Seven Bridges Cancer Genomics Cloud
NYU

Integrating multi-omic data on the cloud yields insights into retrotransposon activity in cancer

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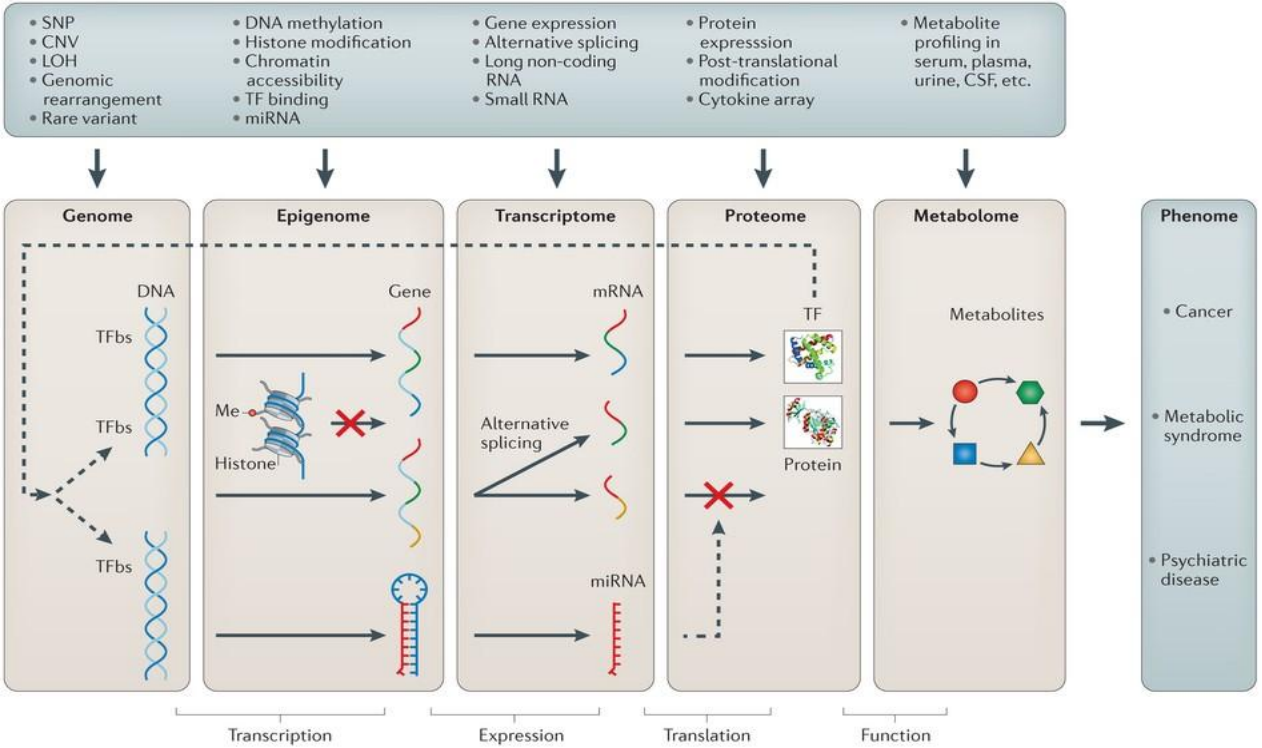
Multi-omic data is critical for cancer research



Ritchie et al., Biological systems multi-omics from the genome, epigenome, transcriptome, proteome and metabolome to the phenome. (2015)

Comprehensively understanding the full picture of a research question requires examining multiple modalities

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The Seven Bridges Cancer Genomics Cloud

