Animal Data: Big, or just large?

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FOOD FROM THOUGHT

Background

- Technological advances have increased variety and scope of information
- Big data:
  - High variability
  - High velocity
  - High volume
  - *High veracity (accuracy)*
  - = High value
- Standardized data storage / knowledge transfer helpful for management

- So, do we have big data or not???

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Some Examples of Big Data:

- By 2020, experts expect that there will be 5,200 gigabytes of data on every person in the world.
- People send about 500 million tweets per day.
- The average U.S. customer uses 1.8 gigabytes of data per month on their cell phones.
- Walmart processes 1 million customer transactions / hour.
- Amazon sells 600 items per second.
- On average, each person who uses email receives 88 emails per day and send 34.
- ….That's more than 200 billion emails each day.
- MasterCard processes 74 billion transactions per year.
- Commercial airlines make about 5,800 flights per day.

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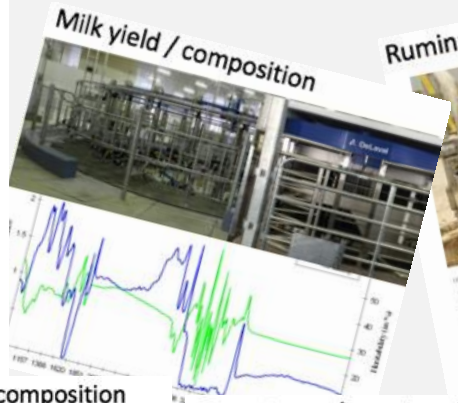
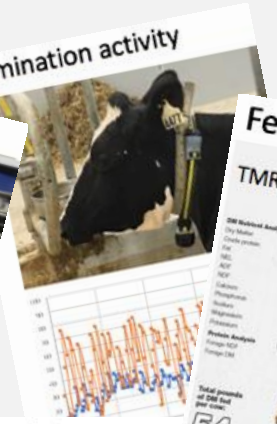
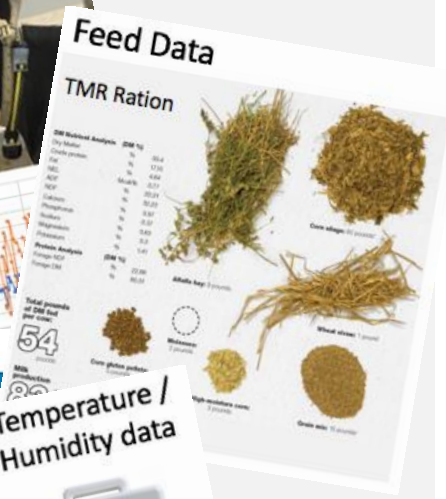
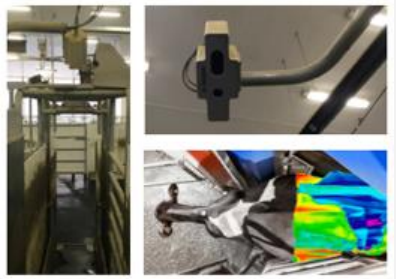
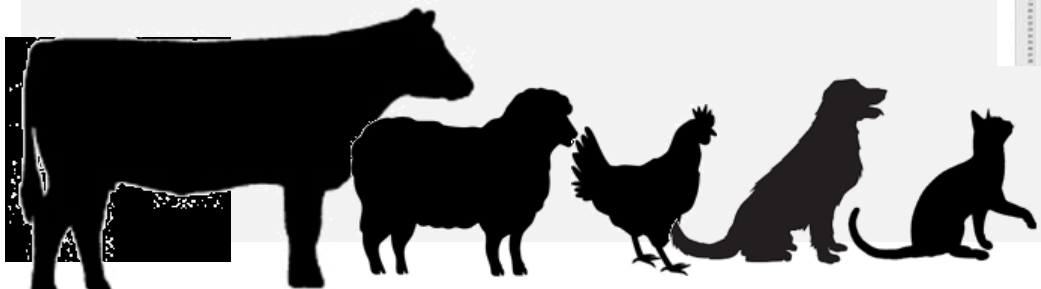
So much data, yet so little information…

