

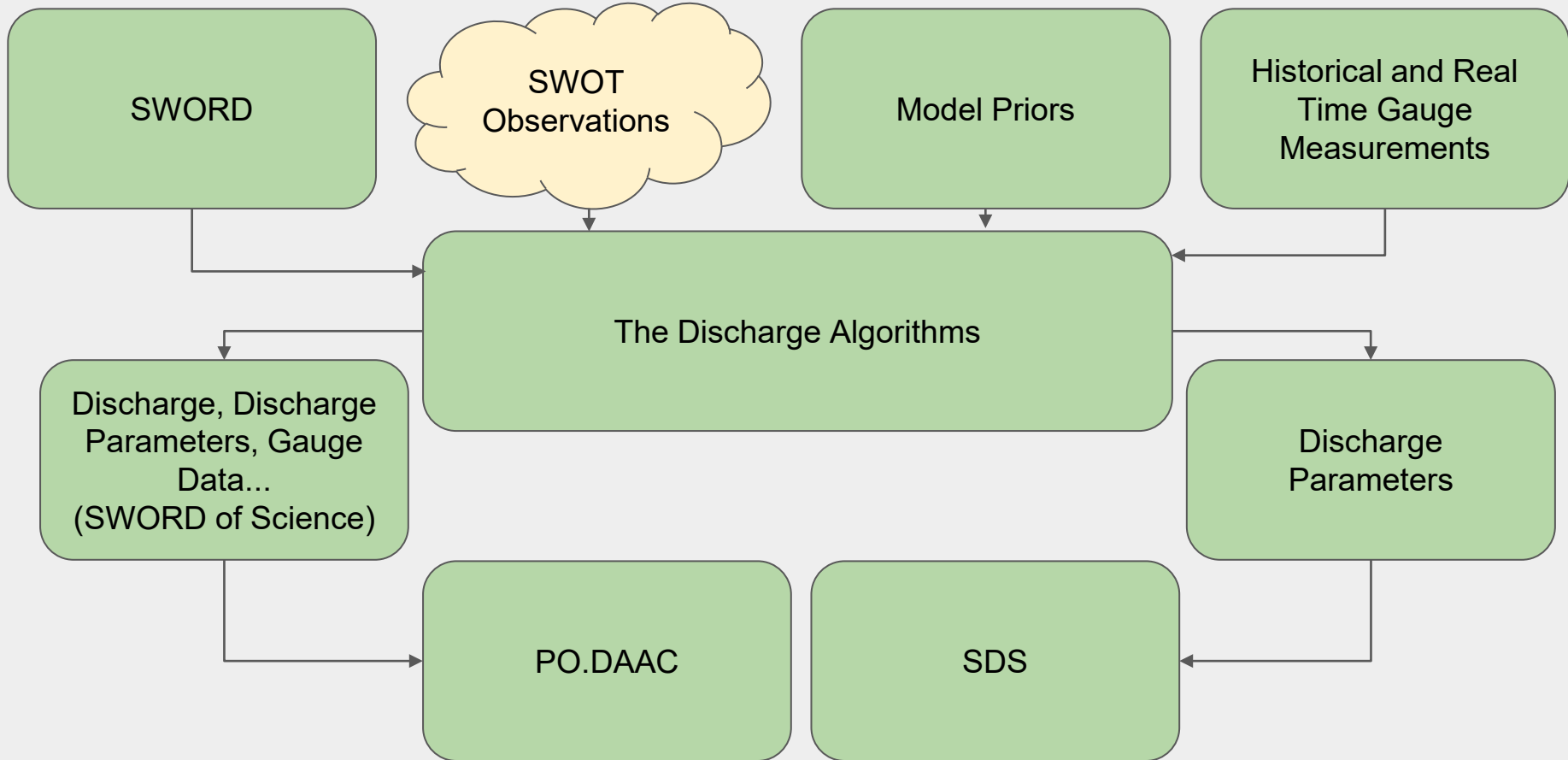
Confluence Technical Update

Travis Simmons, Mike Durand, Colin Gleason, Steve Coss, Nikki Tibaldi, Rui Wei, Renato Prata
de Moraes Frason

