

Model of Data Storage and Processing System for “PIK” Nuclear Reactor Experiments

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PNPI

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“PIK” Nuclear Reactor

PIK is a high-flux 100 MW nuclear reactor situated at PNPI, Gatchina, Russia.

Parameters of its neutron beams and its experimental capabilities are unmatched, the only close alternative is a 58 MW HFR reactor at Institut Laue-Langevin (ILL), Grenoble, France.

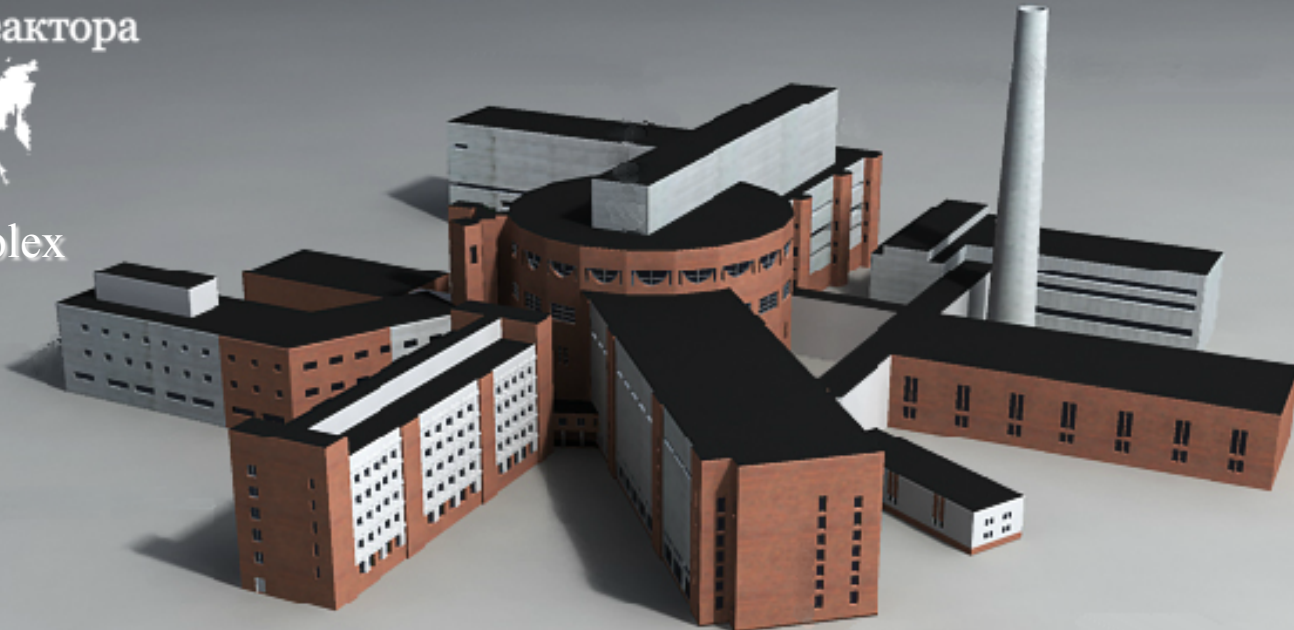
PIK is selected as one of the six “mega-science” installations in Russia.