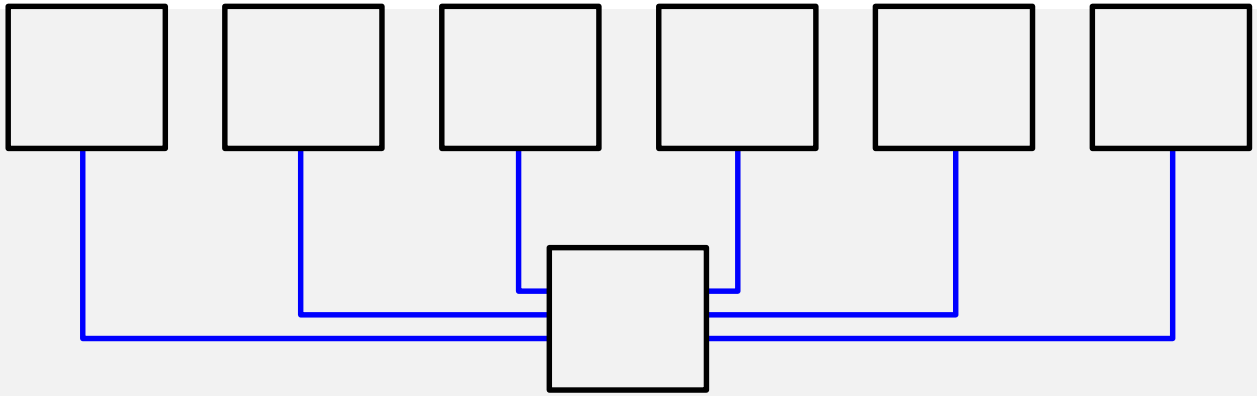












Data collection

Data organization

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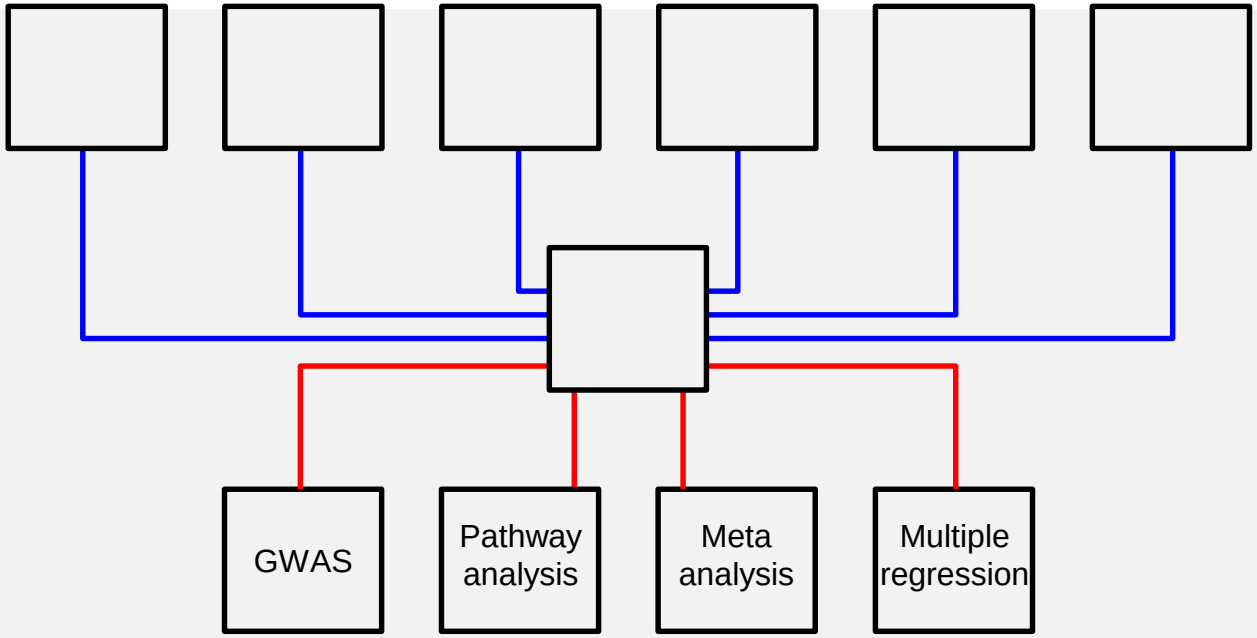

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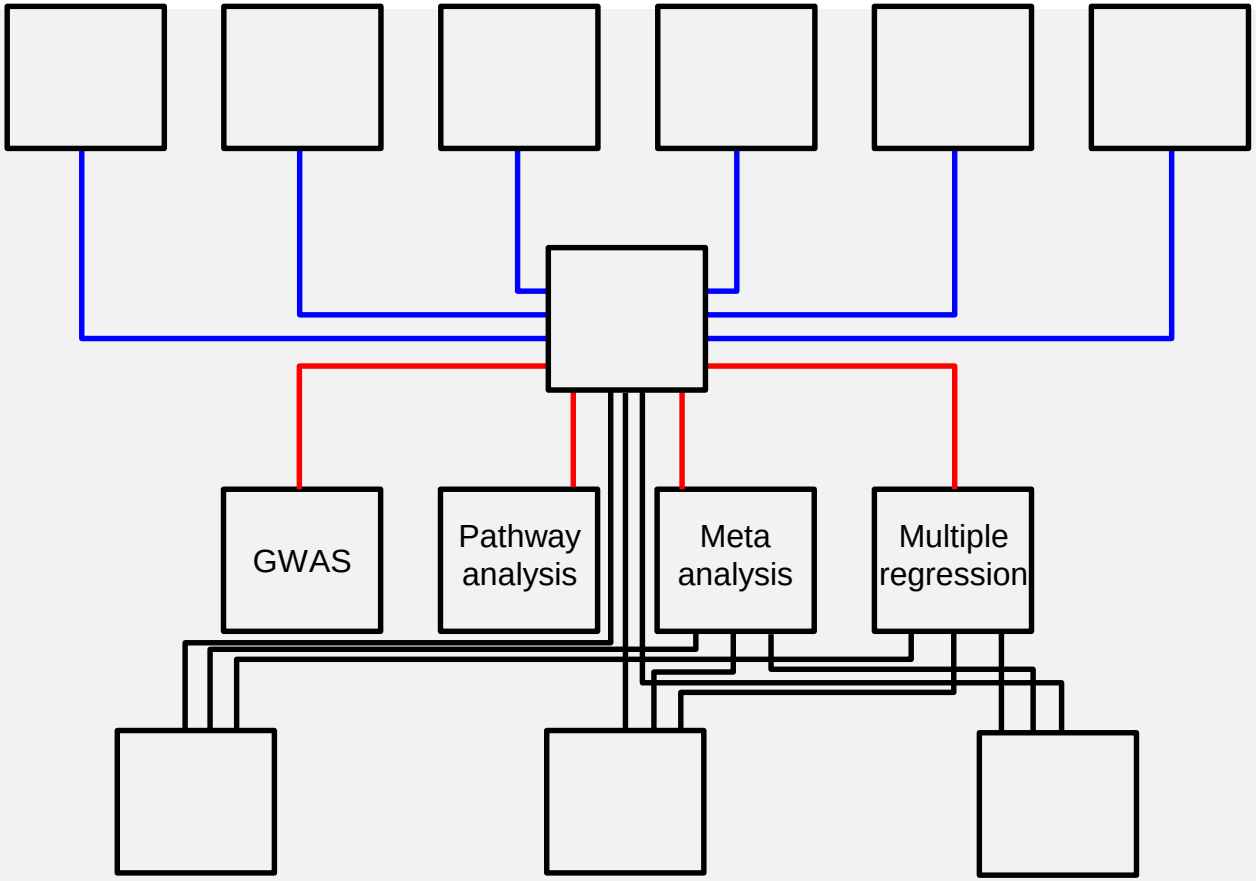

