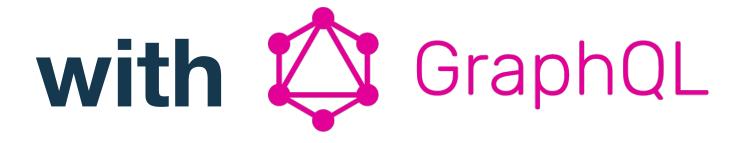
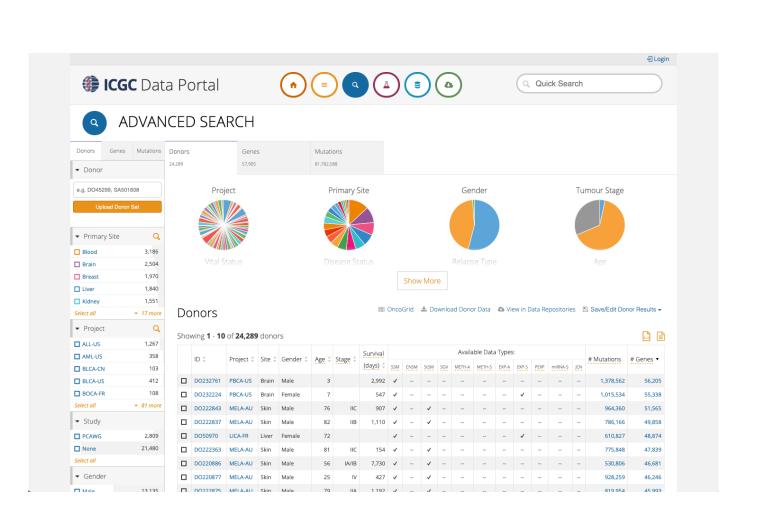
Conquering Micro-services