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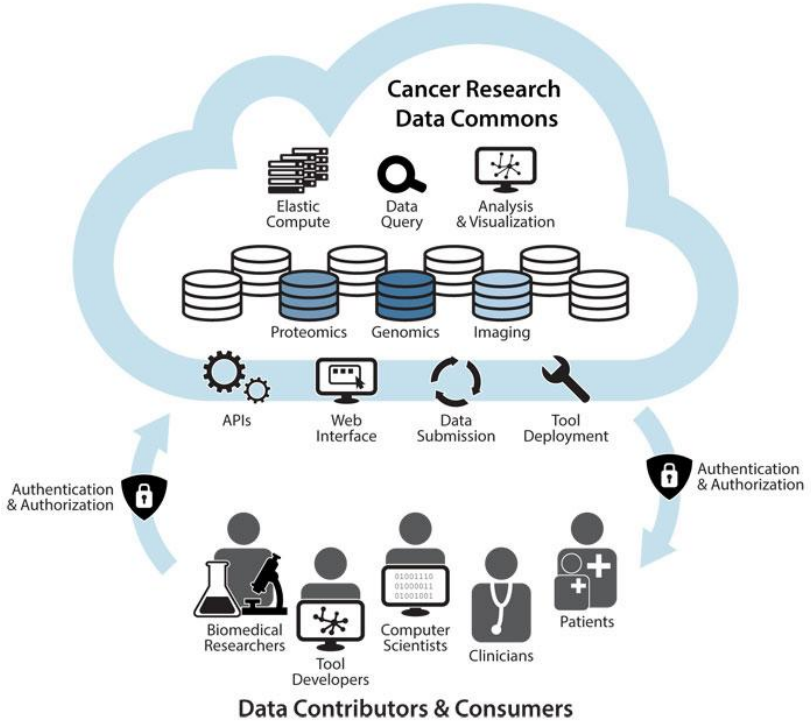

A Cloud Resource within the NCI Cancer Research Data Commons for secure storage, sharing & analysis of petabytes of public, multi-omic cancer datasets

NATIONAL CANCER INSTITUTE

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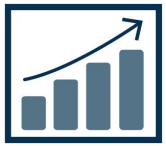
The Seven Bridges Cancer Genomics Cloud

- A stable, secure, and highly customizable cloud storage and computing platform
- A user-friendly portal for collaborative analysis of petabytes of public data alongside private data
- An optimized venue for reproducible data analysis using validated tools and pipelines
- Register for free today at **cancergenomicscloud.org**