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Computer model development

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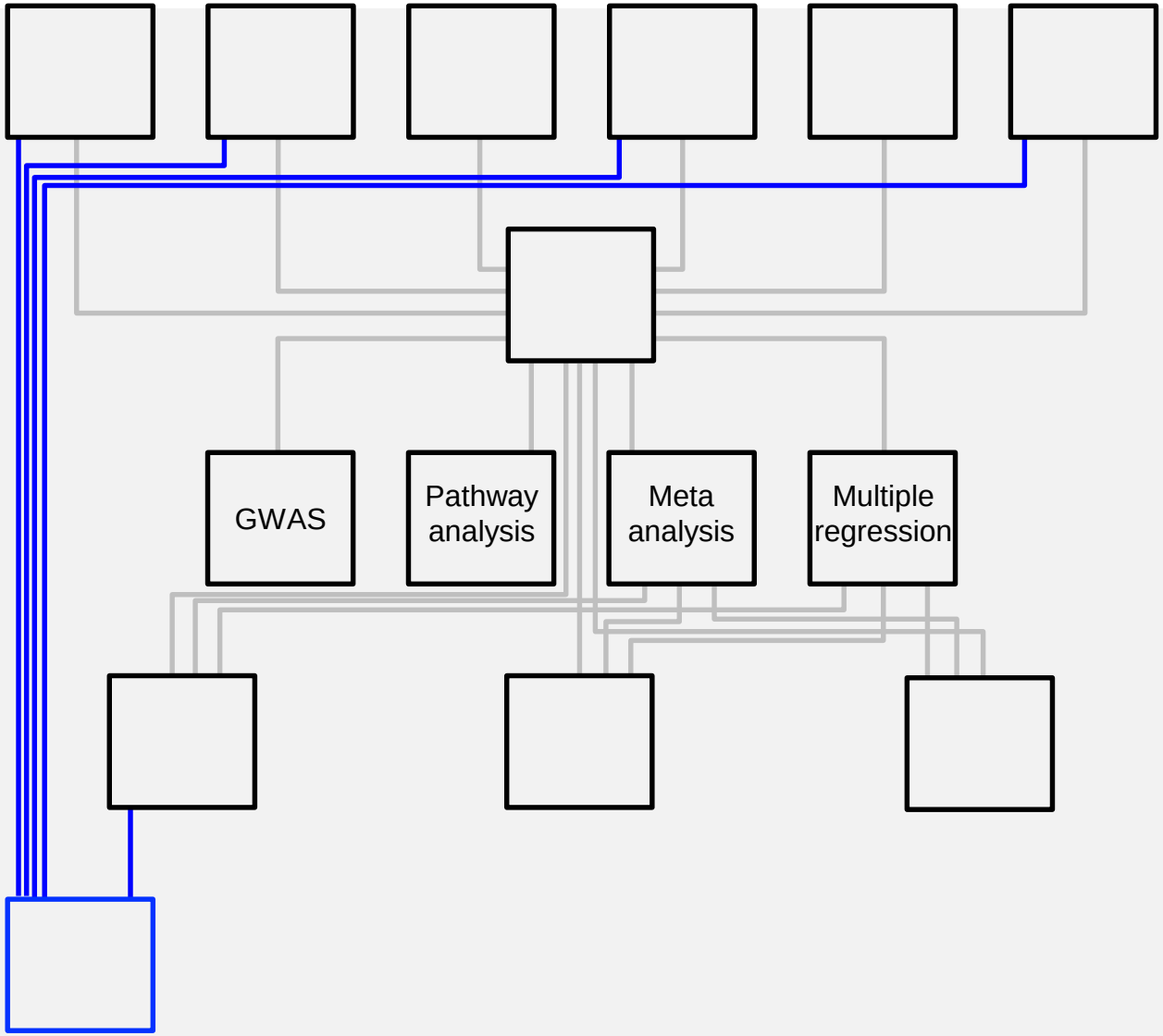