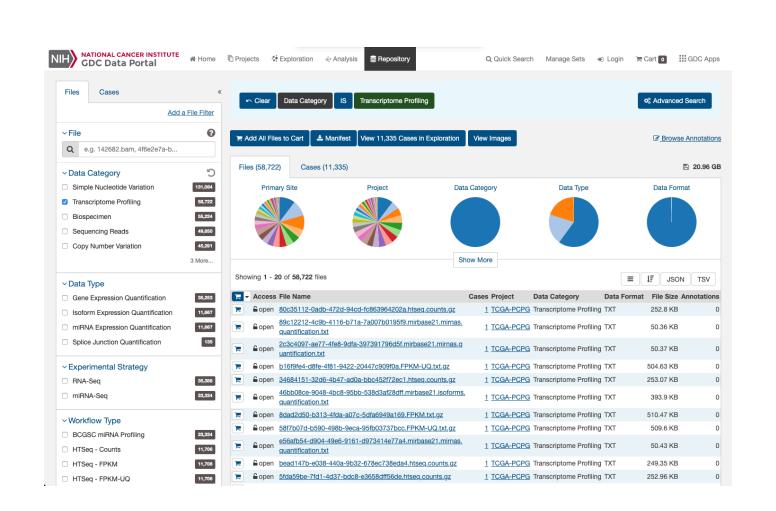
Our plan for ARG®









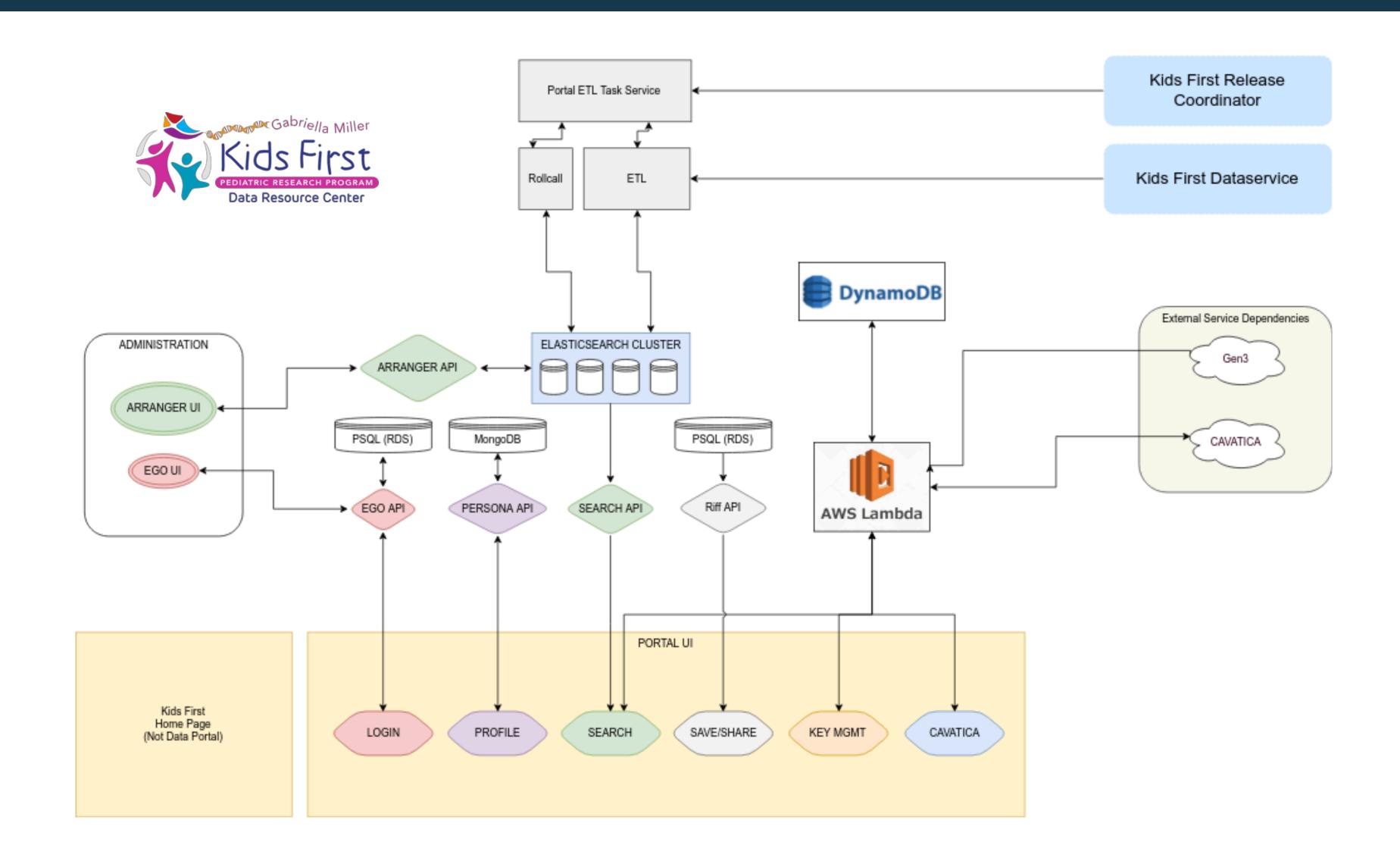




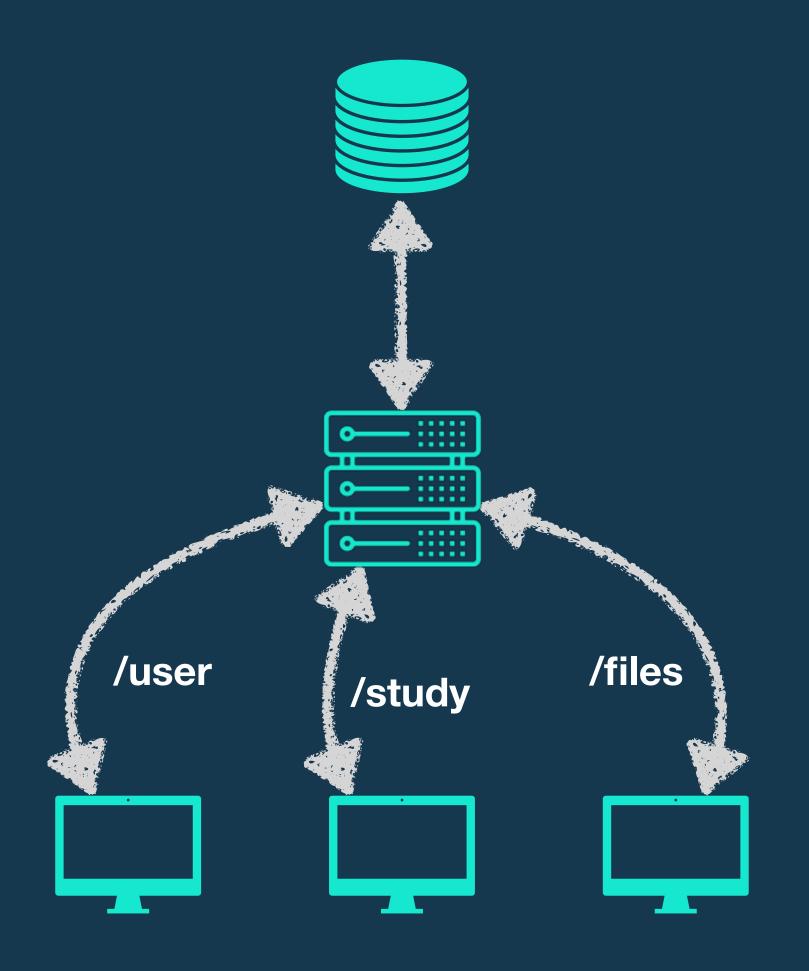
ilter BROWSE ALL	«										
Clinical Filters File Filters		34,471 Files			\$ 8,018 Participants		2,831 Families			904.37 TB Size	
Study Name	Q	Showing 1 - 20 of 34,471 files					ANALYZE IN CAVATICA DOWNLOAD Columns V				Export TSV
☐ Pediatric Brain Tumors:	# FILES 14,144		File ID	Participants ID	Study Name	Proband	Family Id	Data Type	File Format	File Size	Actio
CBTTC Congenital Heart Defects	5,196	0	GF K06ZJS2Q	PT_1F9D96X3	TARGET: Acute Myeloid Leukemia	Yes	FM_4H42S7Y6	Aligned Reads	bam	174.67 GB	<u> </u>
Orofacial Cleft: European Ancestry	3,885	0	GF CVK895RR	PT_2K21M65V	TARGET: Acute Myeloid Leukemia	Yes	FM_BZ5BJY13	Aligned Reads	bam	11.31 GB	<u> </u>
Ewing Sarcoma: Genetic Risk	3,141				-						
Syndromic Cranial Dysinnervation	2,403		GF 3BMEXD82	PT_56JXQQ7R	TARGET: Acute Myeloid Leukemia	Yes	FM_QRCTEPNJ	Aligned Reads	bam	876.26 MB	<u> </u>
	⊕ 5 More		GF CYCCXXF0	PT_8EJ85RHF	TARGET: Acute Myeloid Leukemia	Yes	FM_RGKSHNBK	Aligned Reads	bam	138.6 GB	<u> </u>
