SouthGreen bioinformatics platform
BTI Boyce Thompson Institute
Crop Ontology for agricultural data
BREEDBASE
The International Treaty on Plant Genetic Resources for Food and Agriculture
TERRAPHENOTYPING REFERENCE PLATFORM
LISTENFIELD
T3
GOBii
IRRI International Rice Research Institute
GT4SP
Plant & Food Research Rangahau Ahumāra Kai
Excellence in Breeding Platform
CIMMYT
Integrated Breeding Platform Today's tools for tomorrow's crops
CIP International Potato Center A CGIAR Research Center
Patranca E.I.R.L.
NEXTGEN CASSAVA
AfricaYam
ICARDA Science for resilient livelihoods in dry areas
ICRISAT
Diversity Arrays Technology Pty Ltd

Greenville, SC, USA - 2023

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Applications & Impacts

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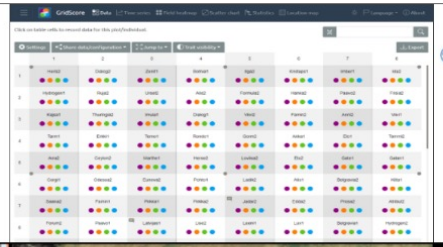
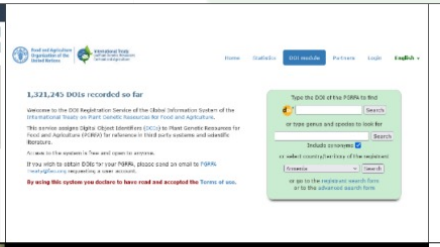
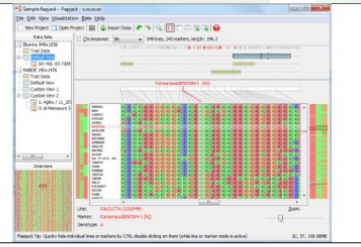
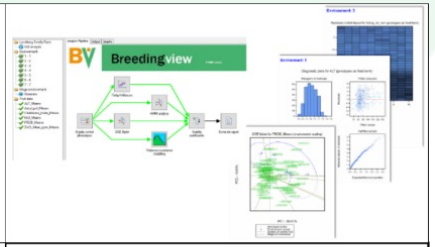
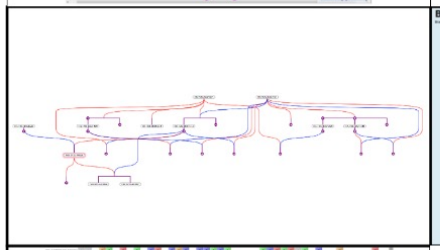
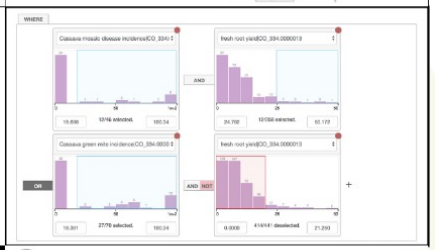
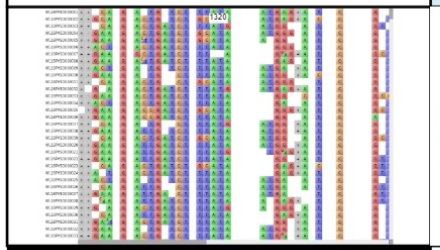
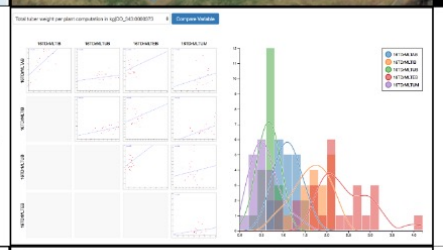
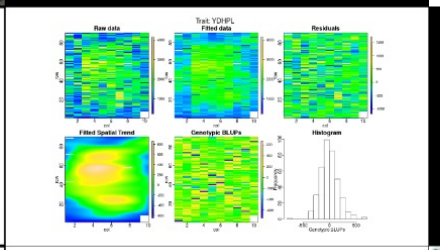
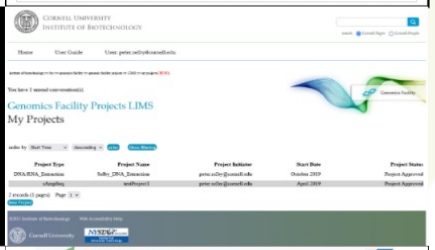
BrAPI Compatible Software