Easy data management

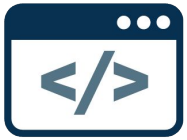


Scalable computation

Optimized bioinformatics algorithms

Secure collaboration

Flexible & fully reproducible methods



Extensible and developer-friendly platform

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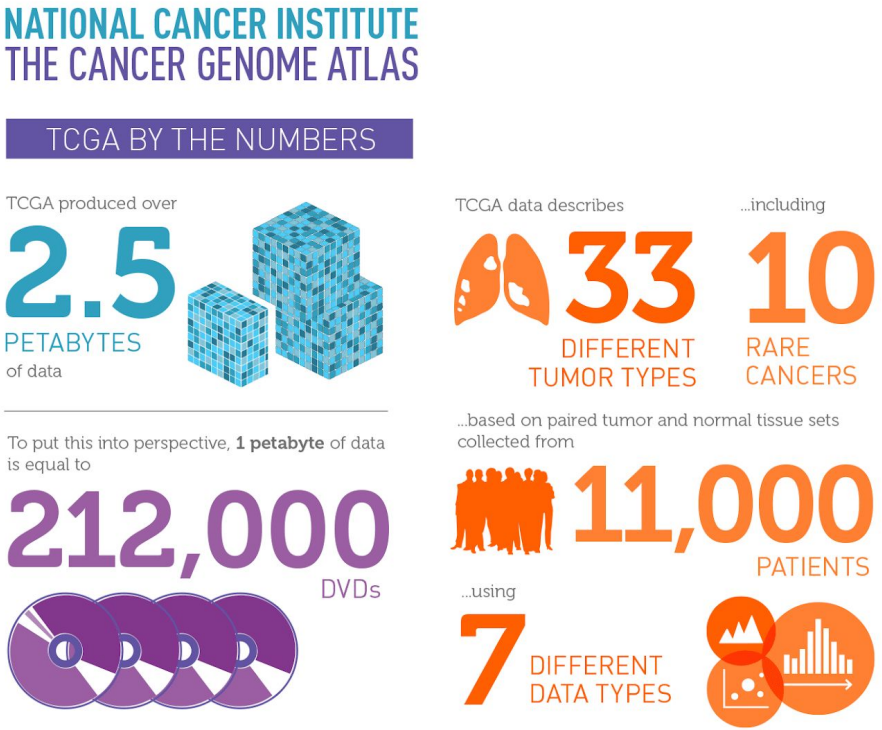
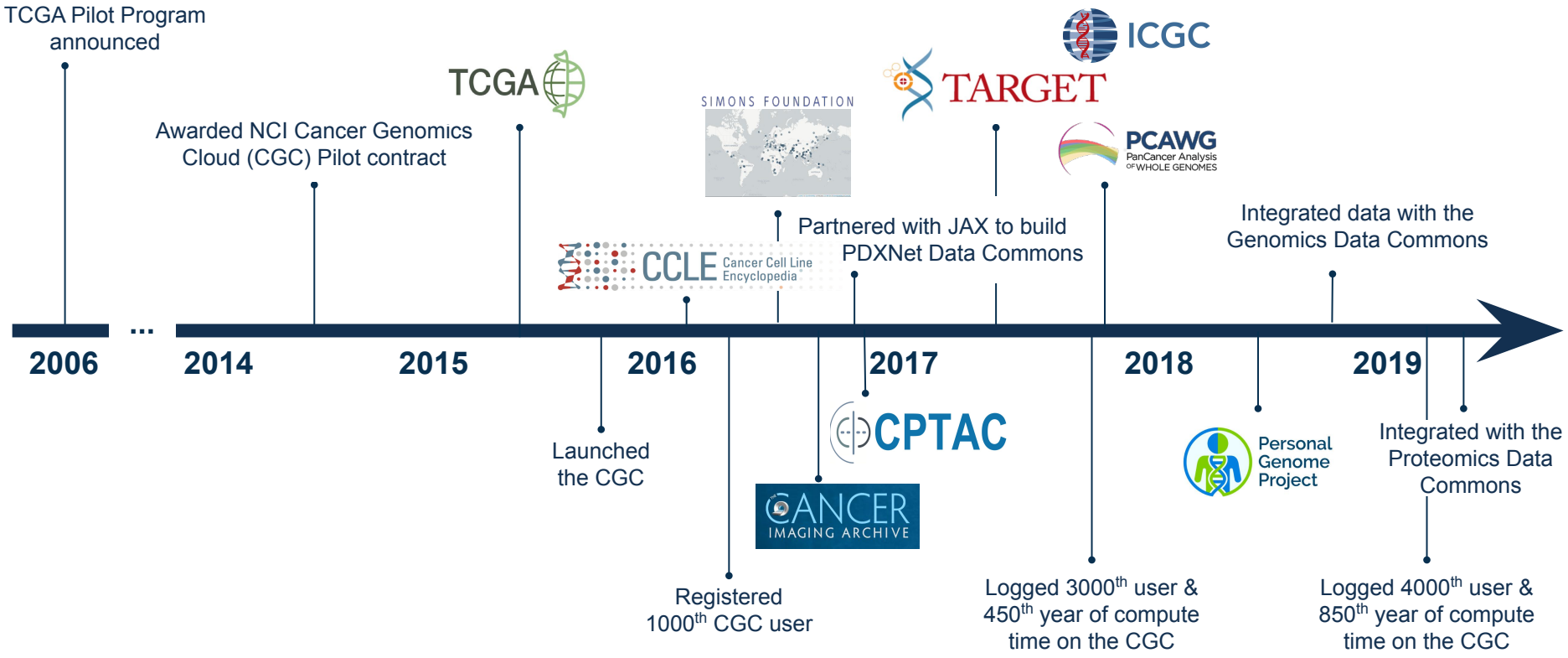
Need for Cloud Resources was motivated by the growth of TCGA