Diagnosis Category	Q		GF YXYT4QH4	PT_5FG8W7CV	TARGET: Acute Myeloid Leukemia	Yes	FM_KAEXDQD2	Aligned Reads	bam	142.64 GB	<u> </u>
	# FILES		GF S2T478Y3	PT KH3HFR33	TARGET: Acute	Yes	FM ZX10EQ5T	Aligned Reads	bam	168.22 MB	
Cancer	16,526		GF 32147613	P1_KHSHFKSS	Myeloid Leukemia	res	FM_ZX10EQ51	Aligned Reads	Dam	166.22 IVIB	<u> </u>
Structural Birth Defect	6,154		GF FV0KKXA2	PT_5N1VVNTH	TARGET: Acute	Yes	FM_91MAX0SX	Aligned Reads	bam	341.55 MB	_
Diagnosis (Source Text)	Q				Myeloid Leukemia						•
, ,	# FILES		GF DGTRKWXP	PT_WZYJ5RYV	TARGET: Acute Myeloid Leukemia	Yes	FM_7DPH4AYD	Aligned Reads	bam	384.77 GB	<u> </u>
Low-grade glioma/astrocytoma (WHO grade I/II)	3,863		GF R6MVTMBR	PT_D655D9E8	TARGET: Acute Myeloid Leukemia	Yes	FM_15169T53	Aligned Reads	bam	260.15 MB	<u></u>
☐ Medulloblastoma	2,099		GF M7XTW100	PT_0XMV1JG0	TARGET: Acute	Yes	FM_ZW5794M2	Aligned Reads	bam	267.14 MB	_
☐ High-grade glioma/astrocytoma (WHO grade III/IV)	1,665				Myeloid Leukemia						•
	'		GF 4CYJ20V8	PT_JY1633AF	TARGET: Acute Myeloid Leukemia	Yes	FM_BSZGPE65	Aligned Reads	bam	2.45 GB	<u> </u>
 Ependymoma 	1,298	0	GF R6WHX0WZ	PT_C7Q1NG6Z	TARGET: Acute	Yes	FM_R3JE9TXS	Aligned Reads	bam	286.64 MB	_