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Data analysis

Computer model development

Decision Support System development

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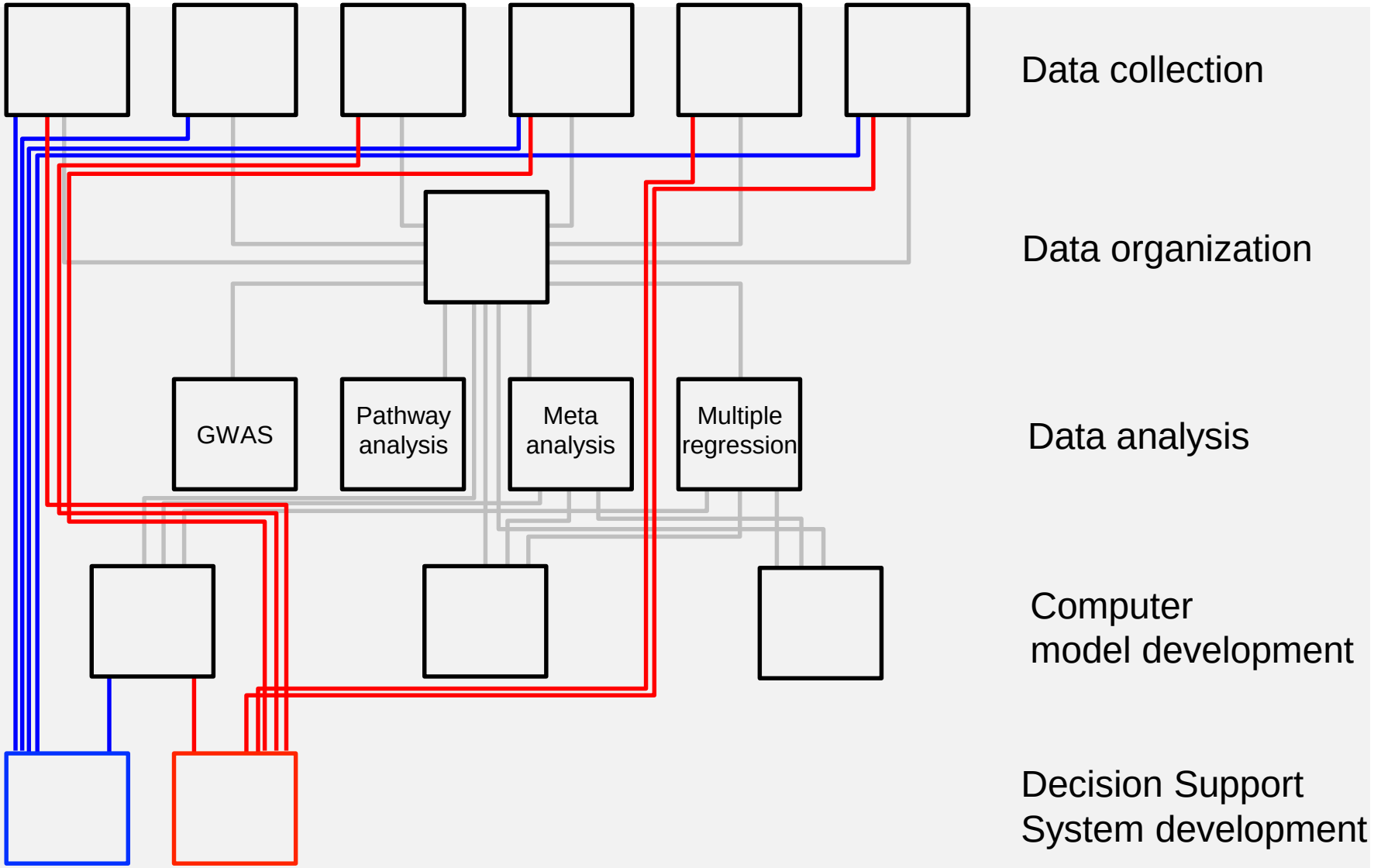

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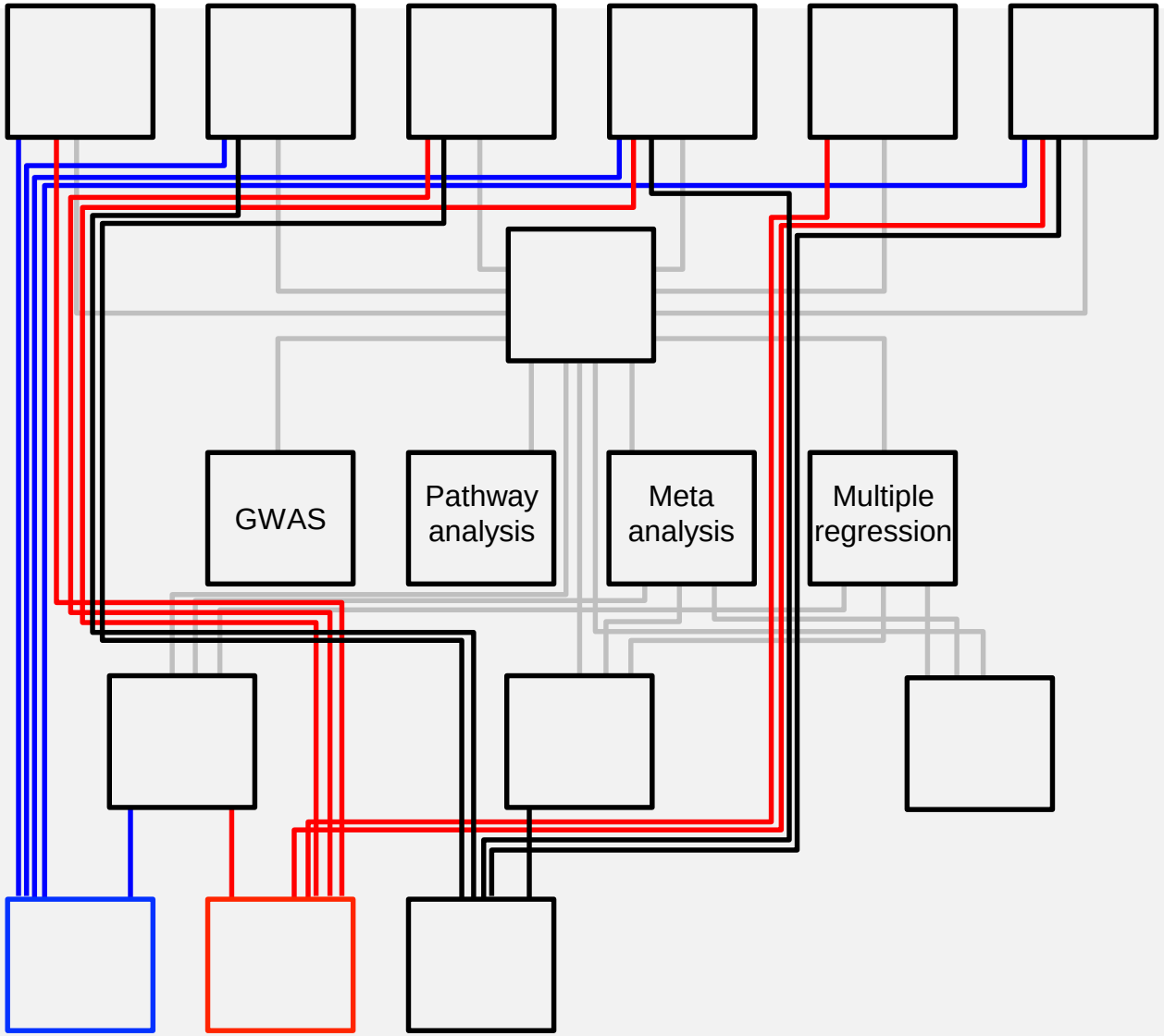

