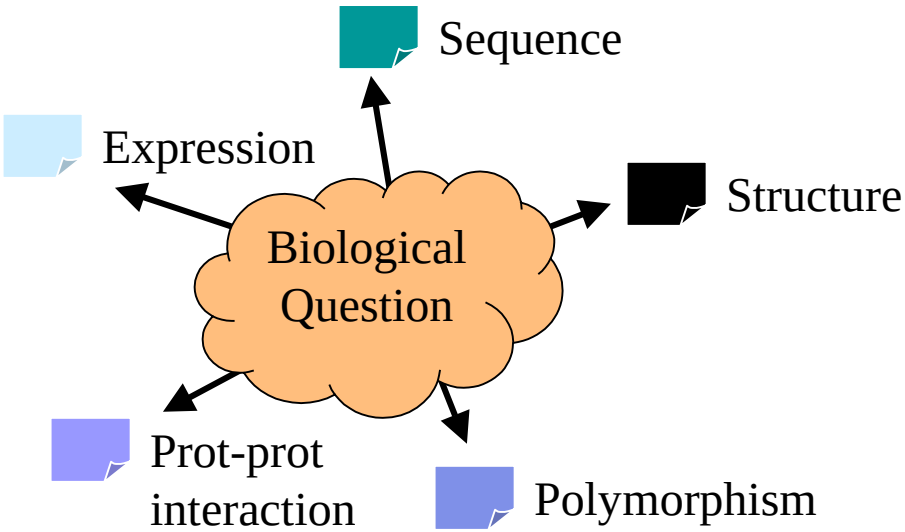
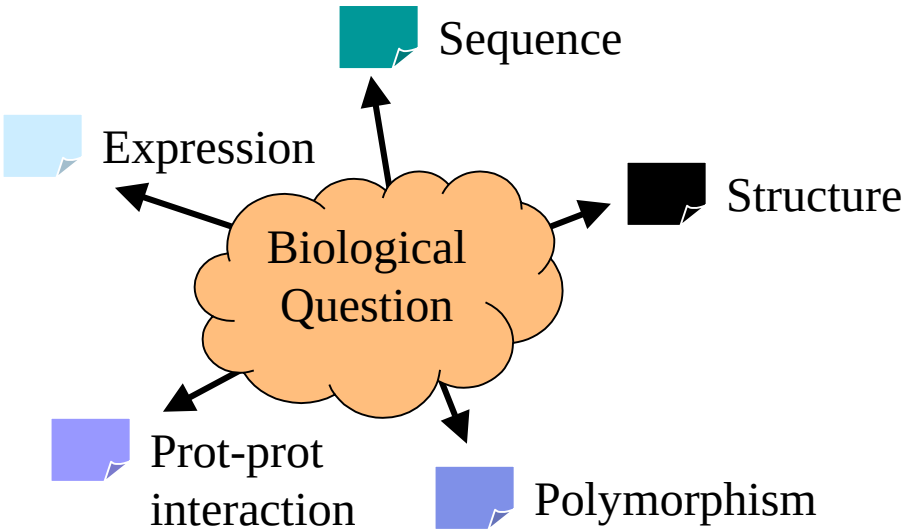
A Model-Driven Architecture For Unifying, Powering and Accelerating Drug Discovery