and more...

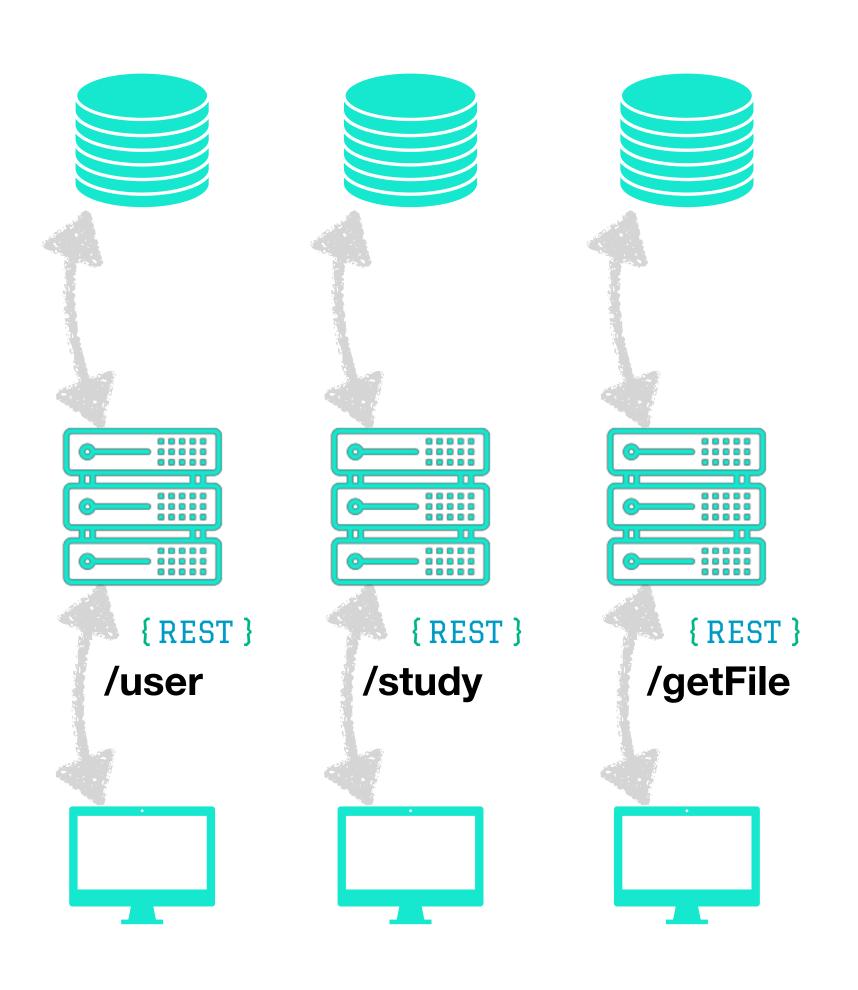
Behind the scene



Monolithic System



Micro-...what?