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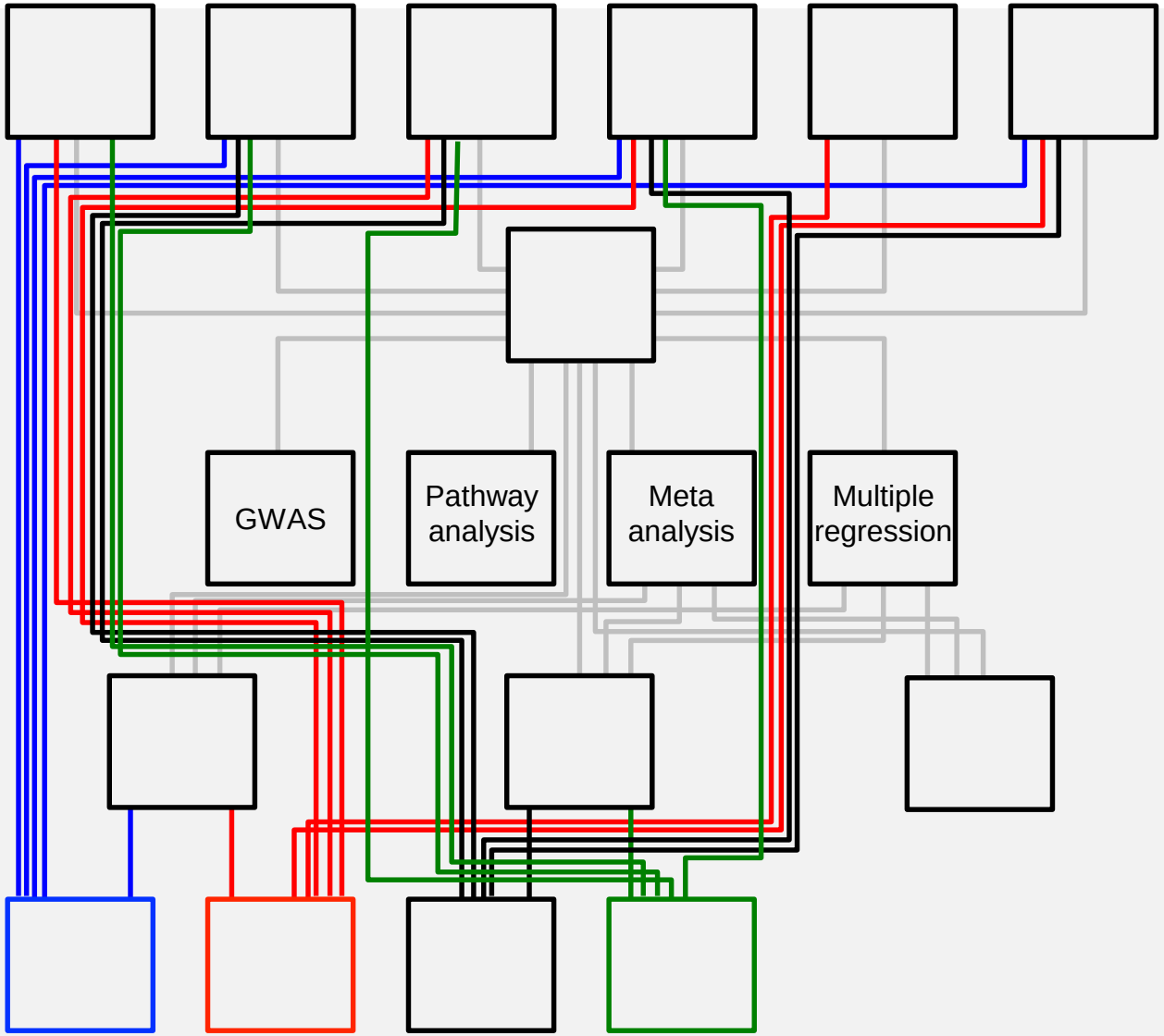