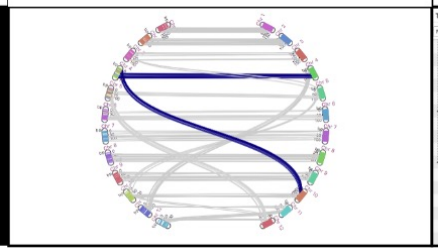
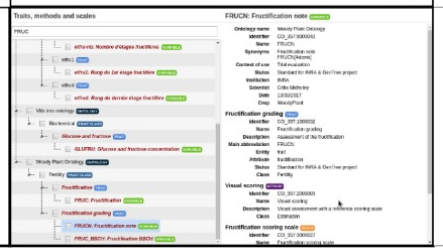





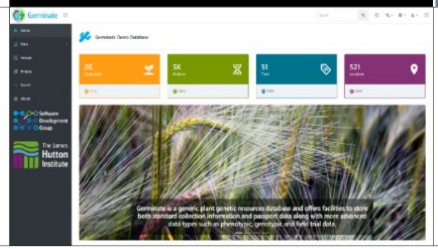






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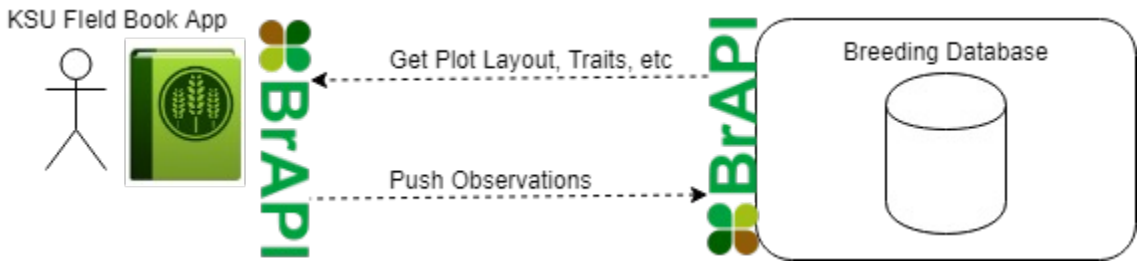
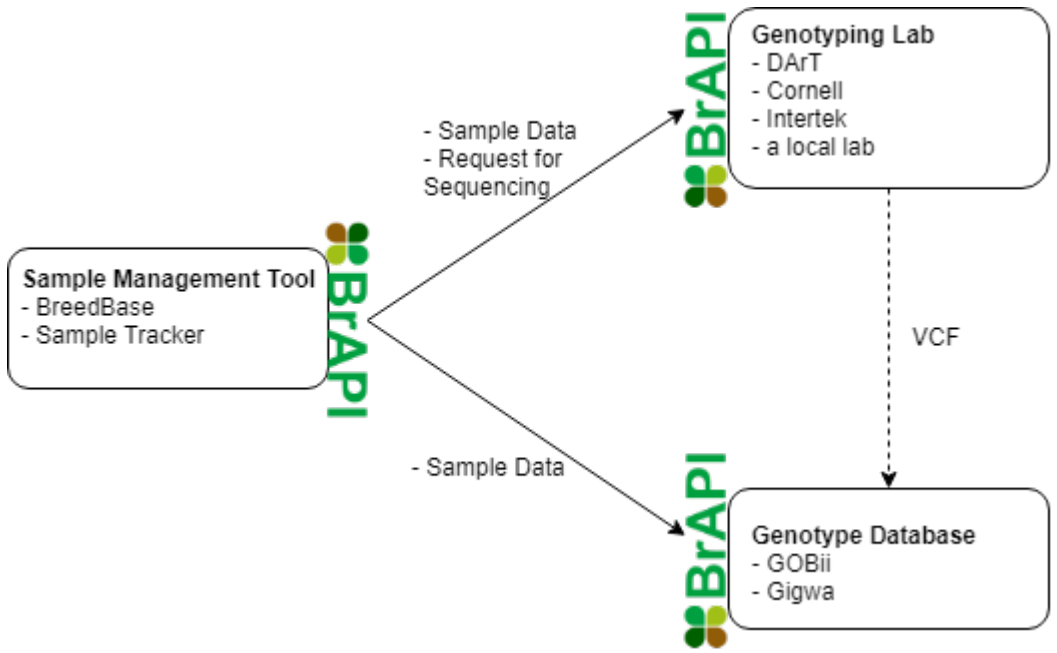
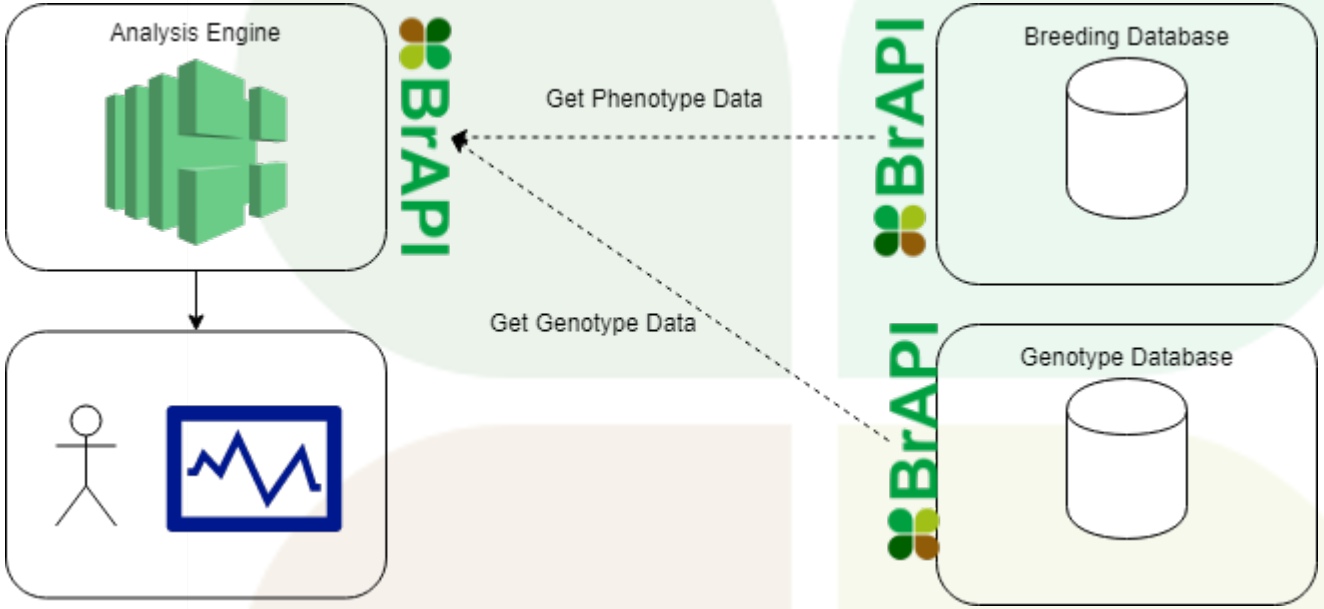
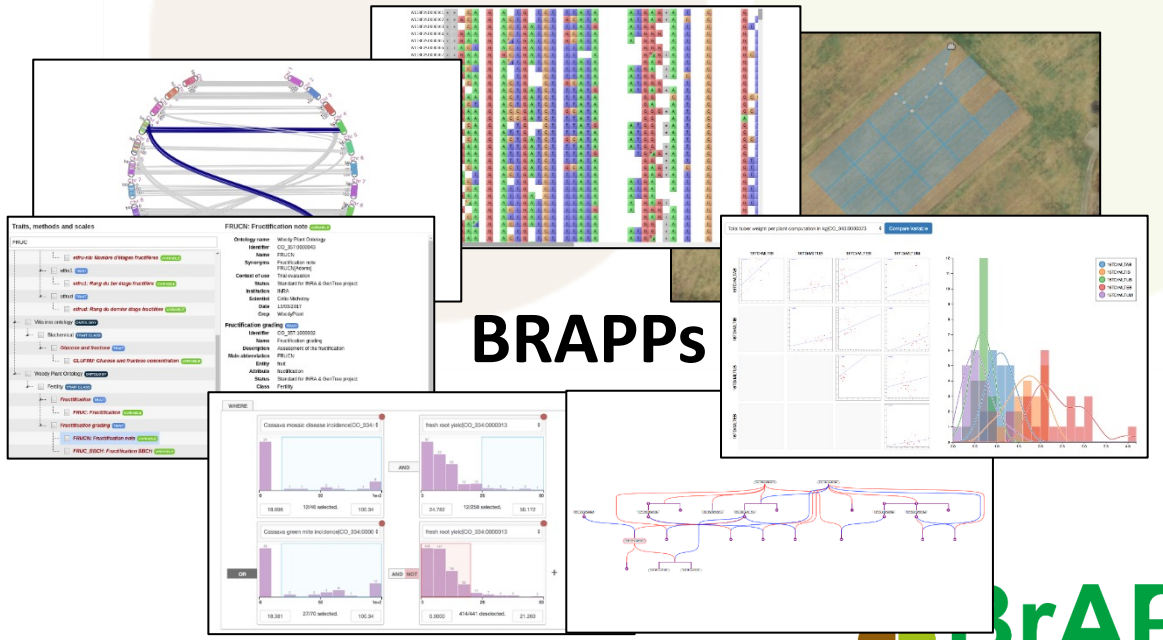
Solved Use Cases









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Resources

BrAPI Specification

https://brapi.org/specification

GitHub

https://github.com/plantbreeding/API

ReadTheDocs

https://plant-breeding-api.readthedocs.io/

Compatible Software List

https://brapi.org/compatibleSoftware

Publication

https://doi.org/10.1093/bioinformatics/btz190

Contact

https://brapi.org/contact

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Questions?

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