www.cancer.gov/ccg

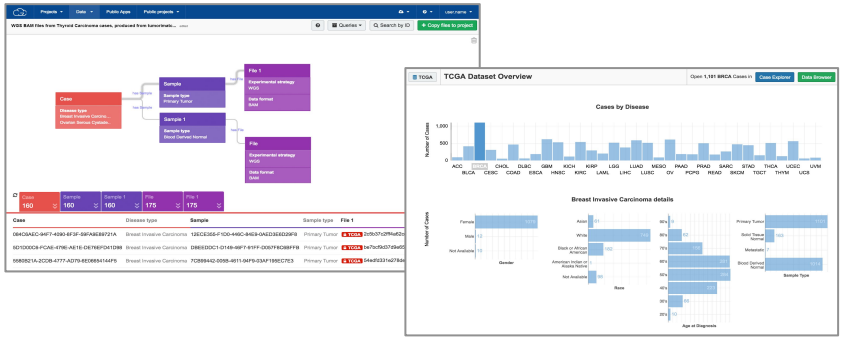
Growth of the Cancer Genomics Cloud Ecosystem

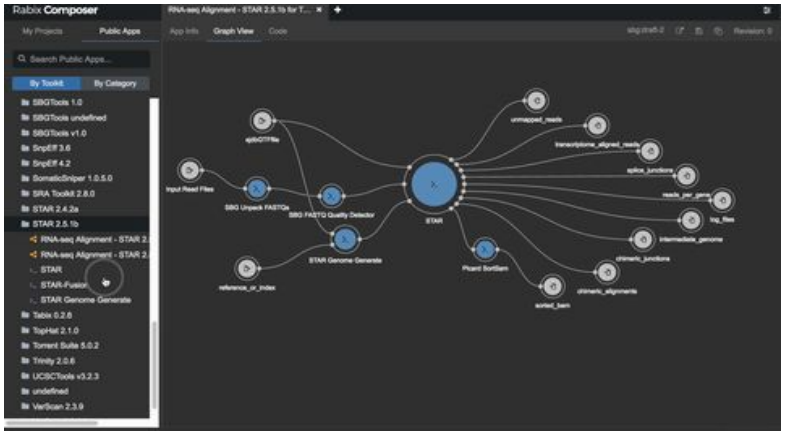


The Seven Bridges Cancer Genomics Cloud (CGC)

- Access **3+ PB** of multi-omic public data through interactive query tools & APIs.
- Upload private data for analysis.
- Collaborate securely with colleagues anywhere.

- Use the **400+** cloud- and cost-optimized tools in our Public Apps library.
- Deploy custom tools using our SDK (**Rabix**) & Jupyter notebook (**Data Cruncher**).
- Consult with our **200+** expert support staff.