Комплекс реактора



г. Гатчина

Reactor complex



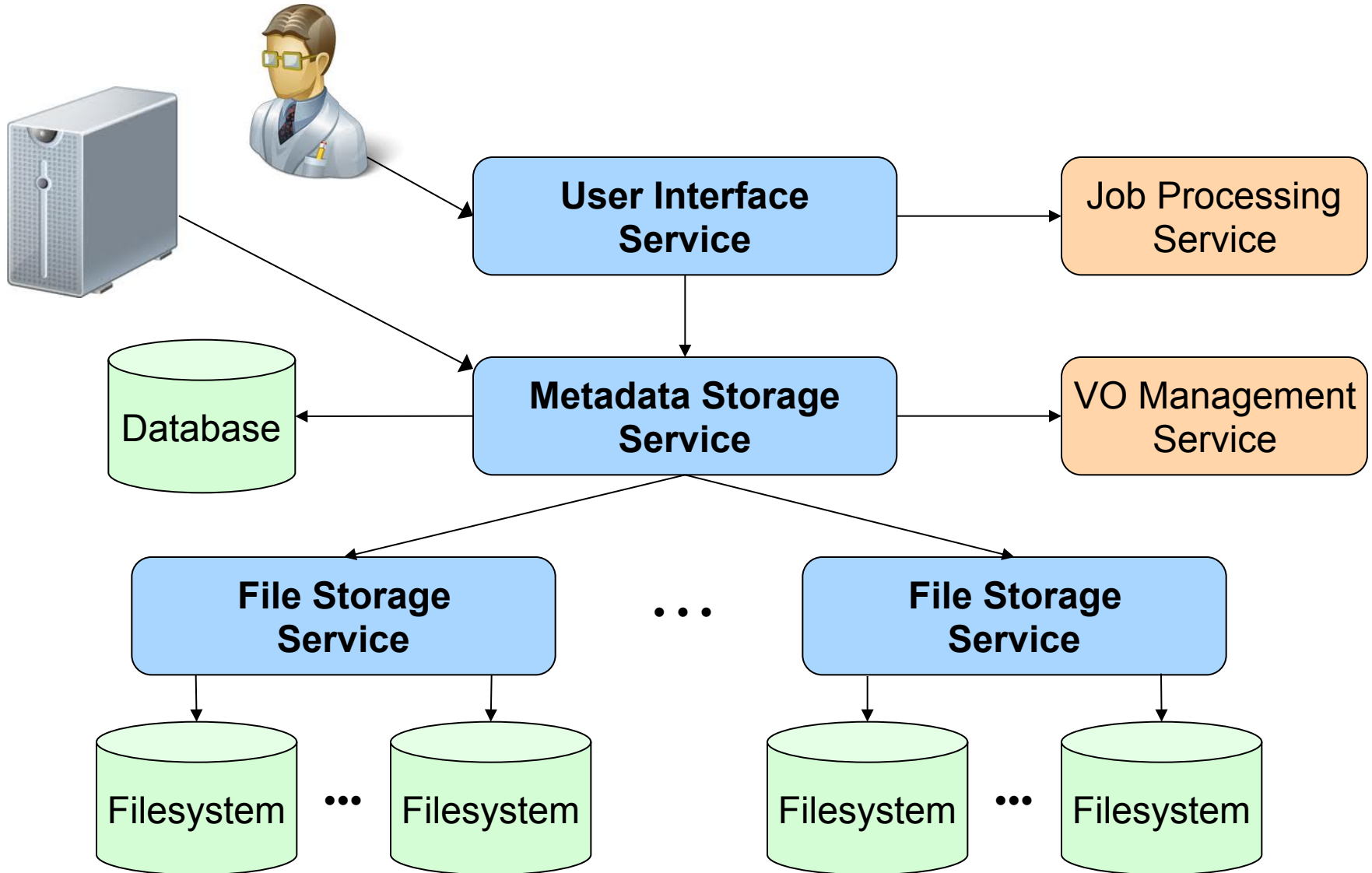
“PIK” Nuclear Reactor

- More than 50 planned experiments
- Various application areas (neutron physics, radiation biology, etc)
- International collaboration



There's a need for uniform, handy and secure off-line data storage and processing system: **MODUS**.