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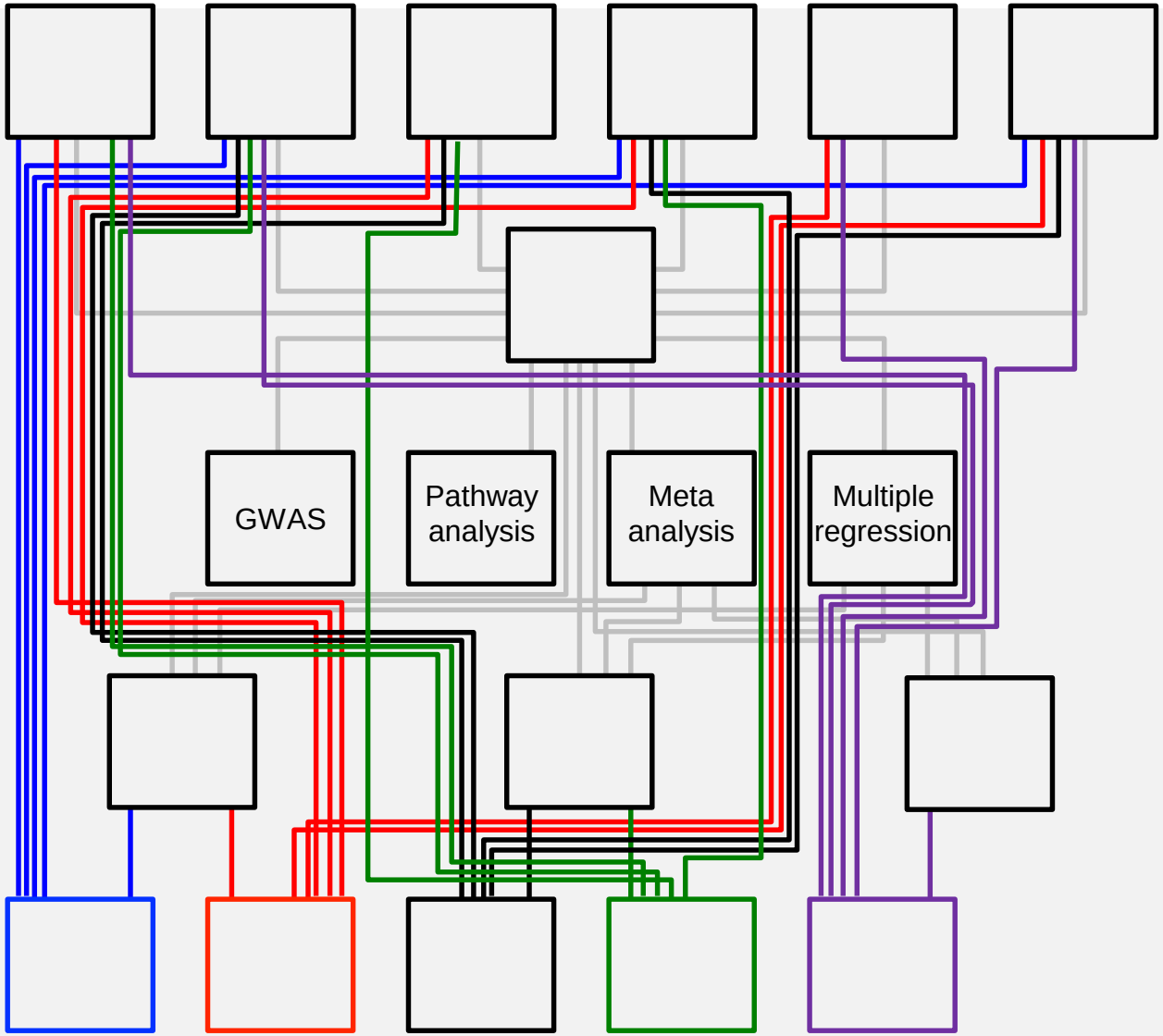

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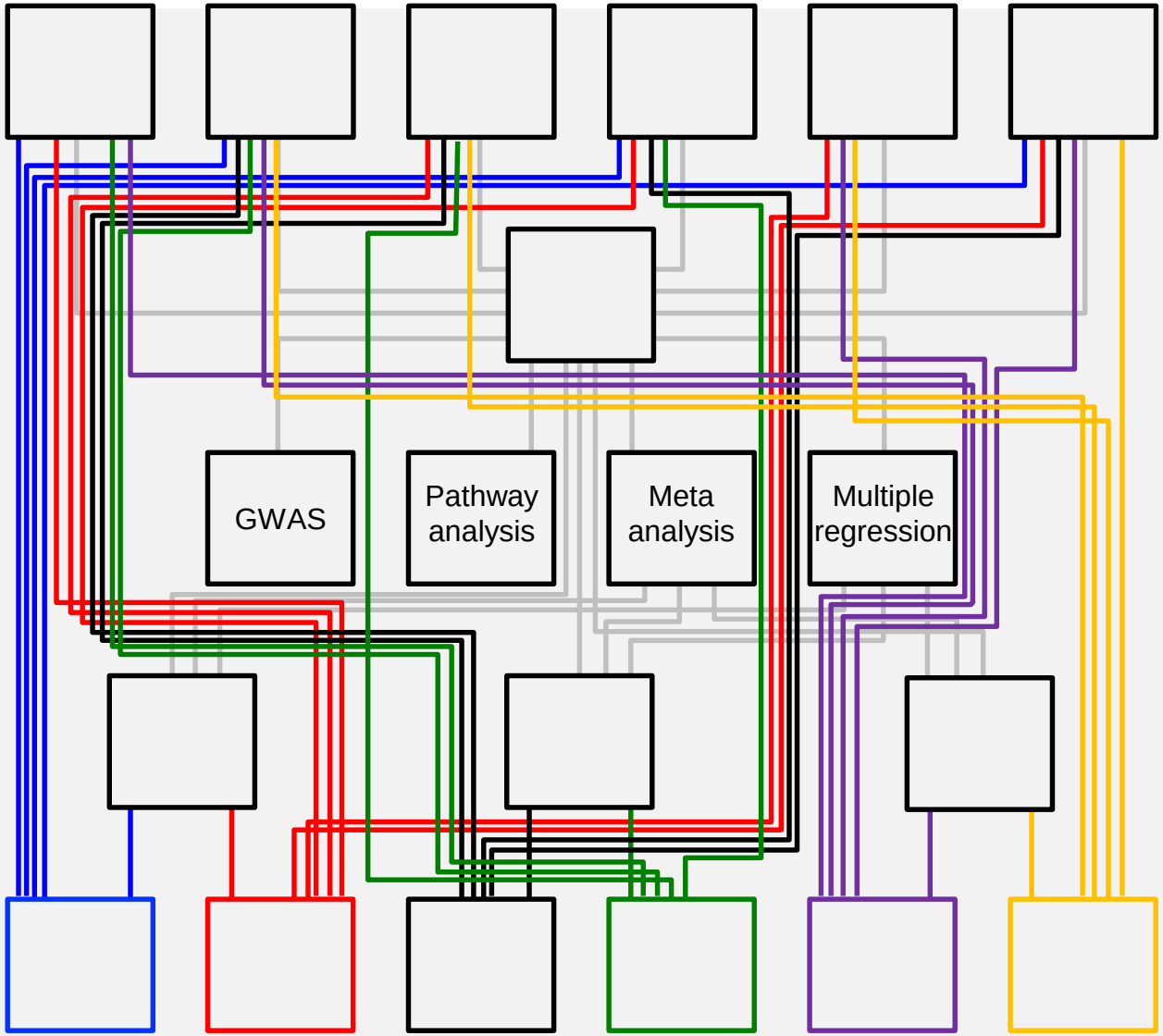