Technology-Driven Data

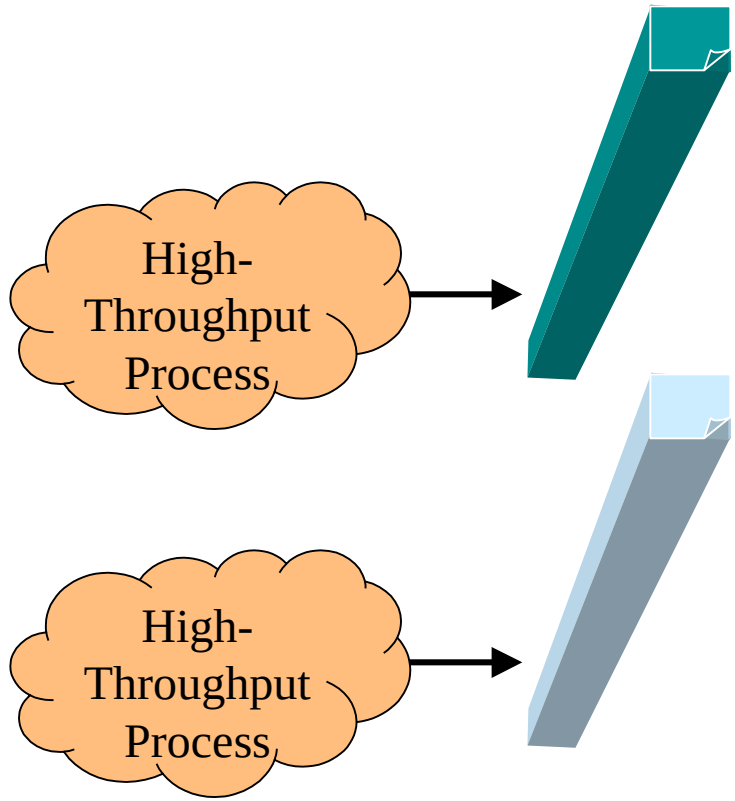


Then

Technology-Driven Data

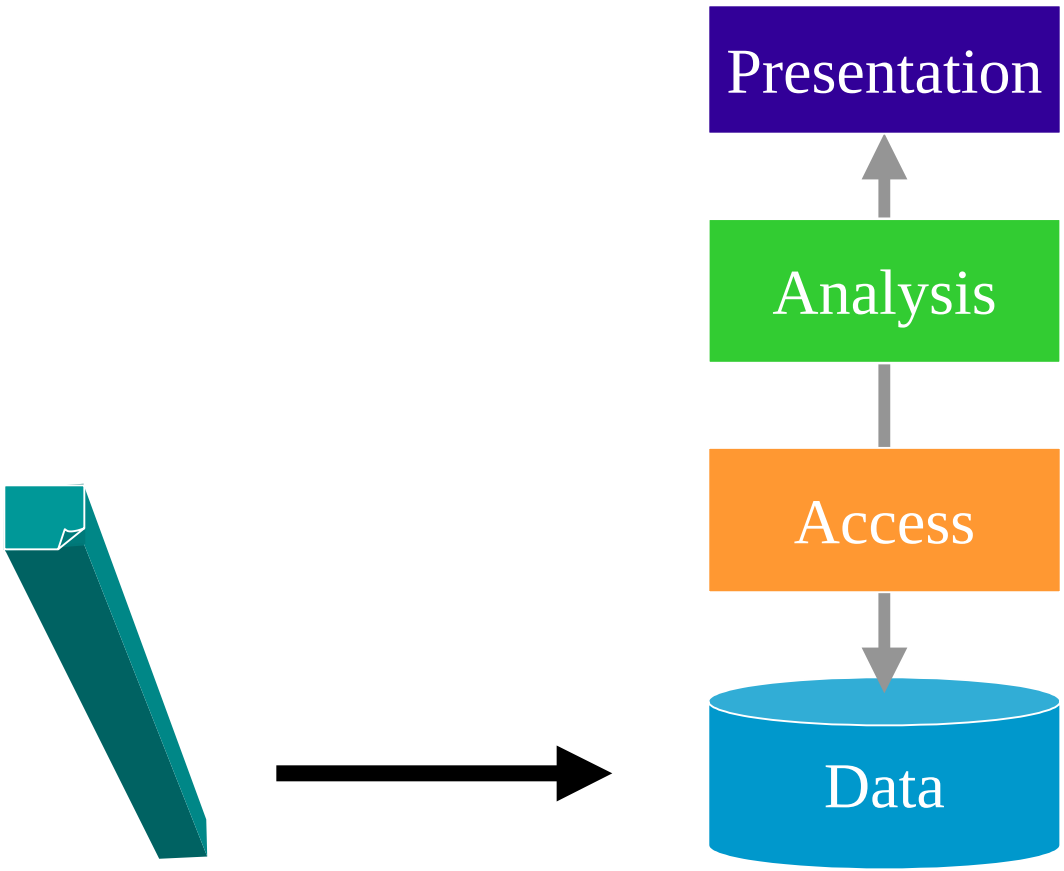


Then

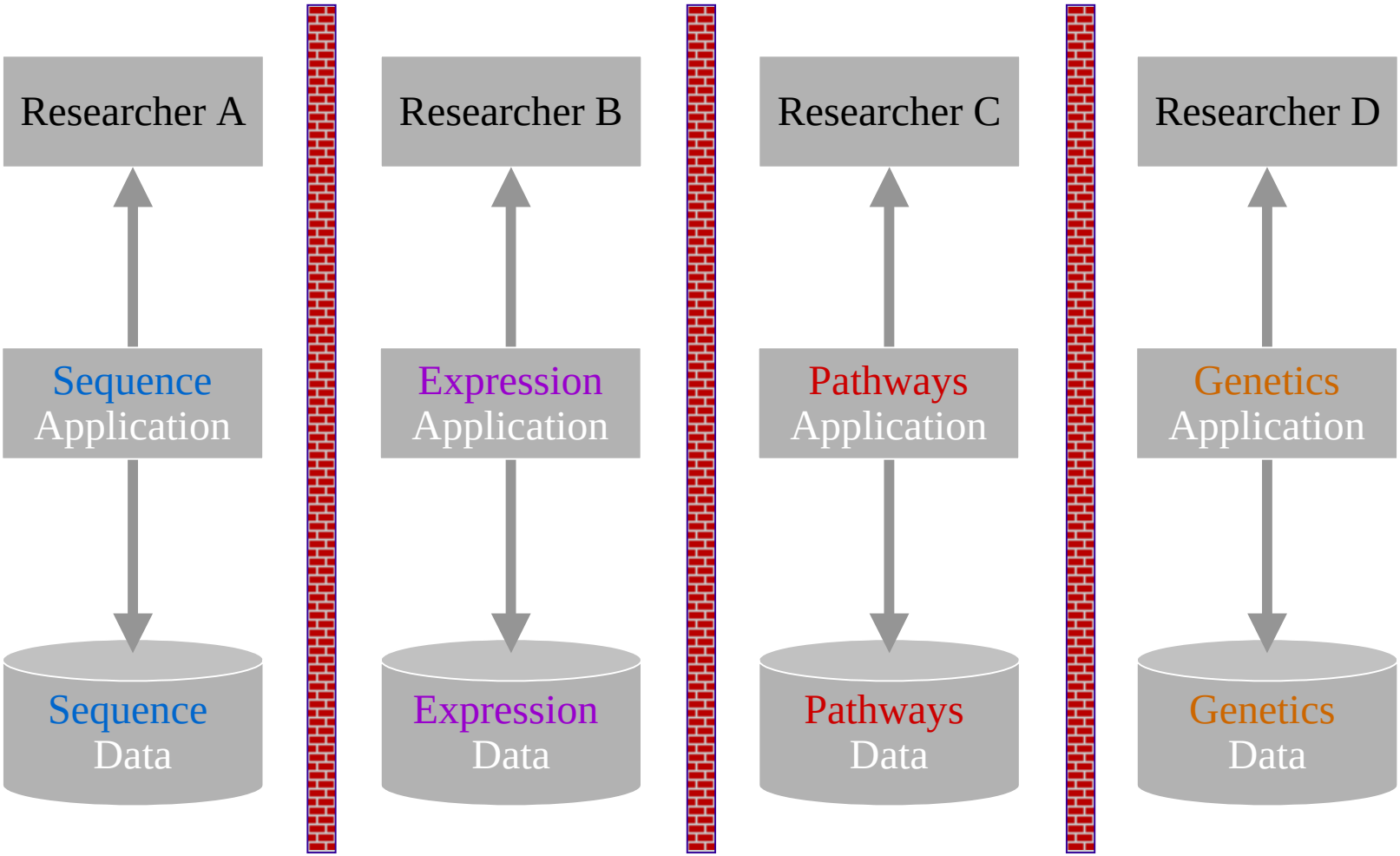


Now

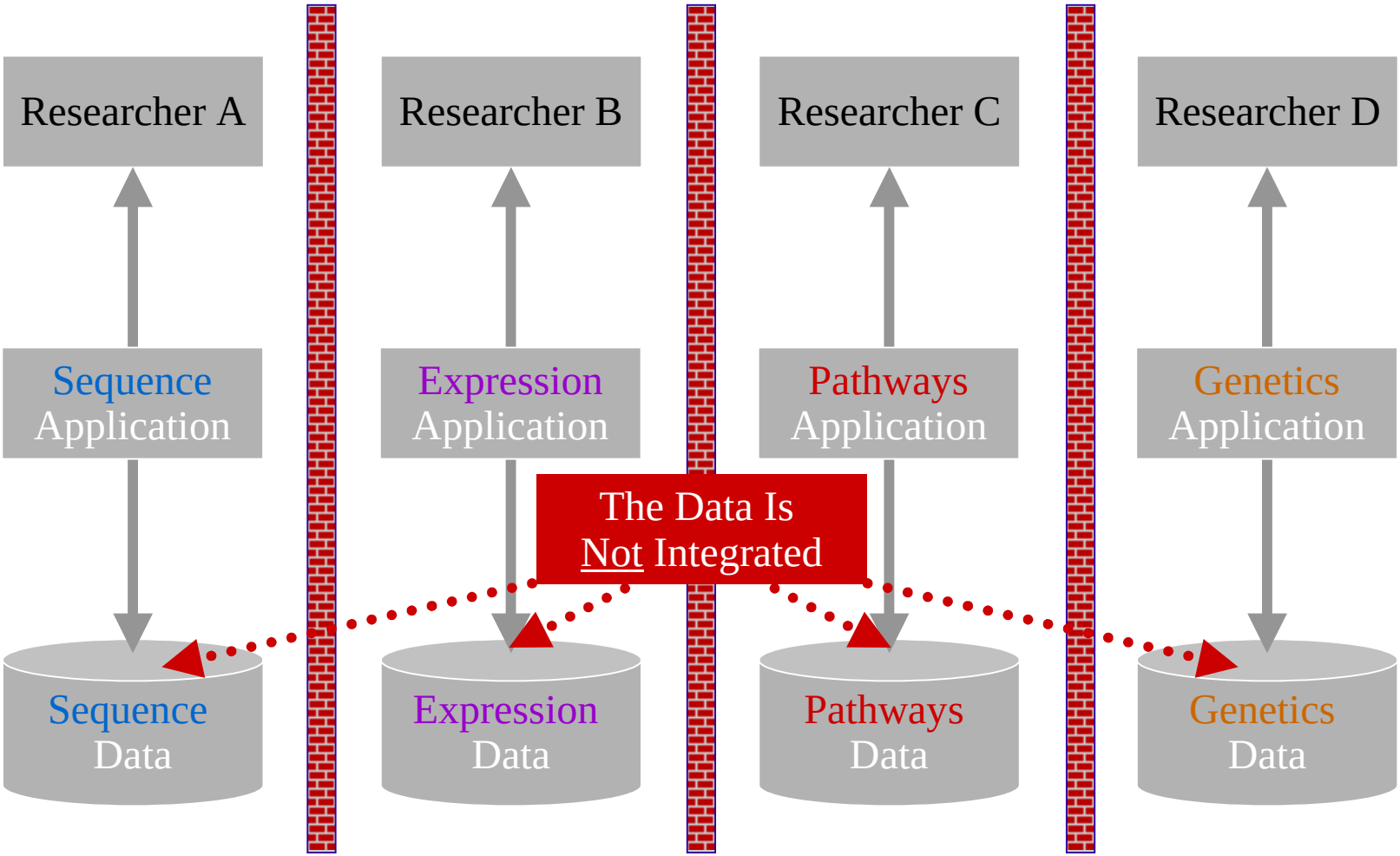
Software in the Genomics Age



Research Applications Are Developed And Run In "Silos"



The Problems With "Silos"



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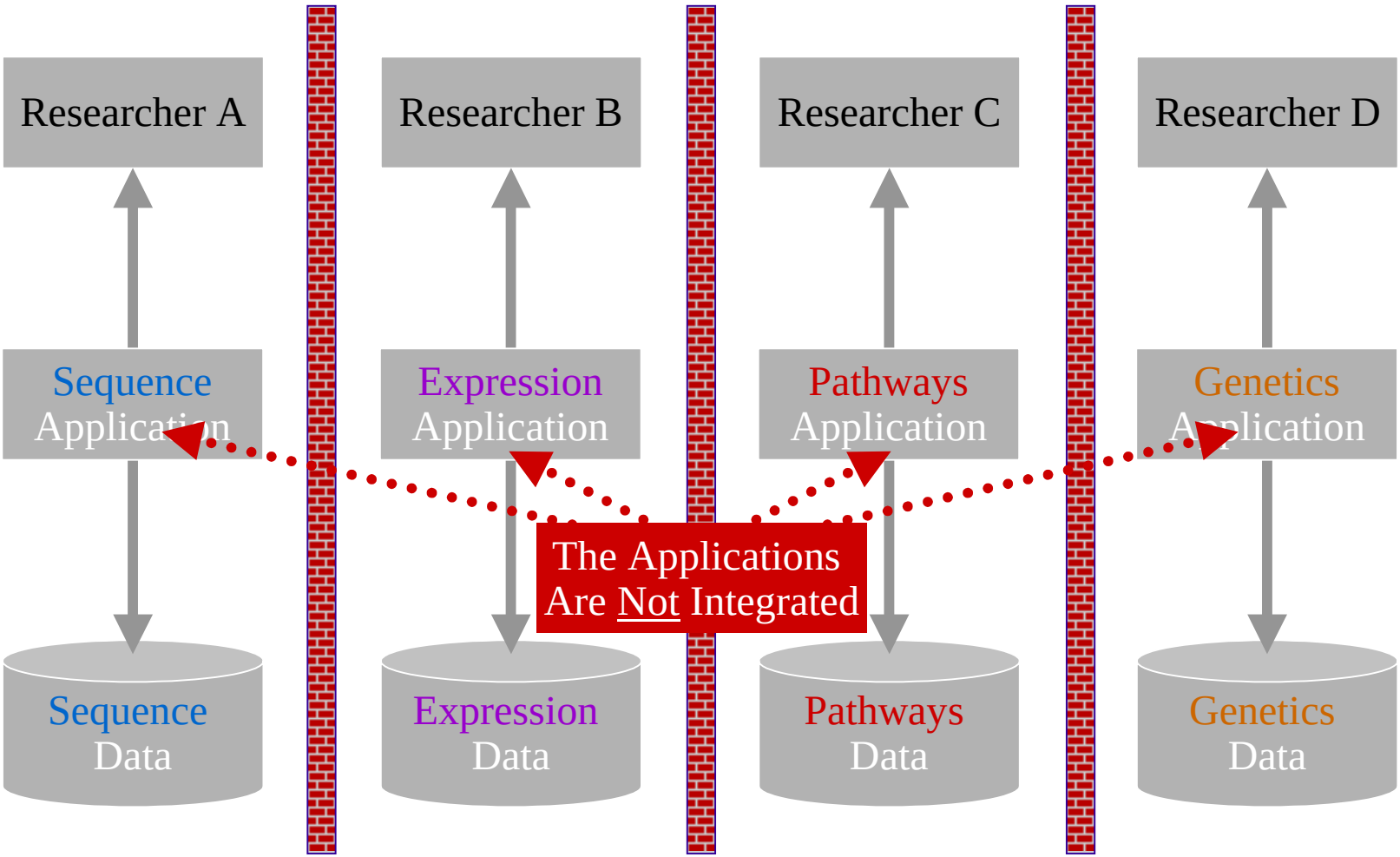