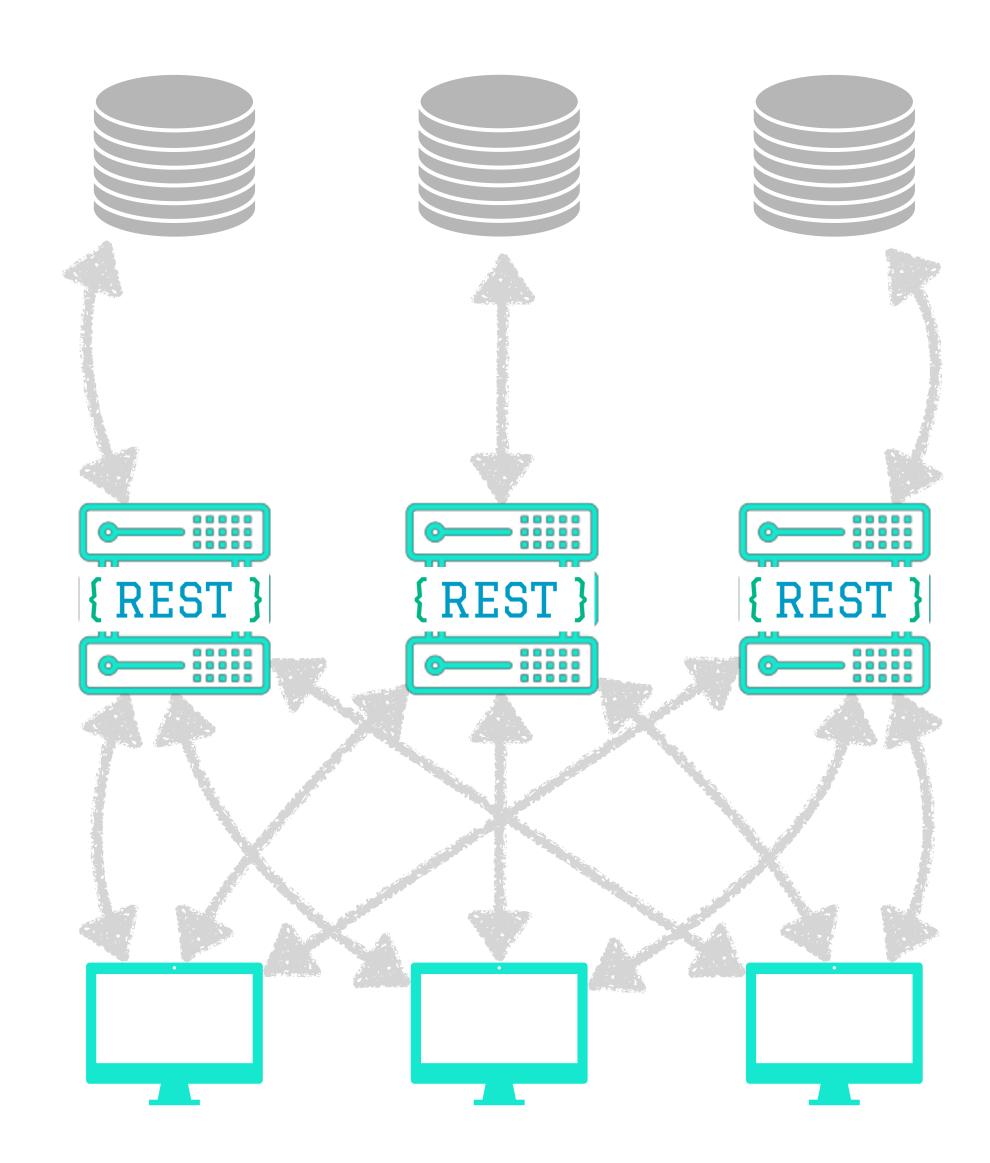


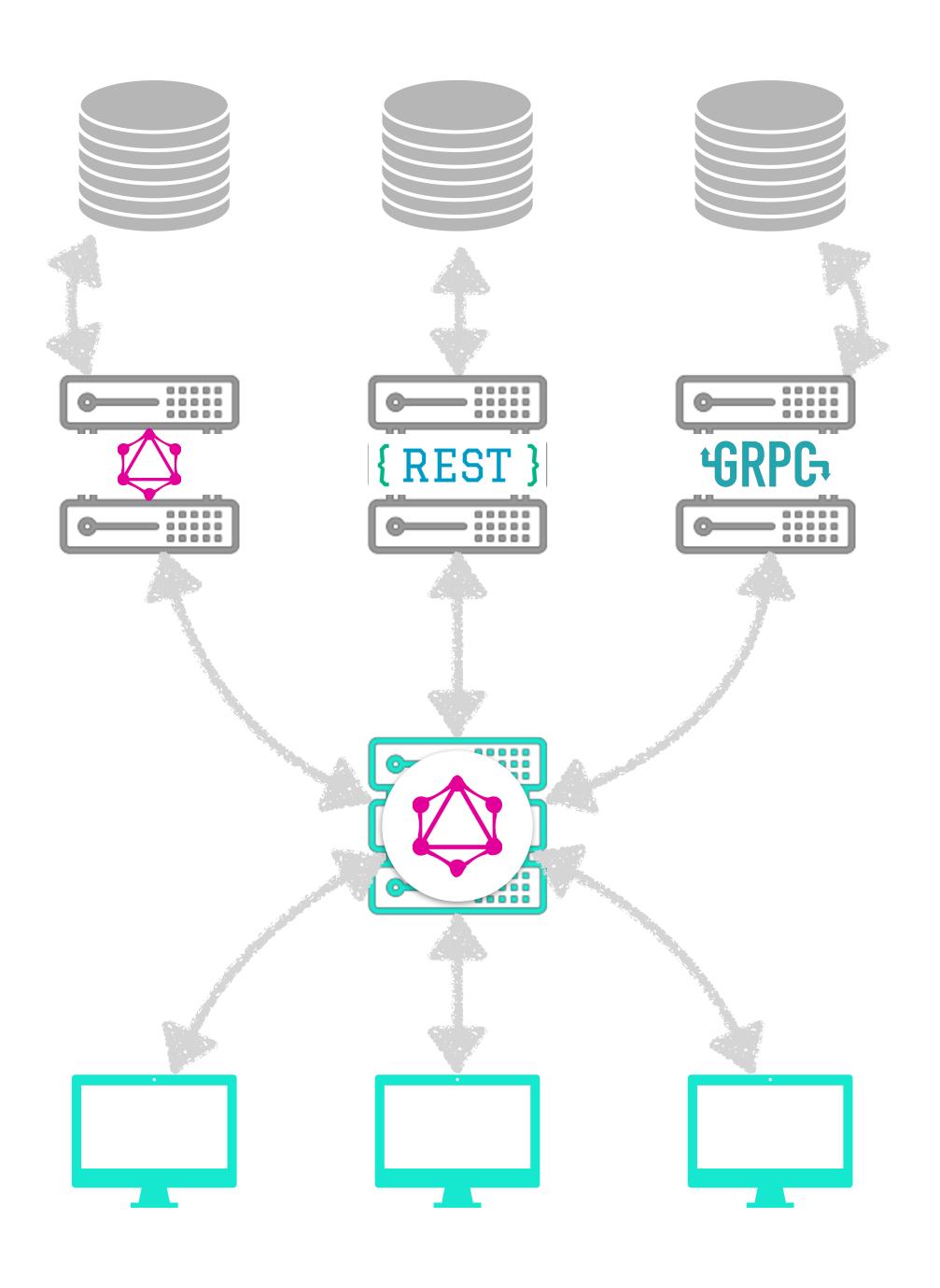
Micro-services System

- Functionally decoupled
- Independently deployable
- Independently scalable

Some challenge

- No place to handle cross-cutting concerns
- Front-end handles heavy business logic
- Inefficiencies with REST:
 - Over & under-fetching
 - Lack of API schema -> manual documentation





The GraphQL Solution

- •An aggregation layer to handle cross-cutting concern
- ·Why GraphQL?
 - Explorable schema —> selfdocumenting
 - Schema Stitching:
 - •Modelling underlying services as an independent schemas
 - "Stitch" the schemas together as nodes in a graph
 - Network advantage: batched request



SONG

SCORE

Submission System

Validation

System

Data

Dictionary

Clinical SONG

Data Access

Control

(DACO)