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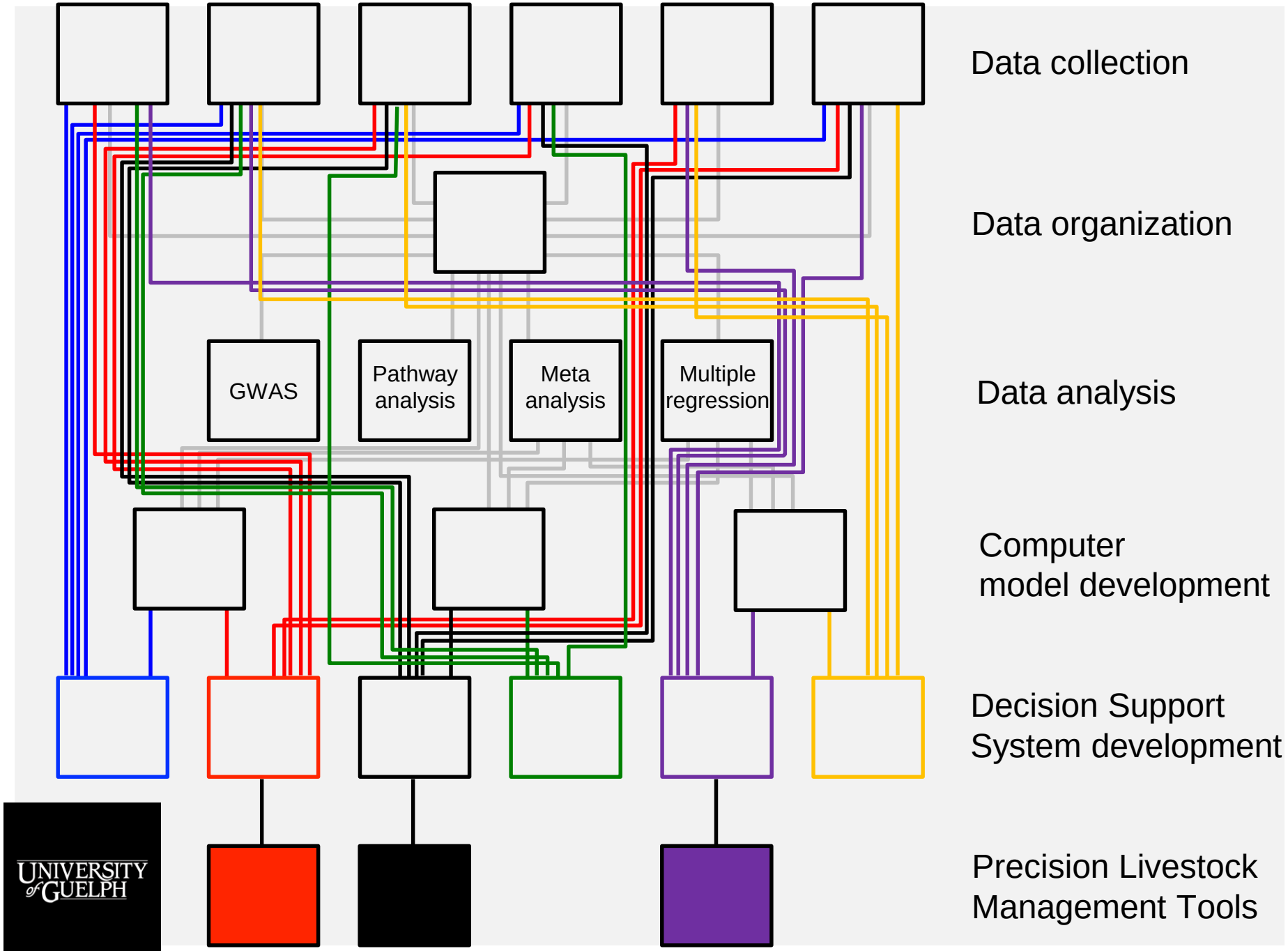
Data collection
Data organization
GWAS
Pathway analysis
Meta analysis
Multiple regression
Data analysis
Computer model development
Decision Support System development
Precision Livestock Management Tools
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Some (more) Examples of Big Data…:

- Number of cows: 476
- Number of activity records / day: 355
- Number of conformation records / day: 355
- Number of milking events / day: 372
- Number of insentec events / day: 10,527
- Size of a genotype file containing 1,000,000 SNPs for 5,000 animals: 1Gb
- Size of a BAM file at 12x coverage for one animal: 50Gb
- 16 minutes of abbatoir video (GoPro 6): 300Gb
- ...etc

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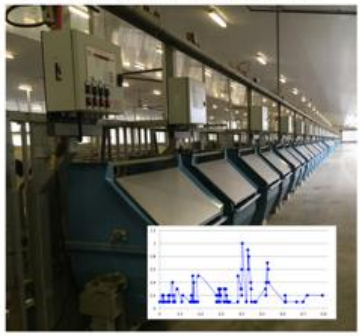
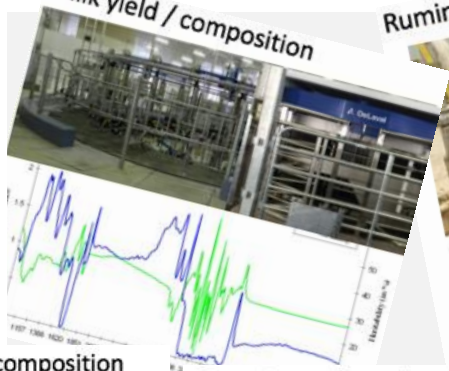
Activity / Locomotion