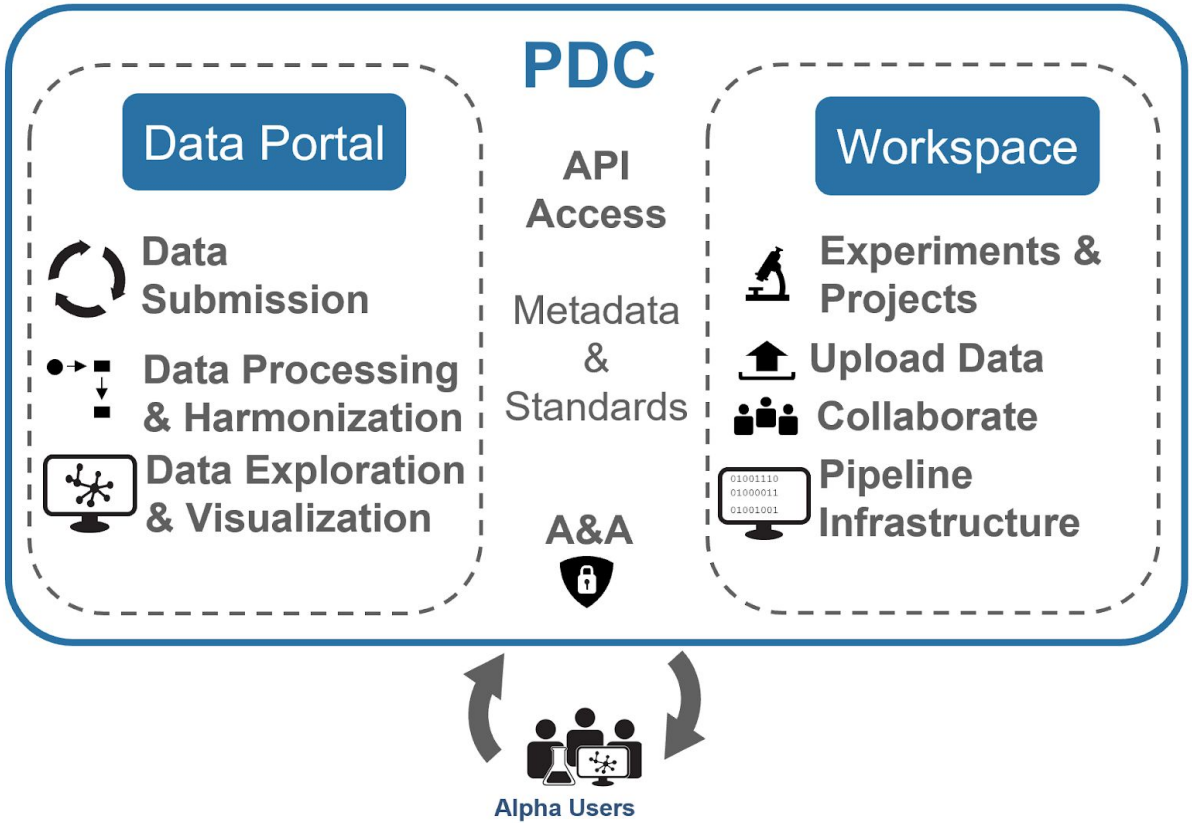




TCGA · The Cancer Imaging Archive · International Cancer Genome Consortium · PCAWG PanCancer Analysis of WHOLE GENOMES · SIMONS FOUNDATION

TARGET · CPTAC · CCLE Cancer Cell Line Encyclopedia

Proteome Data Commons – democratize access to cancer-related proteomic datasets



Courtesy of Izumi HInkson

Enabling multi-omic research on the CGC

- *Many* research questions go beyond genomics data
- Enabling access to the PDC will allow CGC users to **access** and **compute** on data in Proteomics Data Commons in a project on the **CGC**
- Collaboration with Wilson McKerrow, postdoc in David Fenyo's lab
    - Specific use case of analyzing **proteomic, genomic,** and **transcriptomic** data side-by-side in **same project**, ideally for **matching cases** of all 3
    - Useful datasets with all 3 modalities: TCGA, CPTAC-1-

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User flow to compute on PDC files

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Proteomic Data Commons

1. User starts on PDC portal to identify cohort of files
2. User downloads **files manifest** of selected cohort
    a. Note - there are multiple manifest options on the PDC, only the “files manifest” will work

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1. User moves to CGC, creates a project
    a. Files ➔ Add files ➔ Import from PDC
2. User prompted to upload the manifest from the PDC
3. PDC files copied into user’s project
    a. FileID ➔ file URL via Fence

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LINE1 retrotransposon project

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