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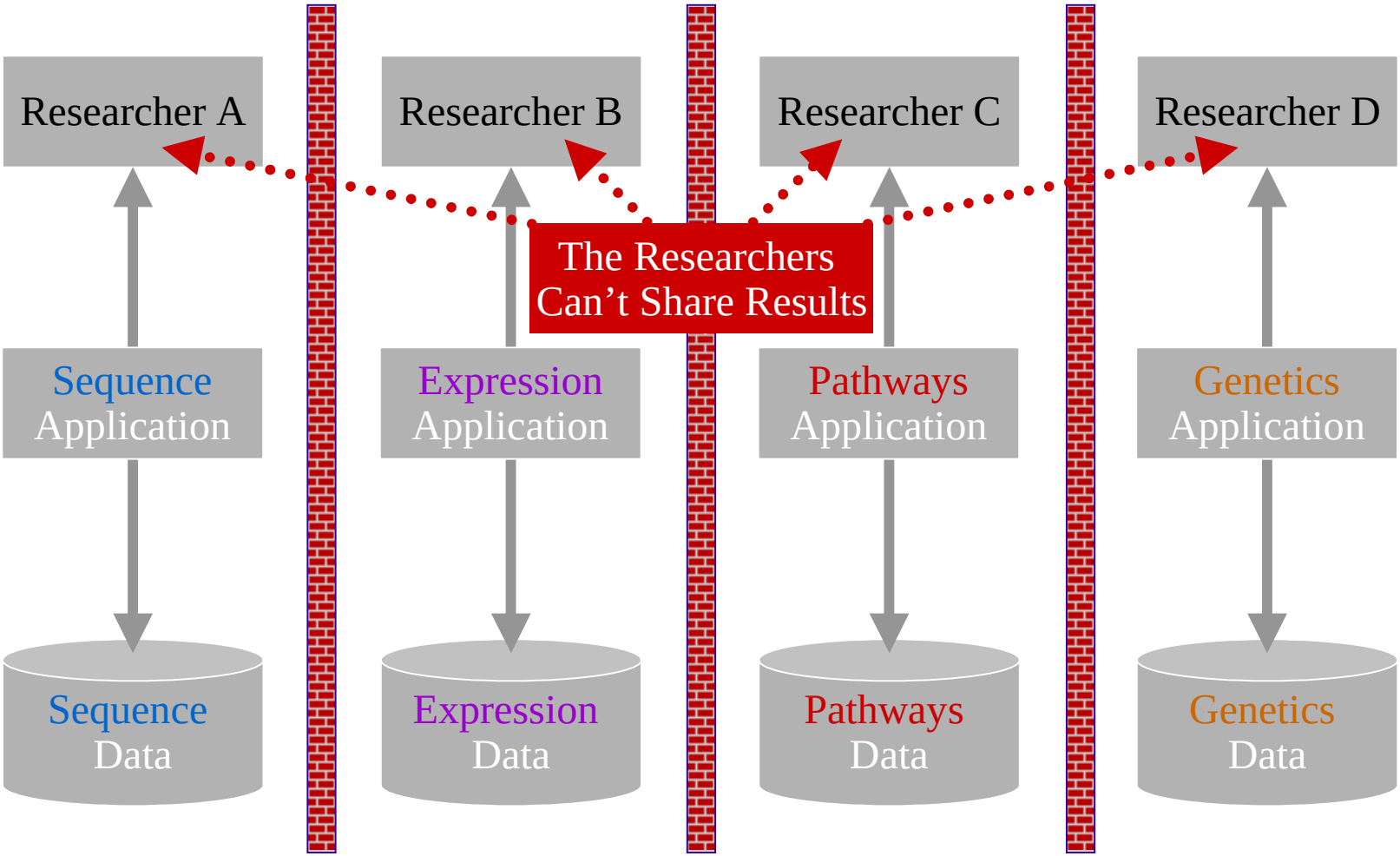
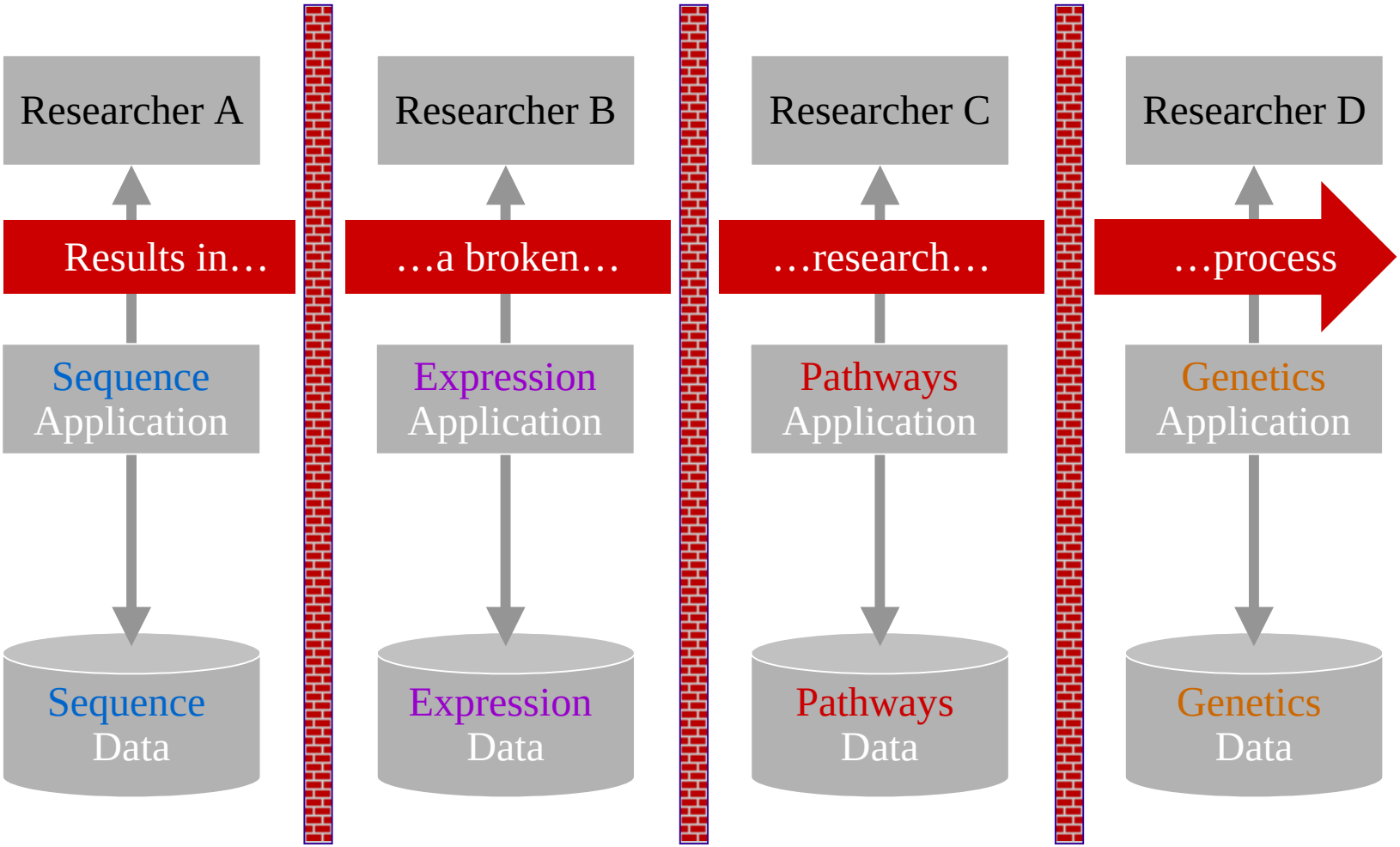


Results In A Broken Process



The Science Pain

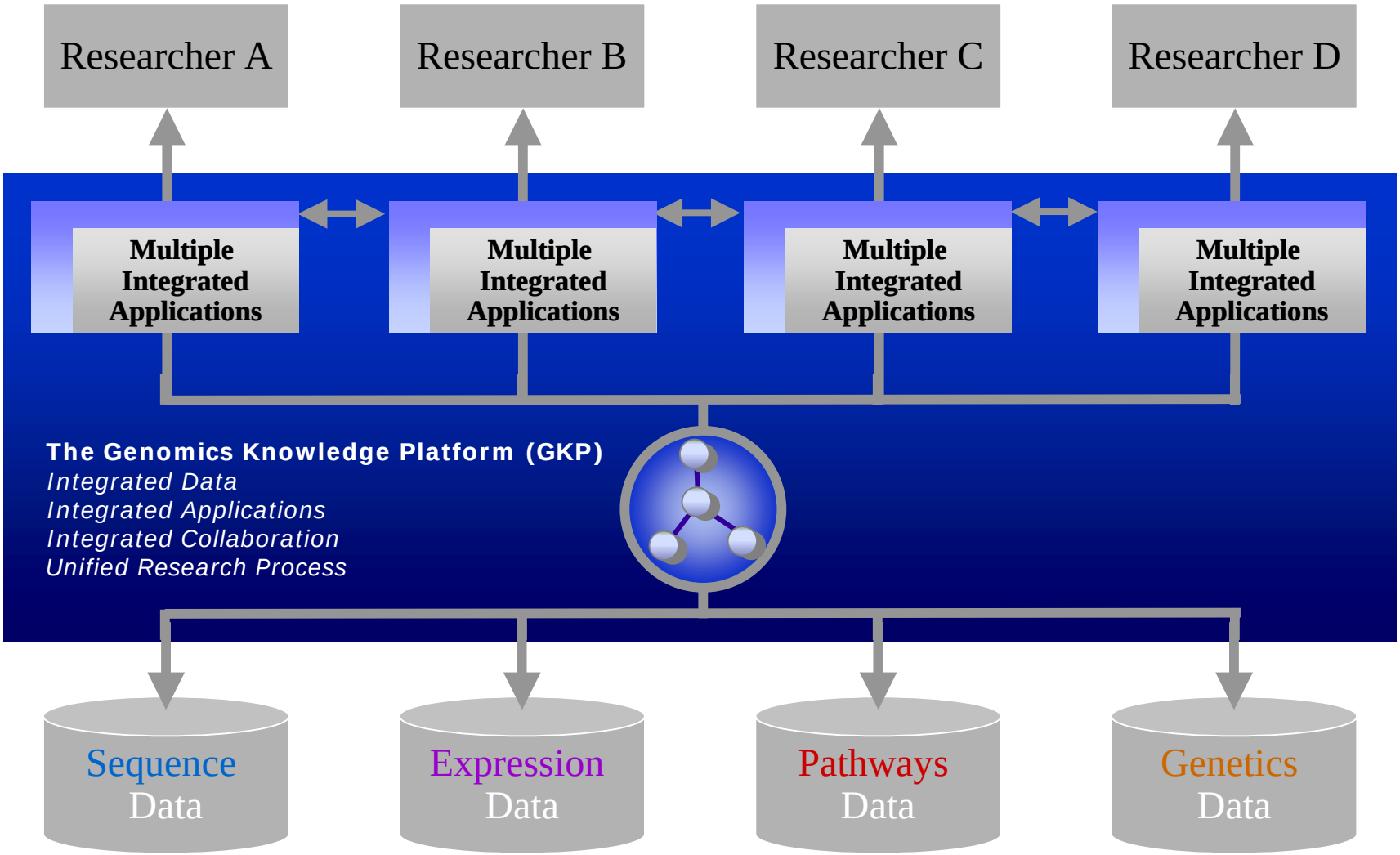
- Too many “Targets” to integrate and maintain
- Wrong “Targets” put into screening
- Human Genes ≅ 30,000
  - Human expression and tissue specificity
  - Genetic variation (SNP’s)
- Cross reference other organismal genomes
- Personalized Medicine (predictive medicine vs. reactive)

The Business Pain

- $880M – Estimated cost to develop a novel drug
- Attrition rate of novel drugs ≅ 45% at clinical phase III
- $200M – Average amount that could be saved by eliminating one in 10 drug targets from research
- $300M – Savings estimated per novel drug if pharmas can properly implement and integrate genomics technologies and data along the way
- $1B – Estimated annual lost revenue for expired patent protection on 20mg Prozac blockbuster drug – Eli Lilly