Queue

Manager

Workflow

Management

Dashboard

RDPC MEMBER

Manifest and

Transfer

Dashboard

RDPCs

R1

Datastore

SONG-R1

SCORE-R1

Workflow System

Centralized Services

ID Service

GENOMIC DATA

Submission

Portal Pages

Harmonization

Dashboard

SUBMITTERS

Submission

Dashboard

Programme

Dashboard

MIDDLE WARE

FRONTEND - ARGO SITE

R2

RDPC Datastore

SONG-R2

SCORE-R2

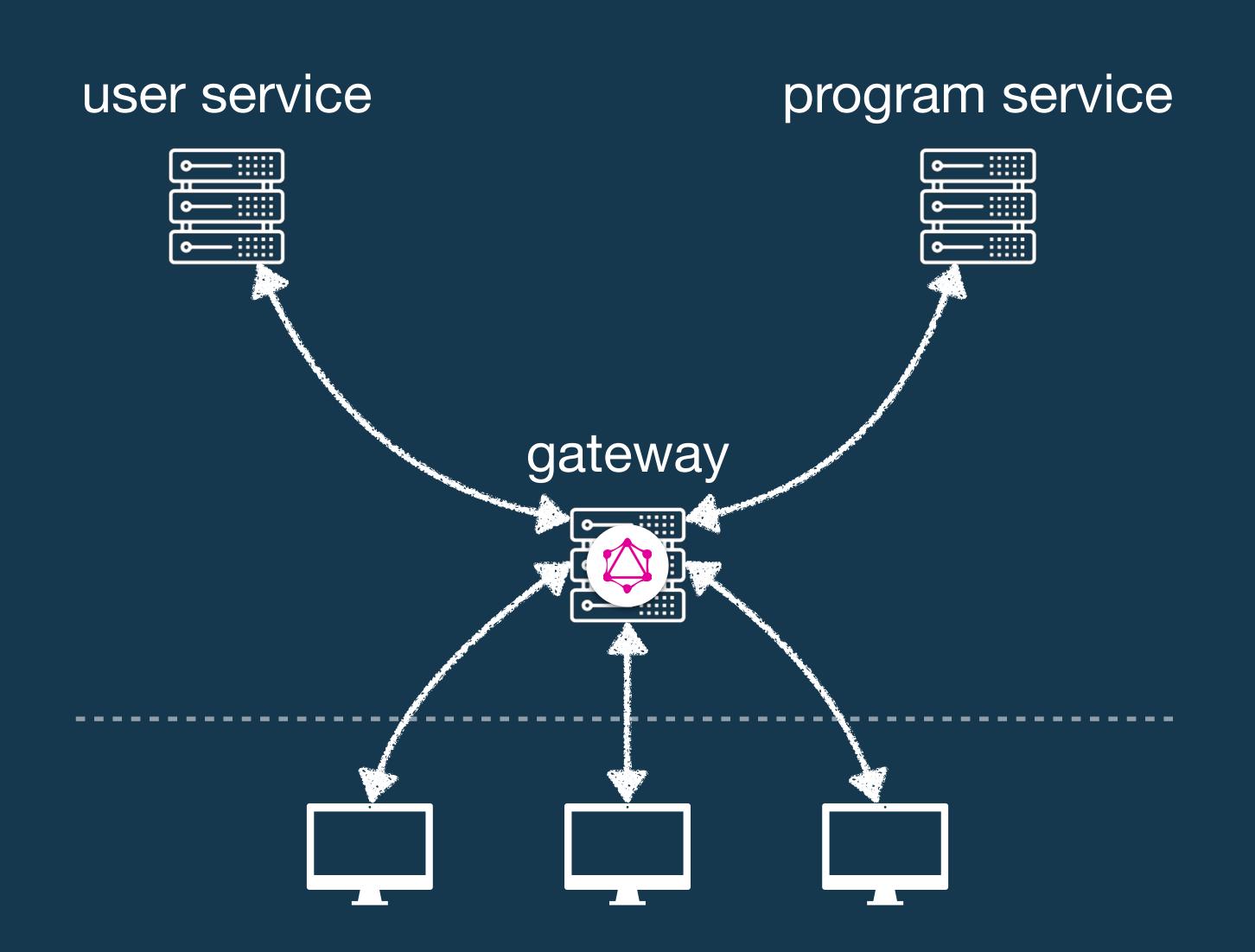
Workflow

System

Location Policy Engine

- CLINCAL DATA ---

demo



The wins

- Explorability:
 - Better developer on-boarding
 - Collaboration with non-technical team members
- Central place for integration test —> higher quality software
- Network performance

thank you