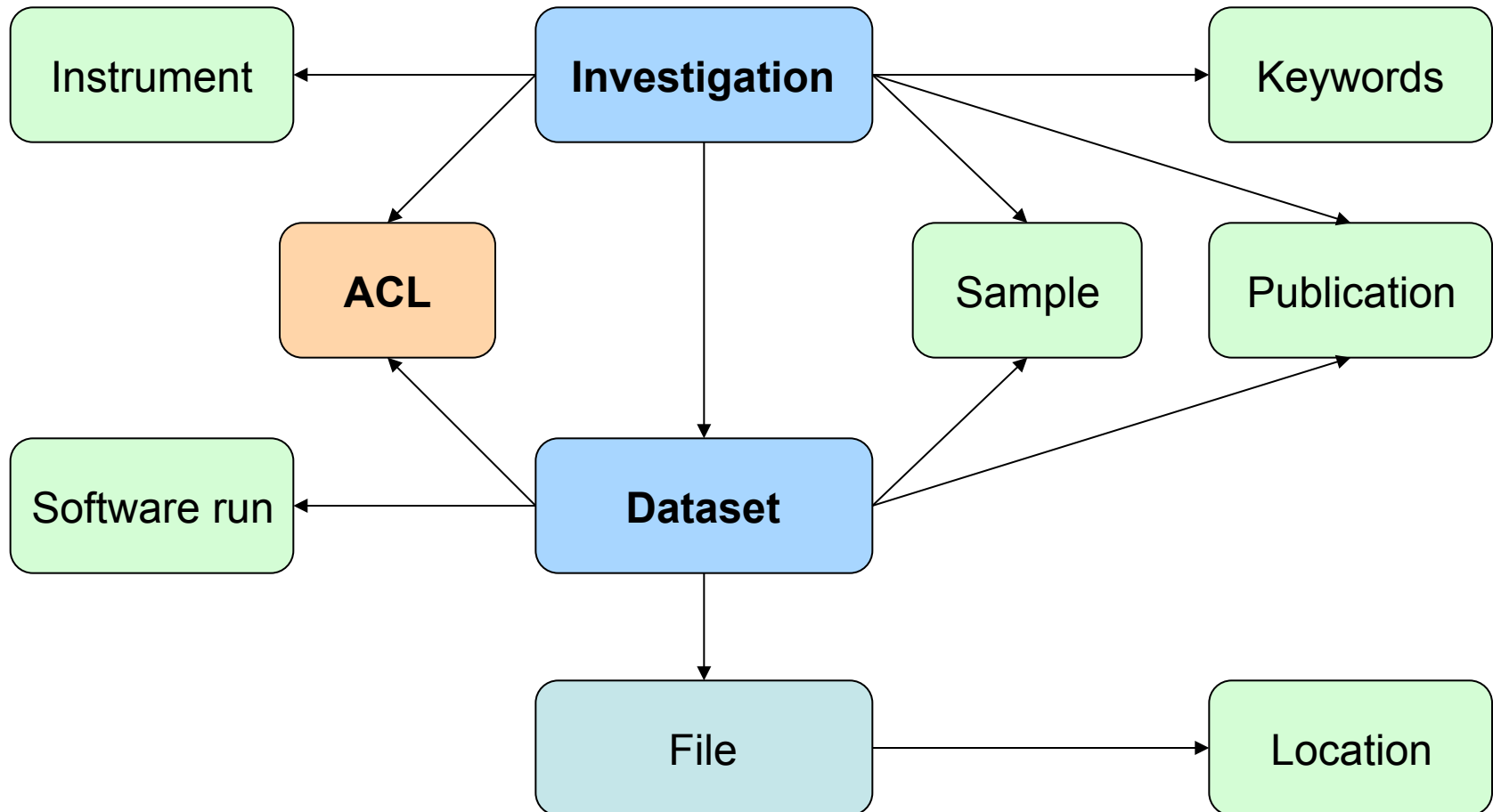
MODUS Schema



MODUS Core Features

- Metadata extraction and search
- Role based access control (RBAC)
- X.509 authentication
- Standard protocols (HTTPS, GridFTP)
- JSON object representation
- Storage scalability and redundancy
- Integration with Grid services (CREAM, VOMS)
- Web based user interface