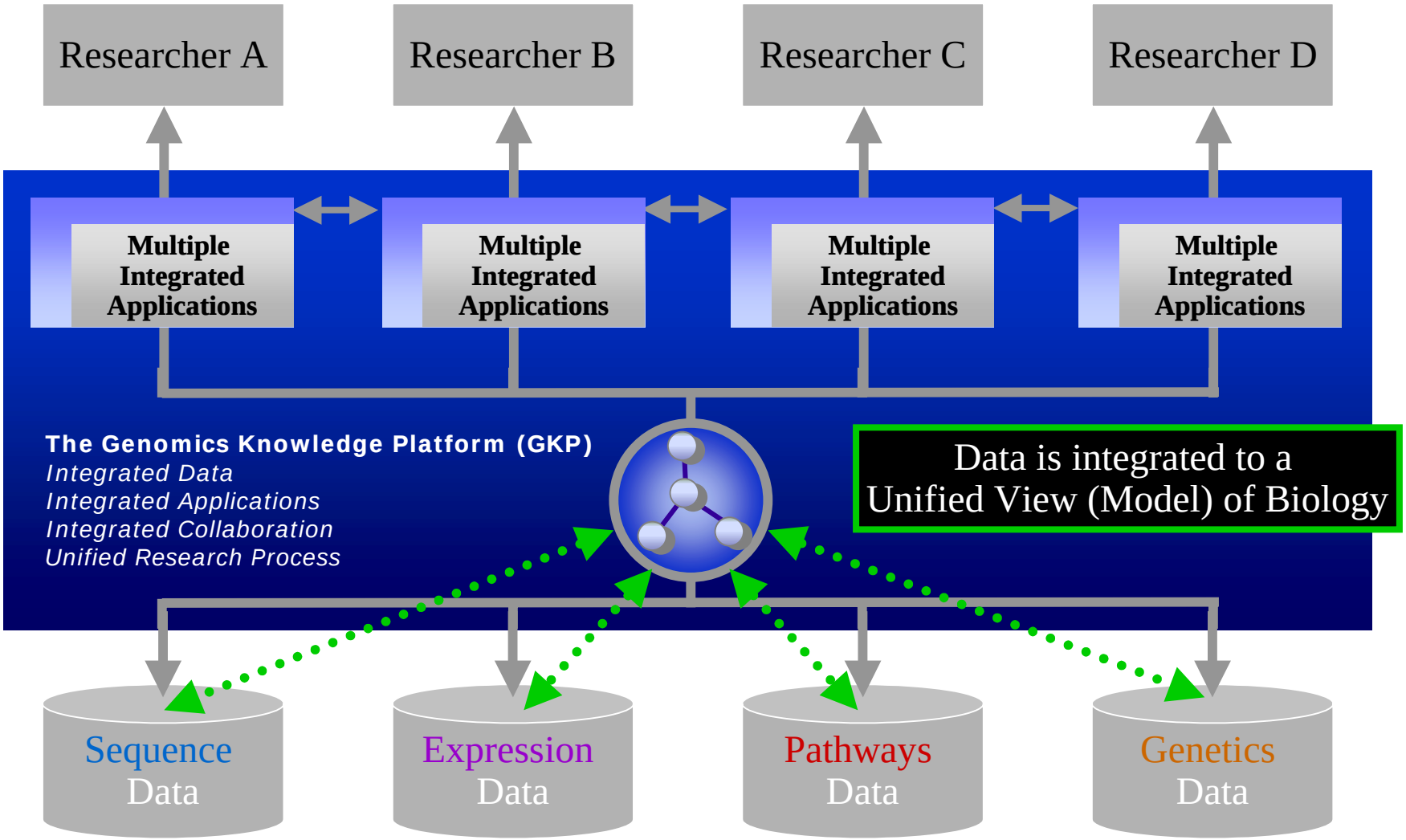
Source: Boston Consulting Group

Introducing The GKP:
Unifying The Process Of Discovery



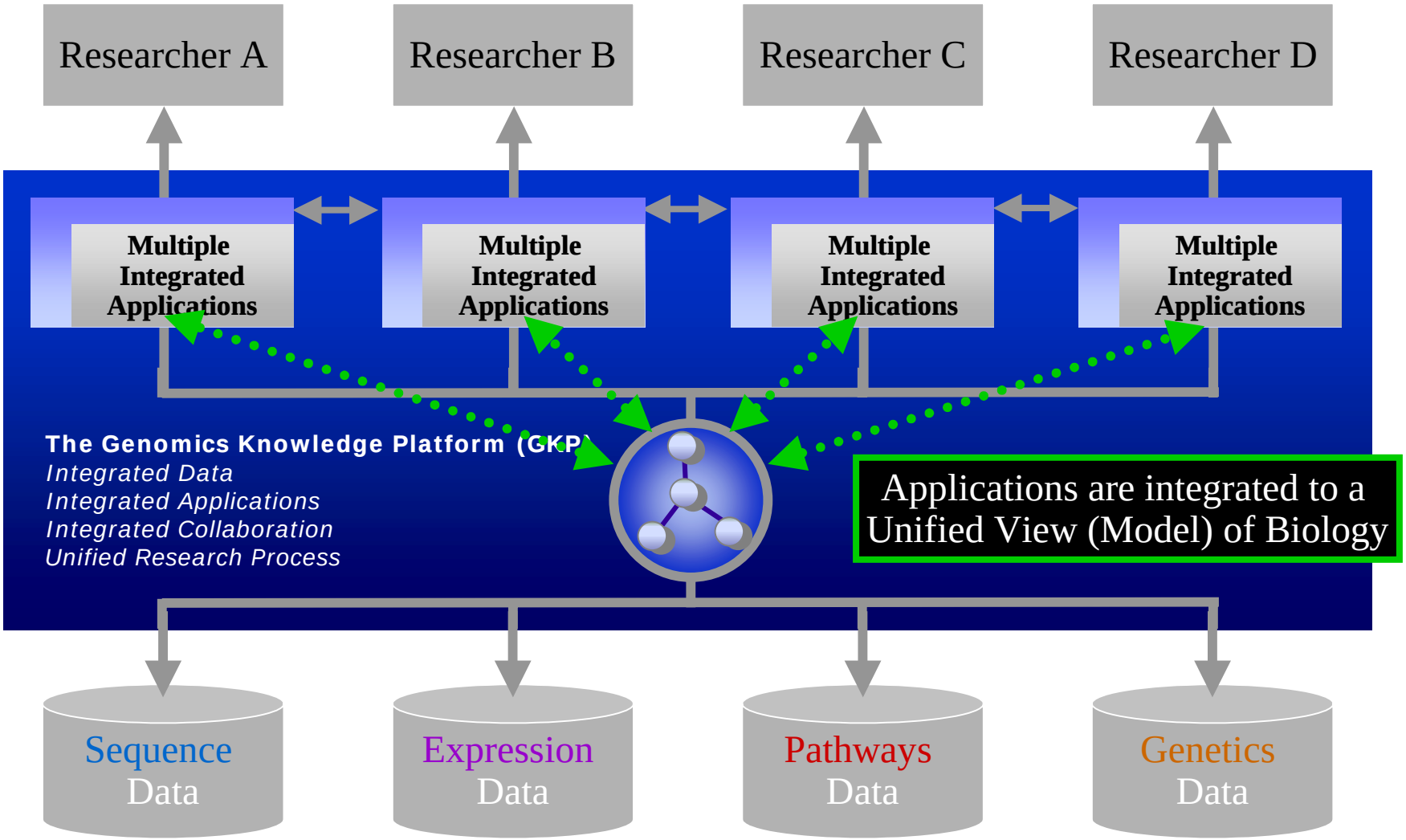
Viewing Data Through Science

GKP
Genomics Knowledge Platform



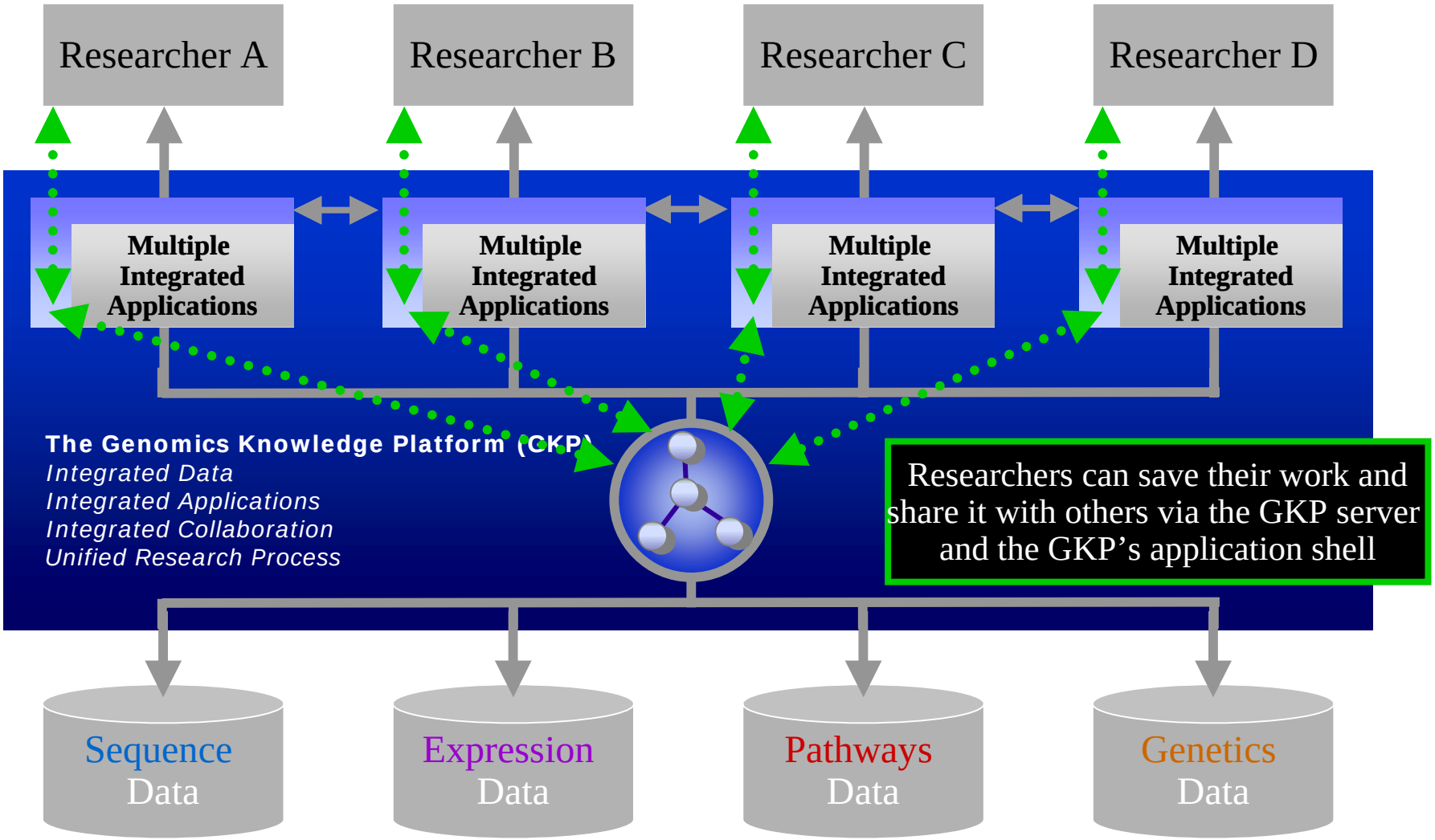
Using A Model Of Science To Integrate Applications

GKP
Genomics Knowledge Platform

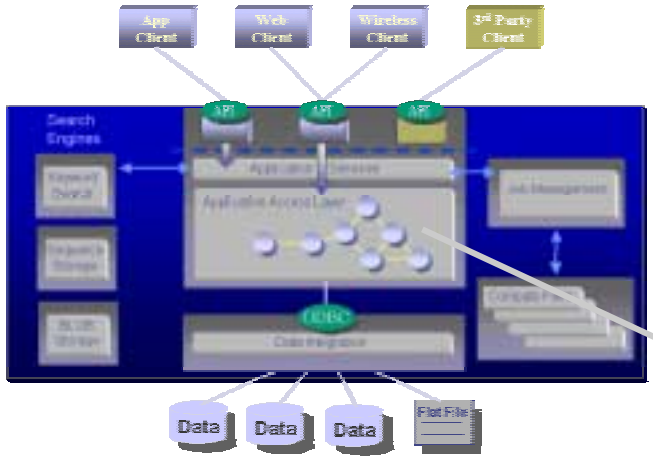


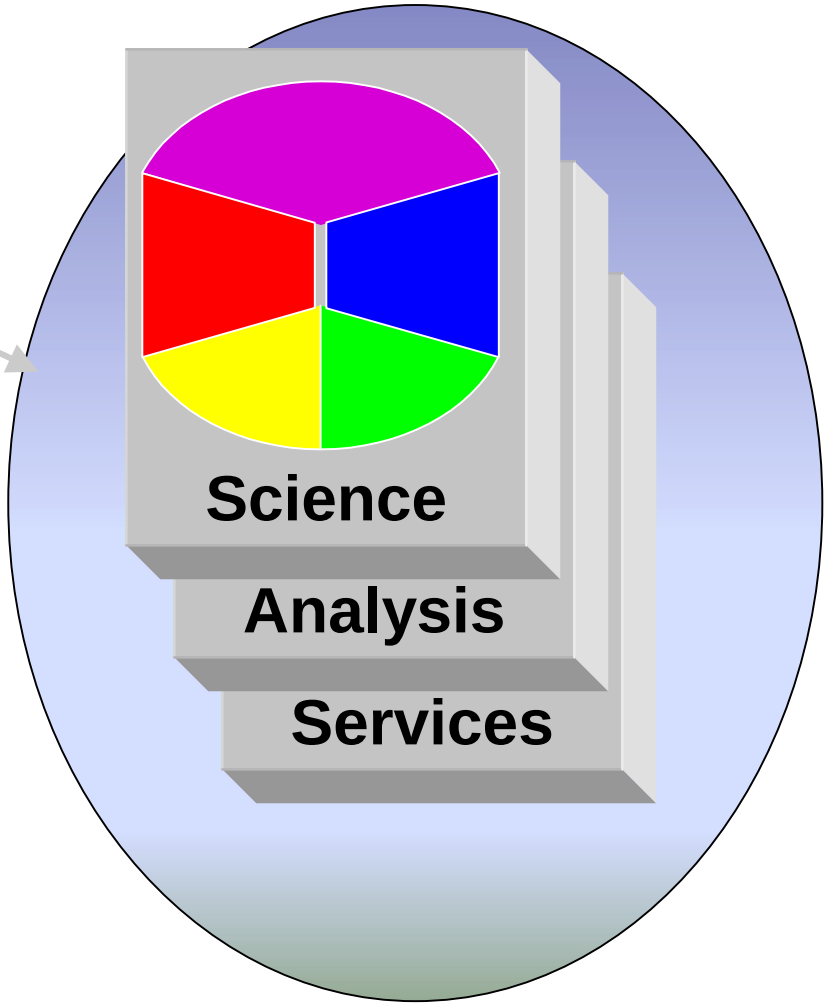
Enabling Collaboration Within And Between Organizations