Feed intake / behaviour



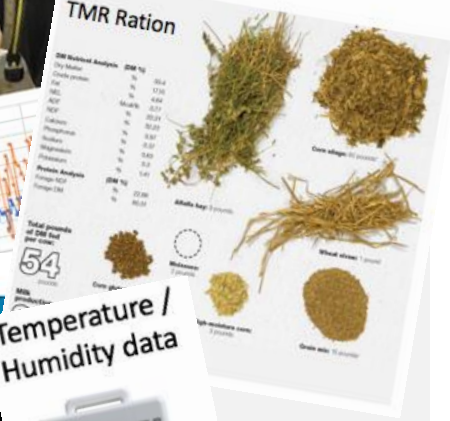
Milk yield / composition



Rumination activity

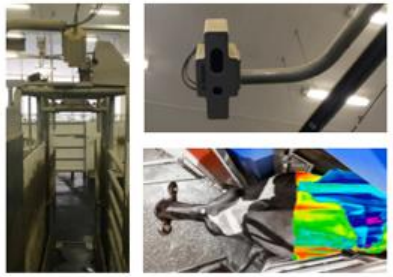
Feed Data

TMR Ration



Methane producti
Feed Efficiency

Body weight (gain), composition and conformation



Genotype / -omics data

Temperature / Humidity data

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“You can have data without information, but you cannot have information without data”

Daniel Keys Moran, Programmer

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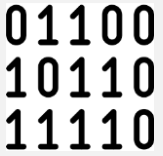
- Determine the economic value of different types of data collection

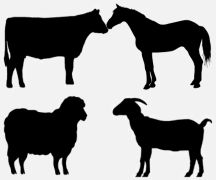
- Predict illness, fertility disorders, etc.

- manage individual animals
- Better understand genetic architecture of economically important traits

- Apply complex algorithms / machine learning approaches



- Conduct comparative analyses between species



- Teach students how to work with big data

- …and much, much more!

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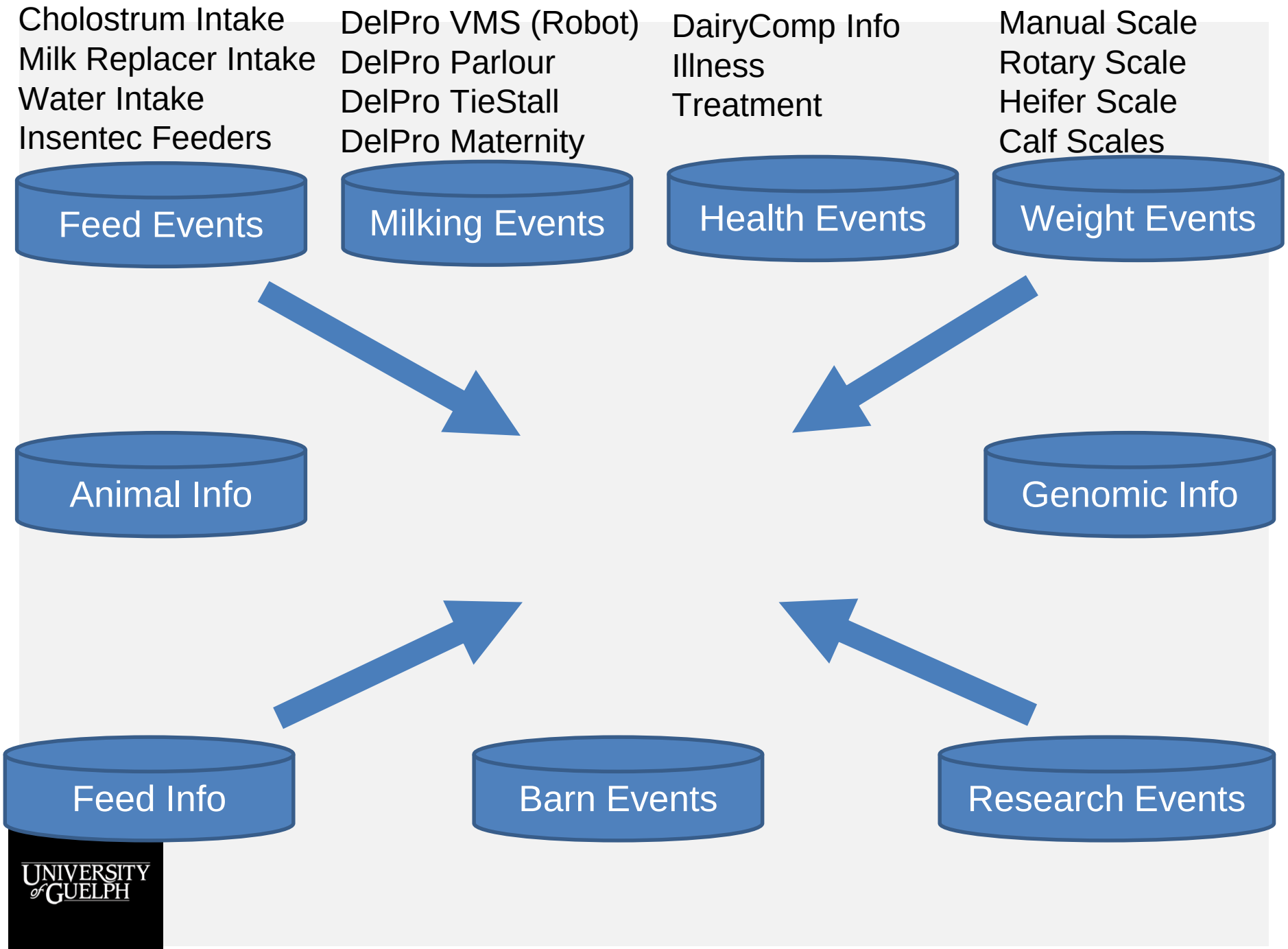

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