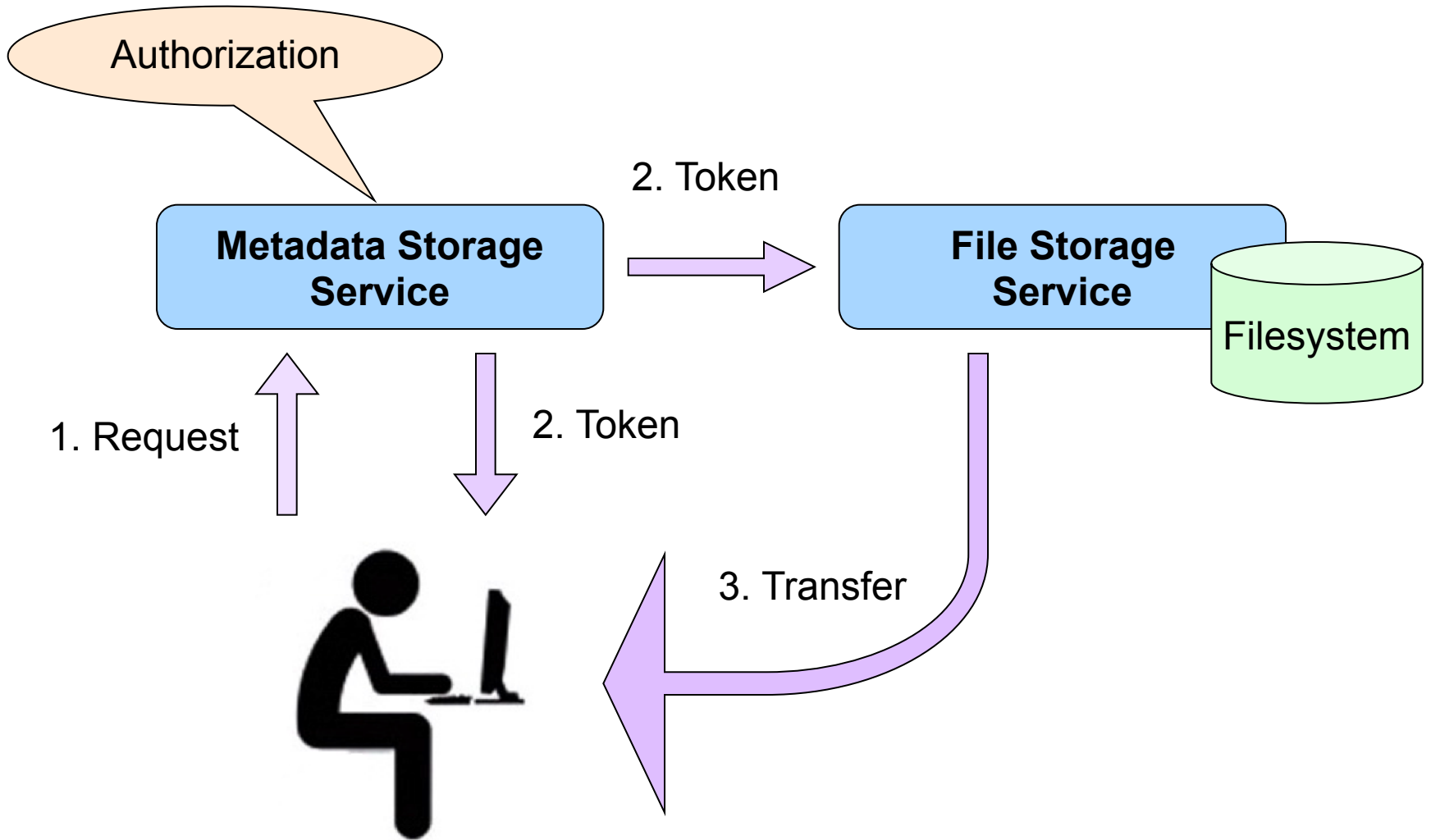
MODUS Metadata Model



MODUS Metadata Model

- **Investigation** is a root object, it is inserted in a database by an administrator upon an experiment registration
- **Dataset** object represents a collection of files along with associated metadata which were created as a result of a single run
- **ACL** object is associated with an Investigation or Dataset and holds a list of users and groups along with their roles
- **File** may have many locations, among which a client can choose the nearest one

MODUS Data Storage Model



MODUS Data Storage Model

- **Metadata Storage Service** is a single authorization point
- **File Storage Service** only serves authenticated users that possess a proper Token
- Data is transferred via standard protocols: HTTPS, GridFTP, etc. A client can choose the one it prefers.
- All registered files are protected by checksums
- File storages of different type (e.g. SRM) are supported by metadata schema

MODUS User Interface

Веб-интерфейс МОДУС - SeaMonkey

File Edit View Go Bookmarks Tools Window Help

https://

Google

Веб-интерфейс МОДУС

Добро пожаловать: **Andrey Kiryanov**

ПК «МОДУС»
веб-интерфейс пользователя

Поиск исследований Поиск данных Управление заданиями

Искать только мои данные Искать все данные

Ключевые слова

Регистрационный номер

Дата начала

Дата завершения

Установка

Участник

Начать поиск Очистить поля поиска

Исследования

- SANS2 experiment 1
 - Ключевые слова
 - Наборы данных
 - /pik/sans2/test1**
 - /pik/sans2/test2
 - Файлы
 - pexus_AI_100.xml
 - Параметры
 - Параметры
 - Входные файлы
 - Программы обработки
 - Права доступа
 - /pik/sans2/tttt
 - /pik/sans2/t

Имя набора данных	/pik/sans2/test1
Образец	мембрана анодированного оксида алюминия
Тип набора данных	симуляция
Описание	Первый тестовый набор файлов для эксперимента 1
Дата создания	2012-03-26 17:07:09

Изменить Сохранить Отменить

MODUS User Interface

- Bilingual (languages are easy to add)
- AJAX + JSON
- Single entry point for metadata manipulation, data transfer and job submission
- Query interface with hierarchical view
- User jobs are submitted via application-oriented interfaces

Thank you!