GKP
Genomics Knowledge Platform

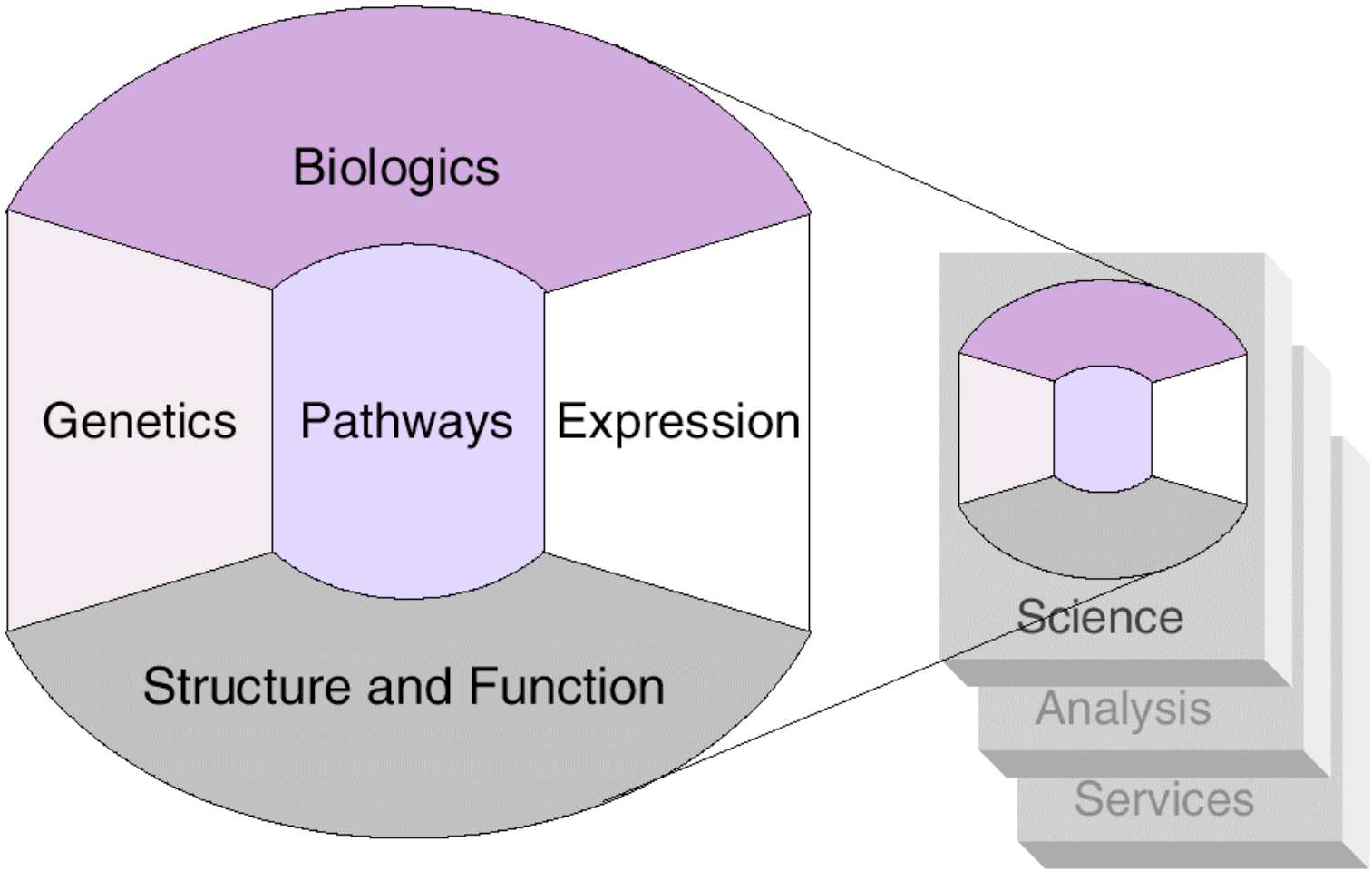


Unified Object Model

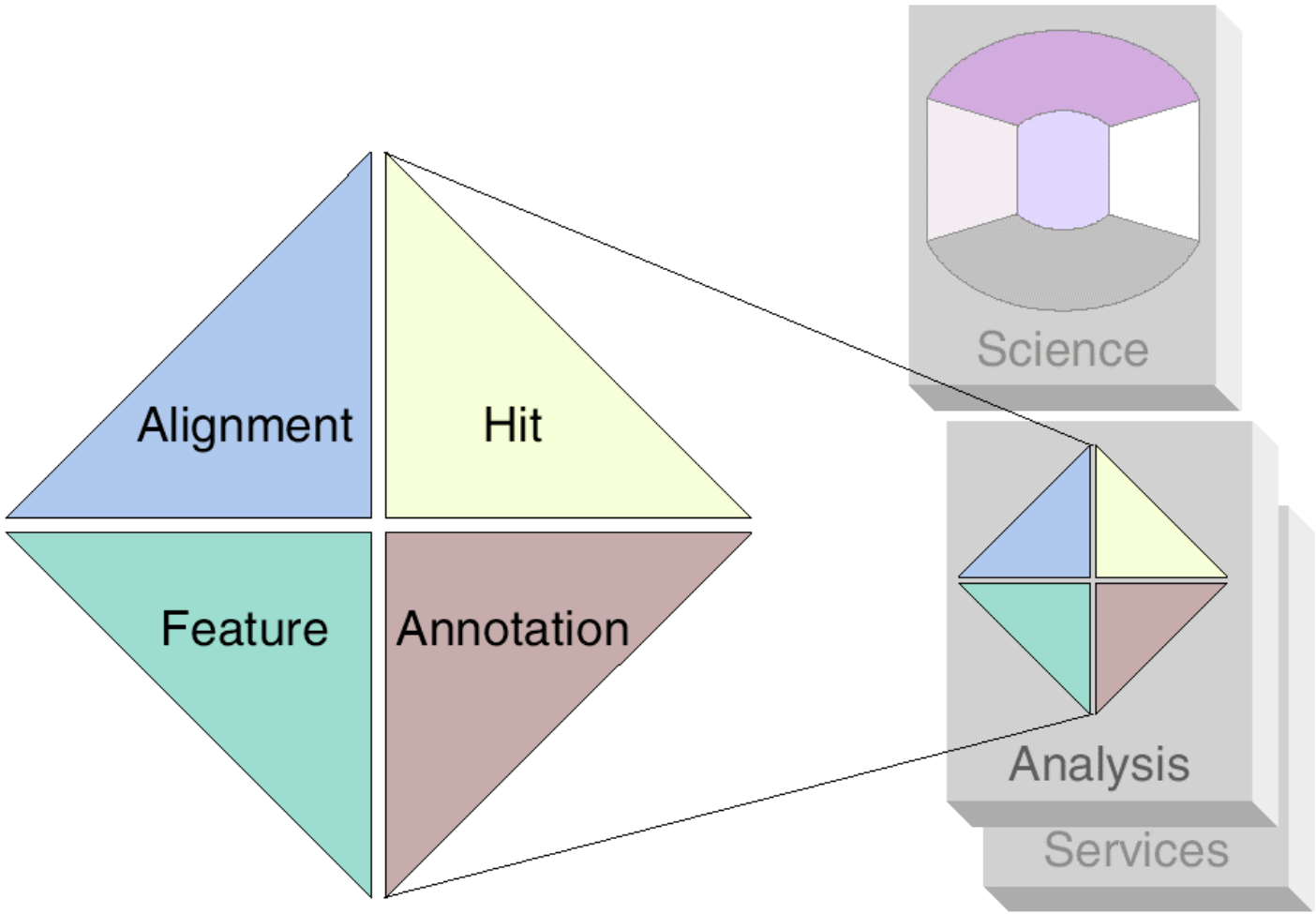




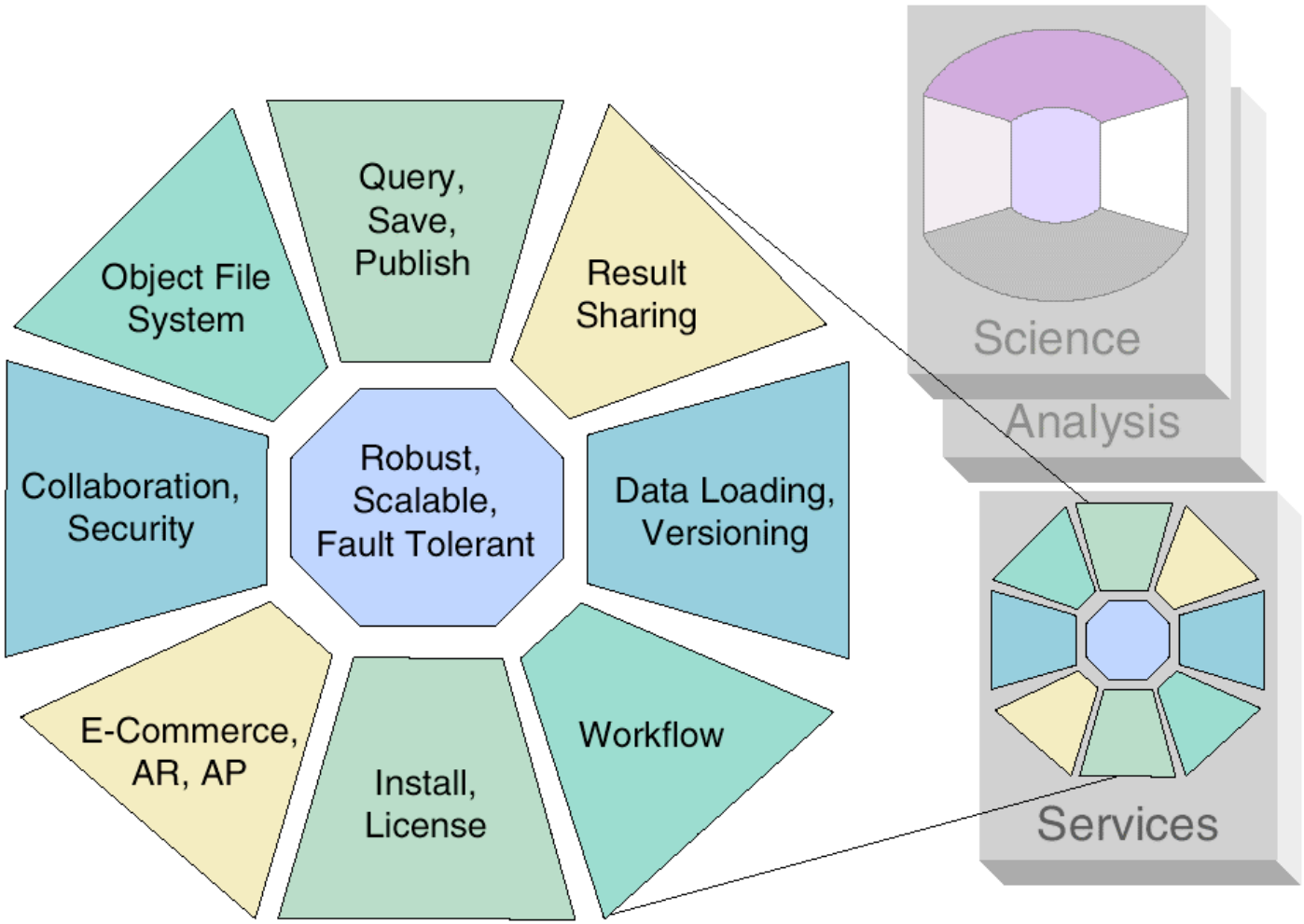
Science Objects



Analysis Layer



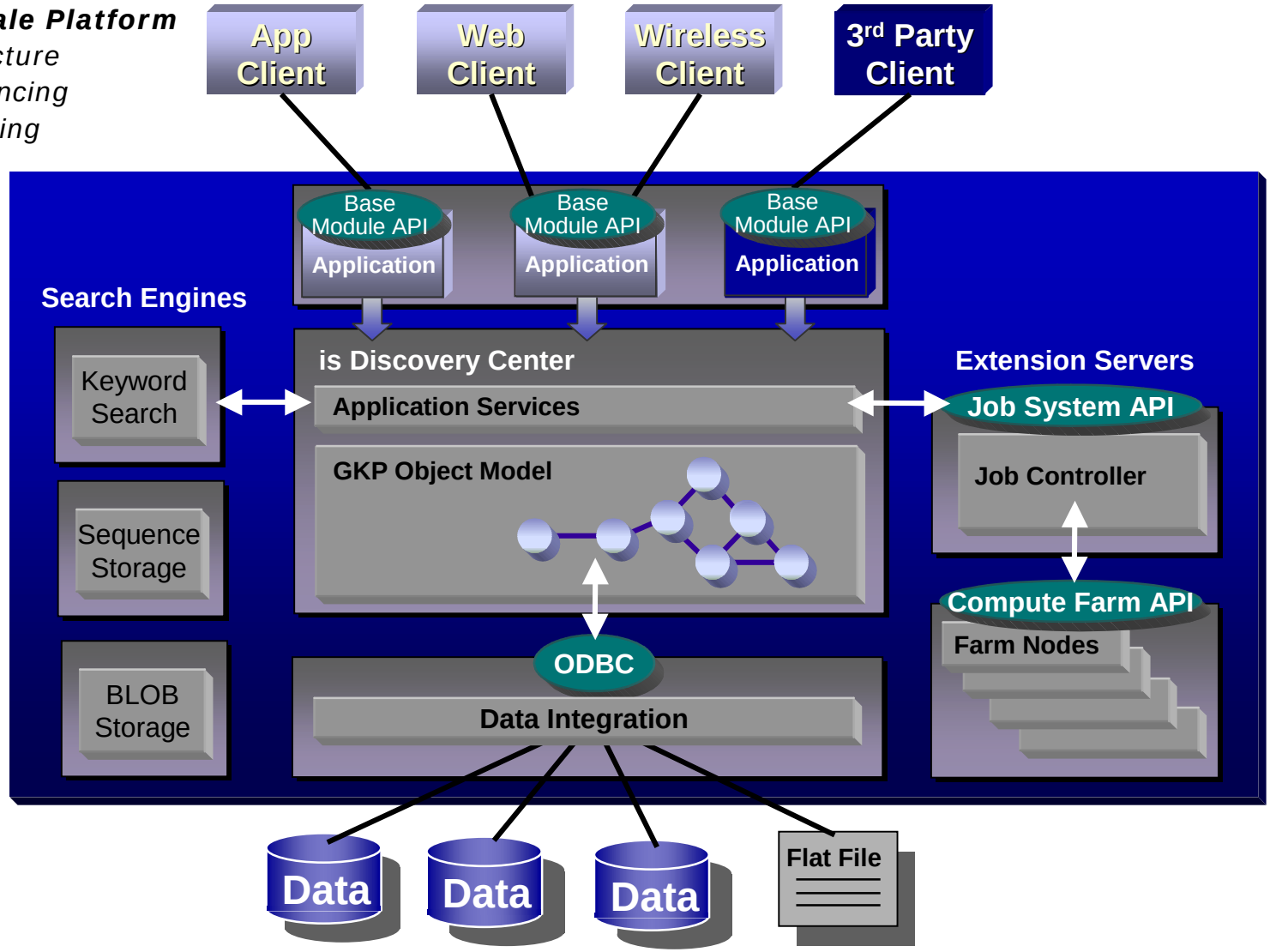
Services Layer



GKP Architecture

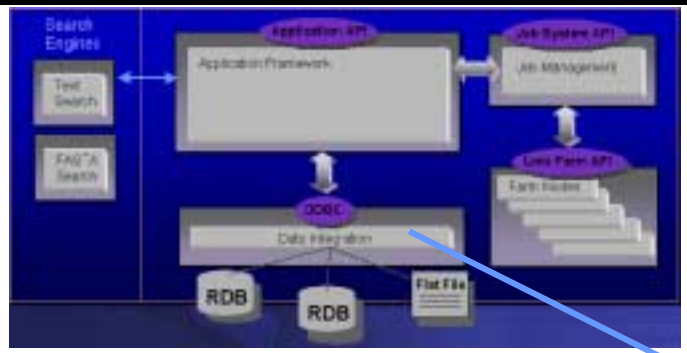
An Enterprise-Scale Platform

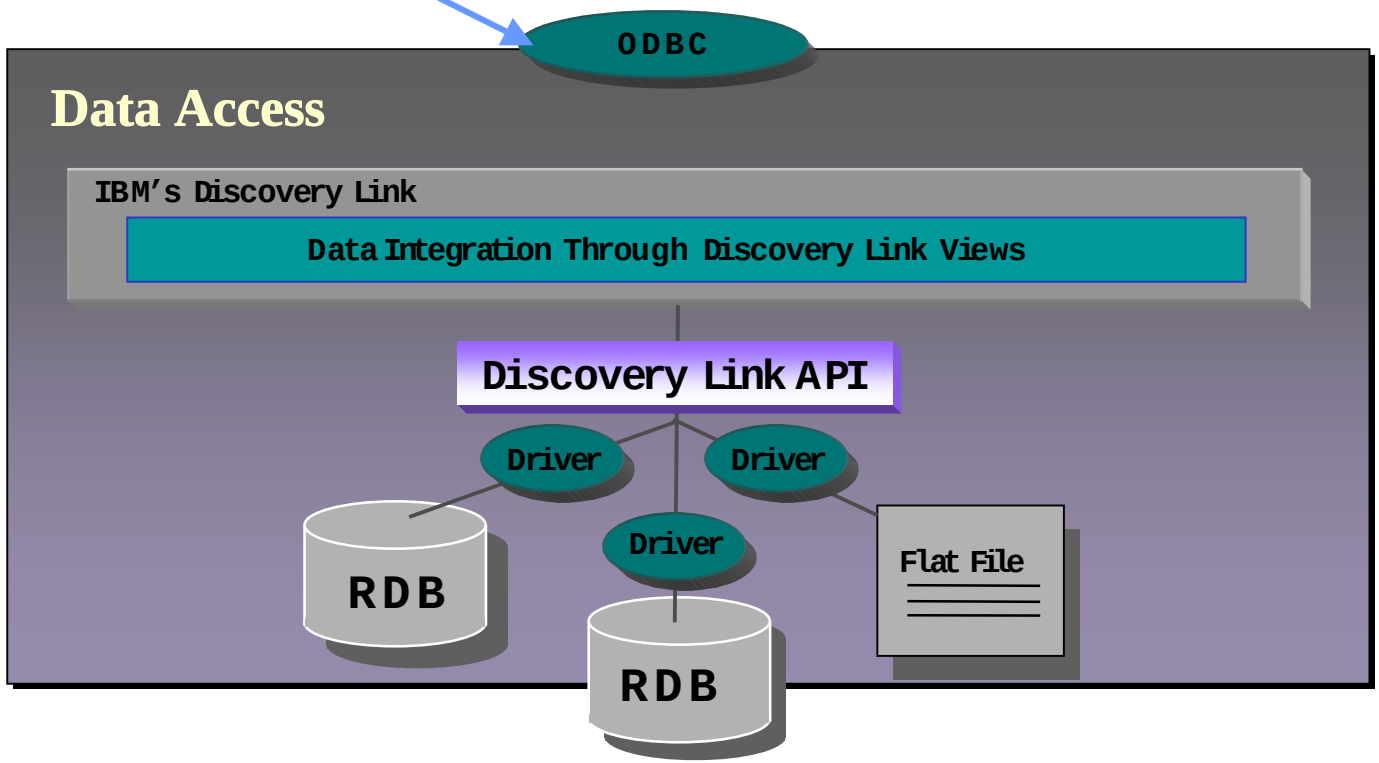
Distributed Architecture
Dynamic Load Balancing
Exponential Clustering
Parallel Processing



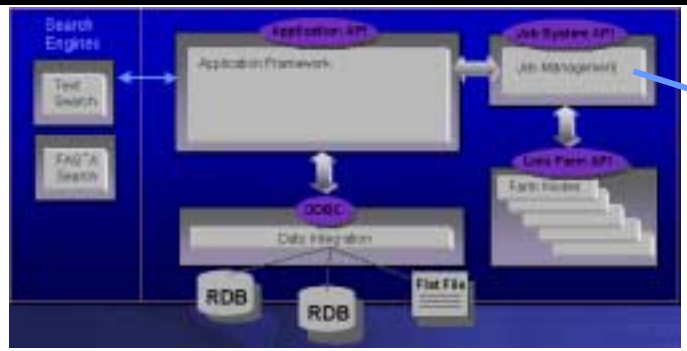
GKP Architecture

Genomics Knowledge Platform





GKP Architecture



Job System API

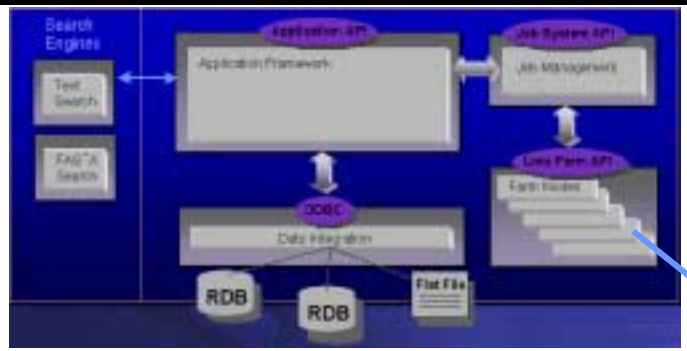
Job Management

- Tool Registration
- Multi Job Task Definitions
- User Request Management
- Task Prioritization
- Parallelization of Single Tasks
- Support Results as Parameters to Other Tasks
- Allow Jobs to Register Jobs
- Plugable Distribution Logic

Application Framework

Data Access

GKP Architecture



Application Framework

Job Management

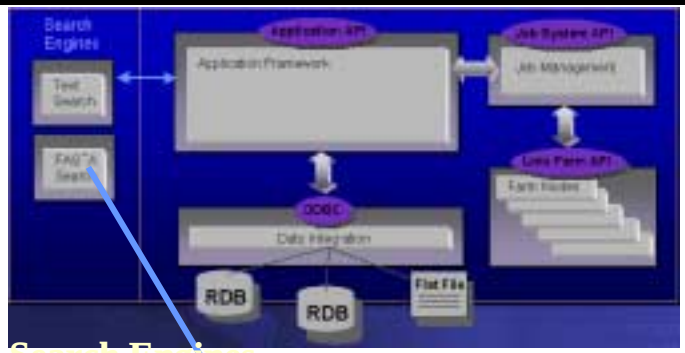
Unix Farm API

Data Access

Unix / Linux Farm

GKP Architecture

Genomics Knowledge Platform



Search Engines

Text Search

Motif/ FASTA

Application Framework

Job Management

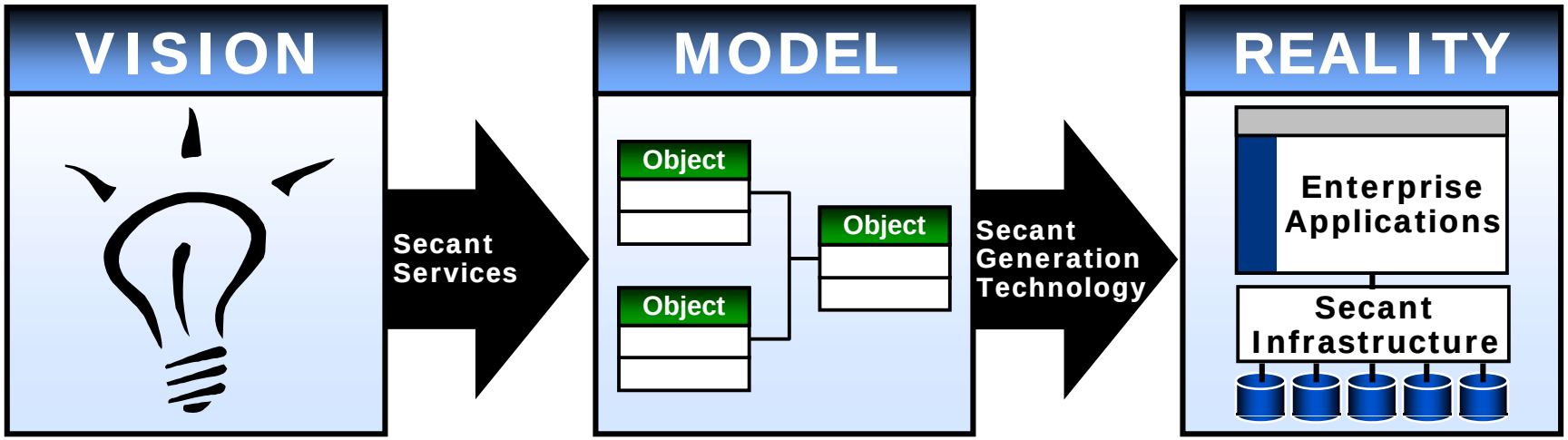
Data Access

Unix / Linux Farm

Model To Reality

GKP
Genomics Knowledge Platform

Secant's



MODEL-DRIVEN INFRASTRUCTURE

Secant's Model-Driven Infrastructure

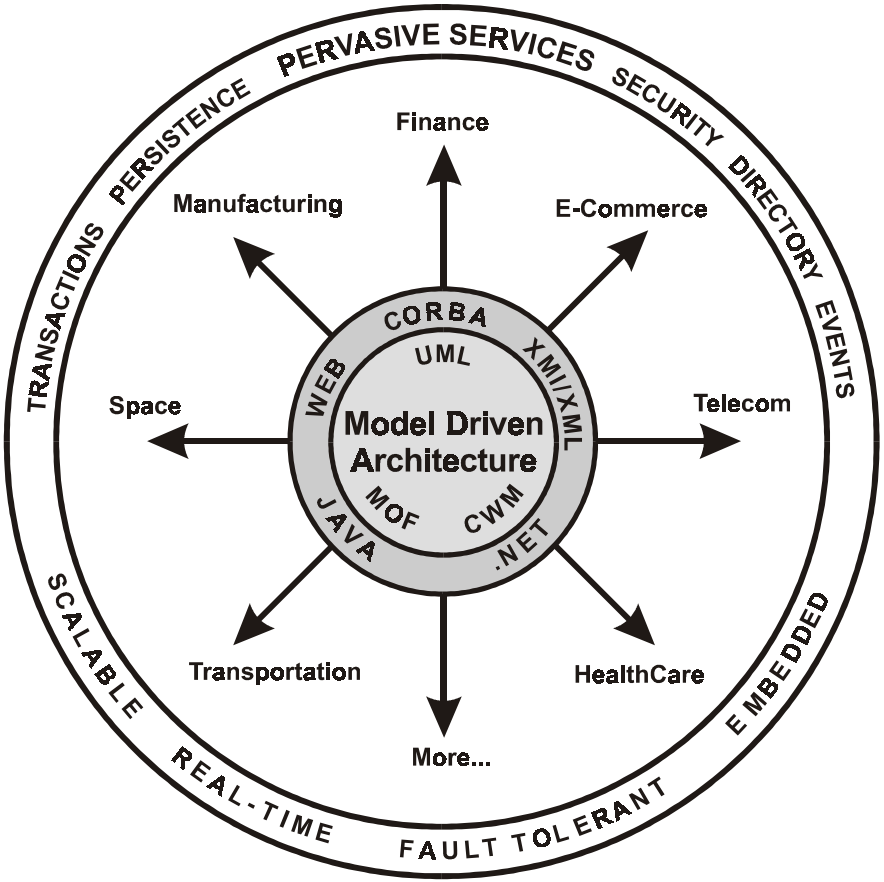
ModelMethods™ Products

- Object Integrator for Java & C++
  - Object/Relational Mapping, Caching Technology
  - Modeling Tool Integrations
- Enterprise Server for Java & C++
  - Supports Java 2 Platform, Enterprise Edition
    - EJB, CORBA, Transactions, Security, Clustering
    - J2EE Licensee
  - Supports CORBA / C++
  - Modeling Tool Integrations

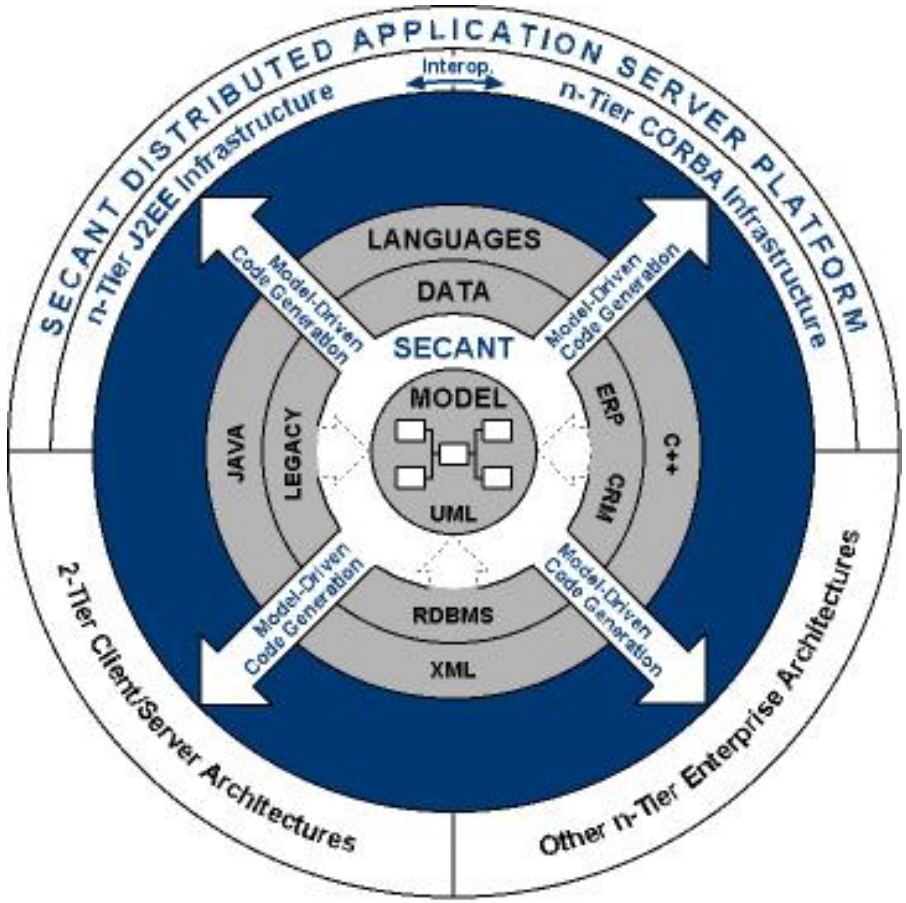
Model-Driven Approach

GKP
Genomics Knowledge Platform

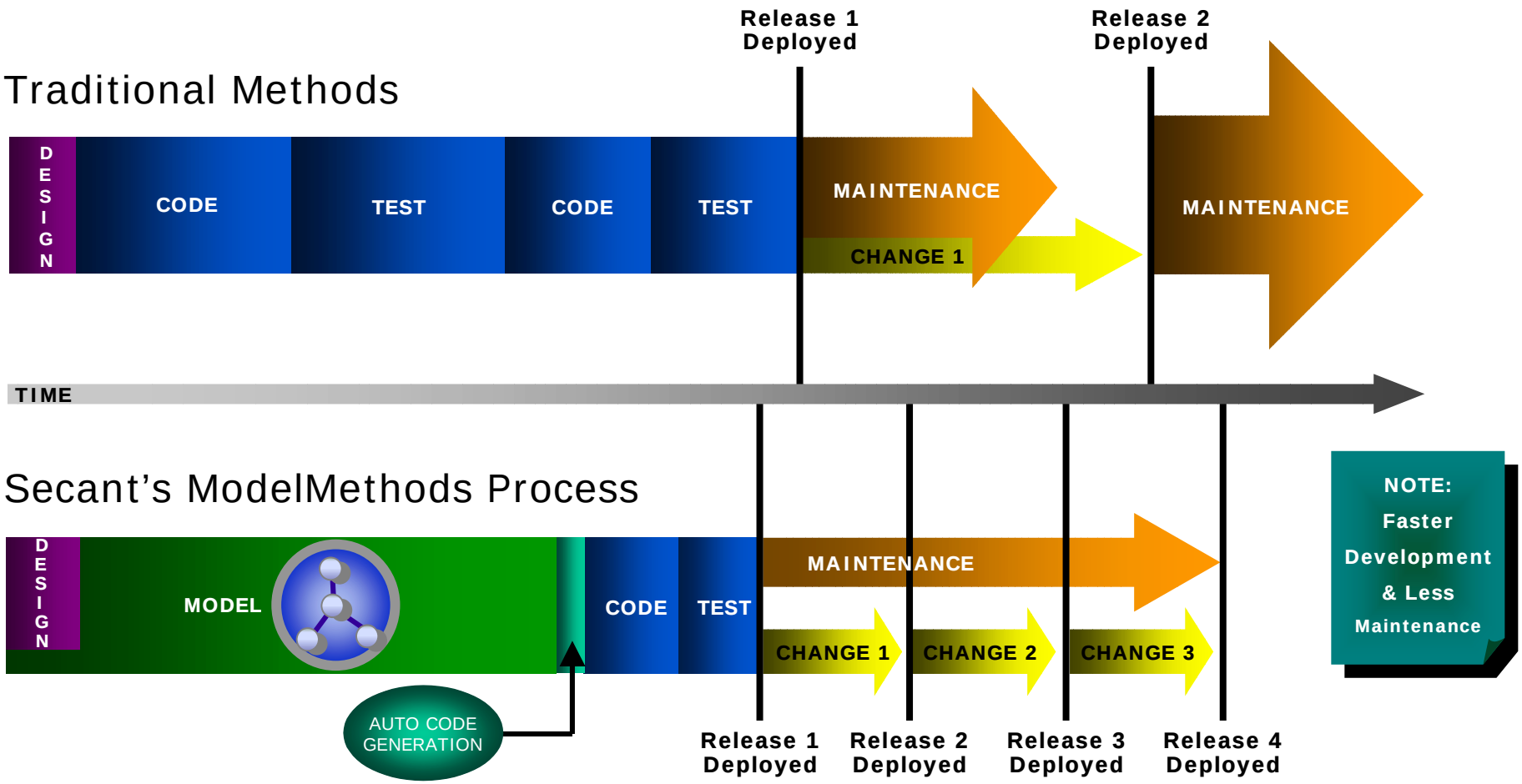
The OMG MDA Specification



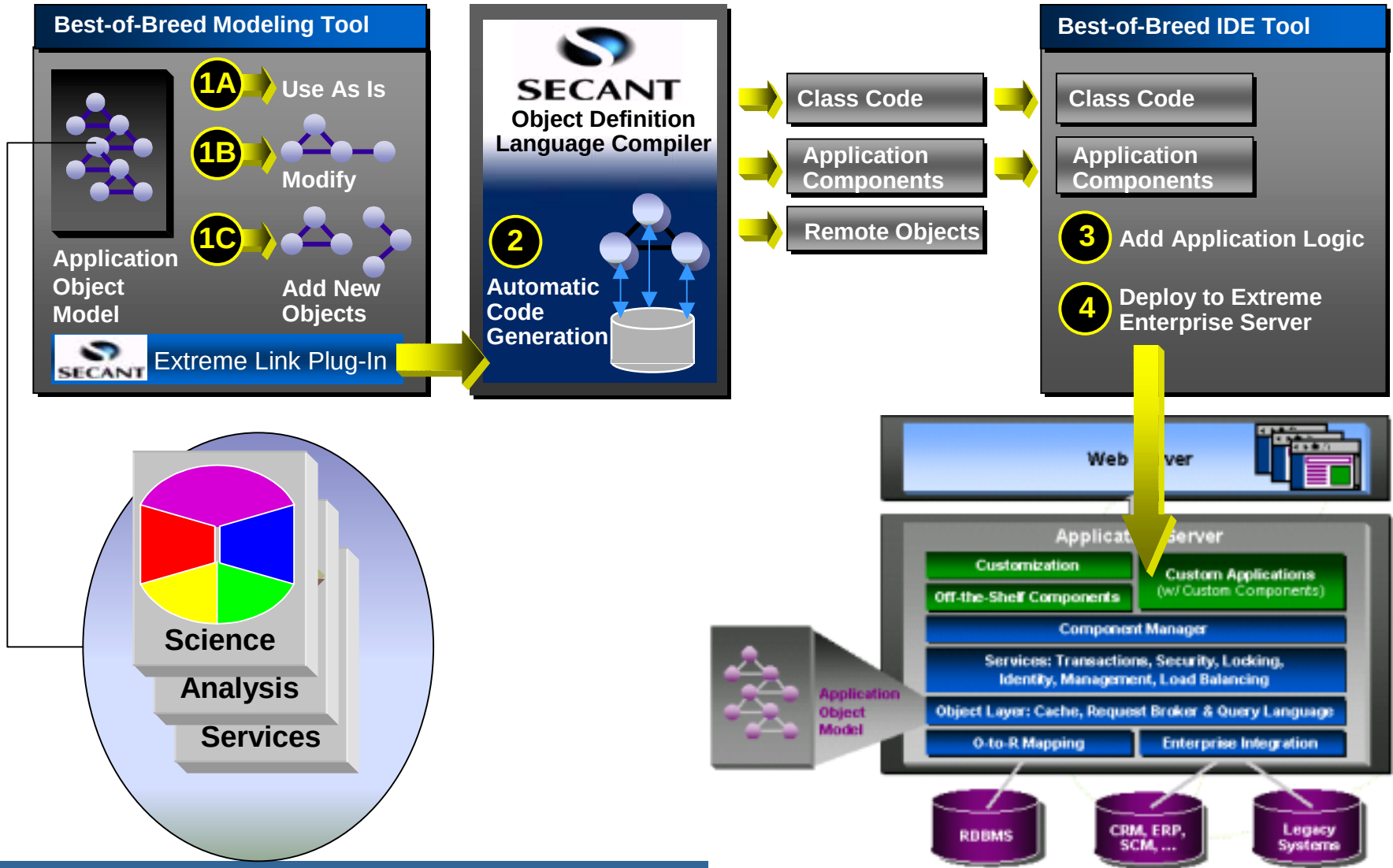
Secant's Model-Driven Infrastructure



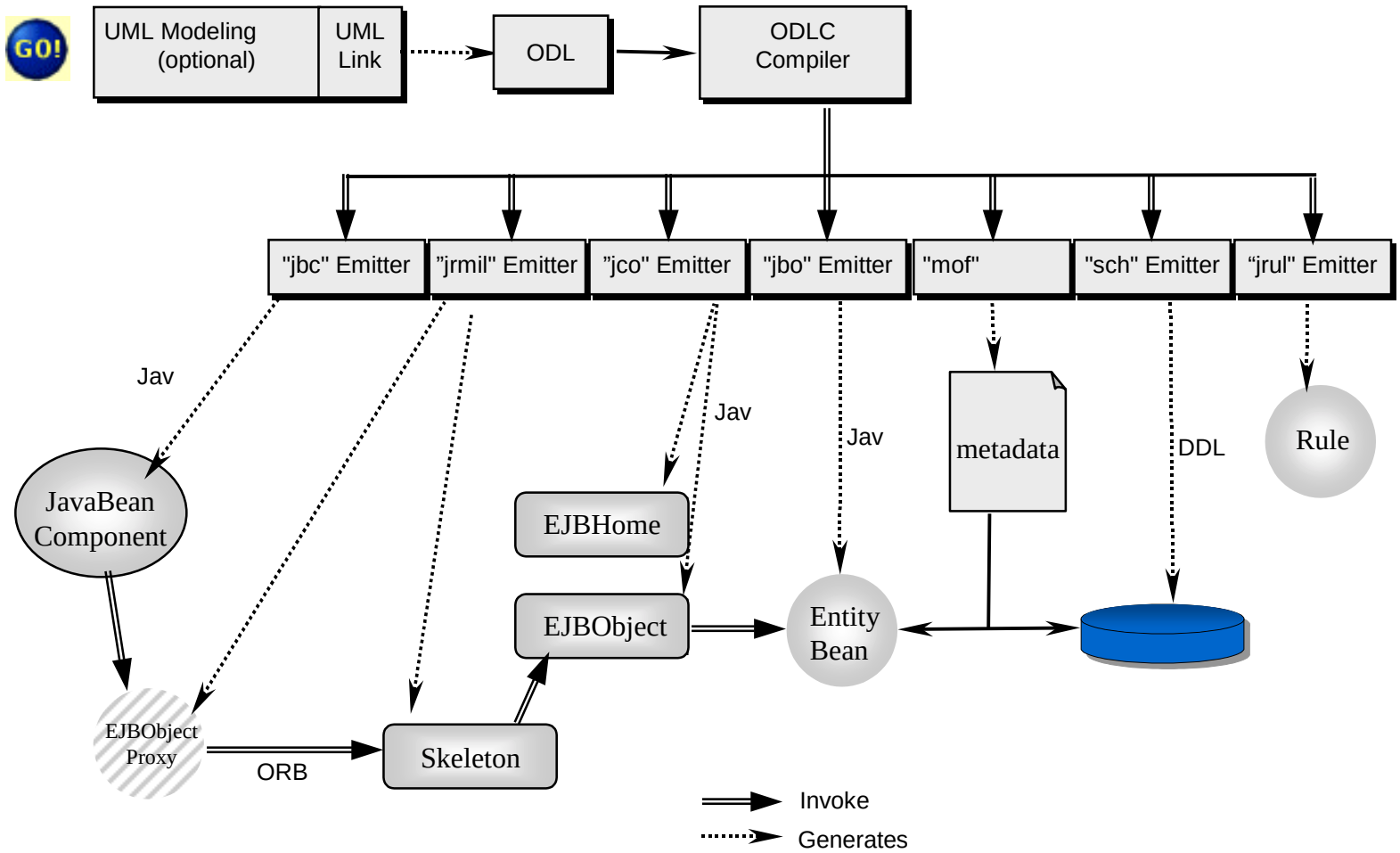
Development Methodologies Compared



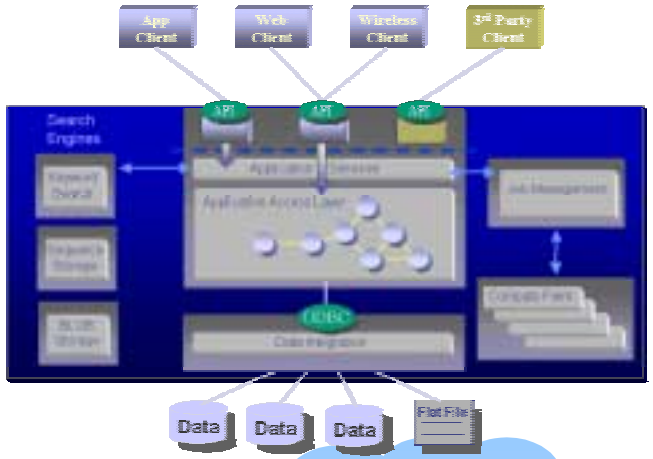
ModelMethod Development

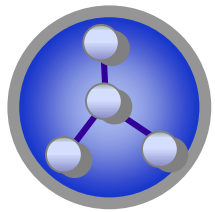


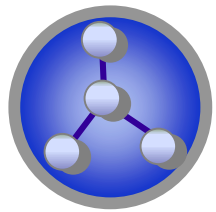
Model-based Code Generation



Continuum in Value







Biology

Chemistry

Clinical

Results in…

…a broken…

…research…

…process