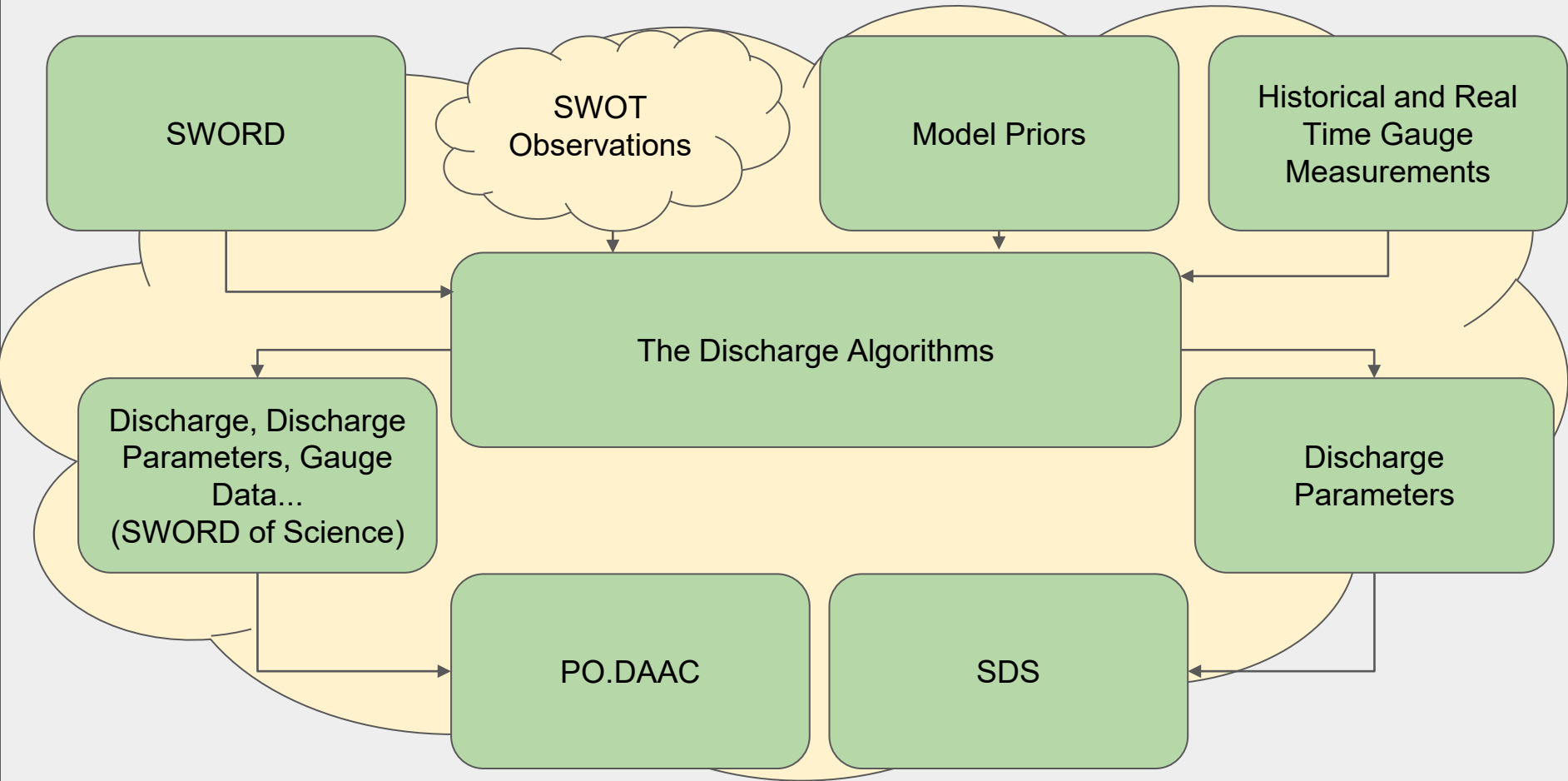
The Goal

Discharge and discharge parameter estimation at every SWORD reach at every SWOT observation in an automated and cost effective way for the duration of the mission so that the SDS can create their Level 2 discharge product and you all can do fun science

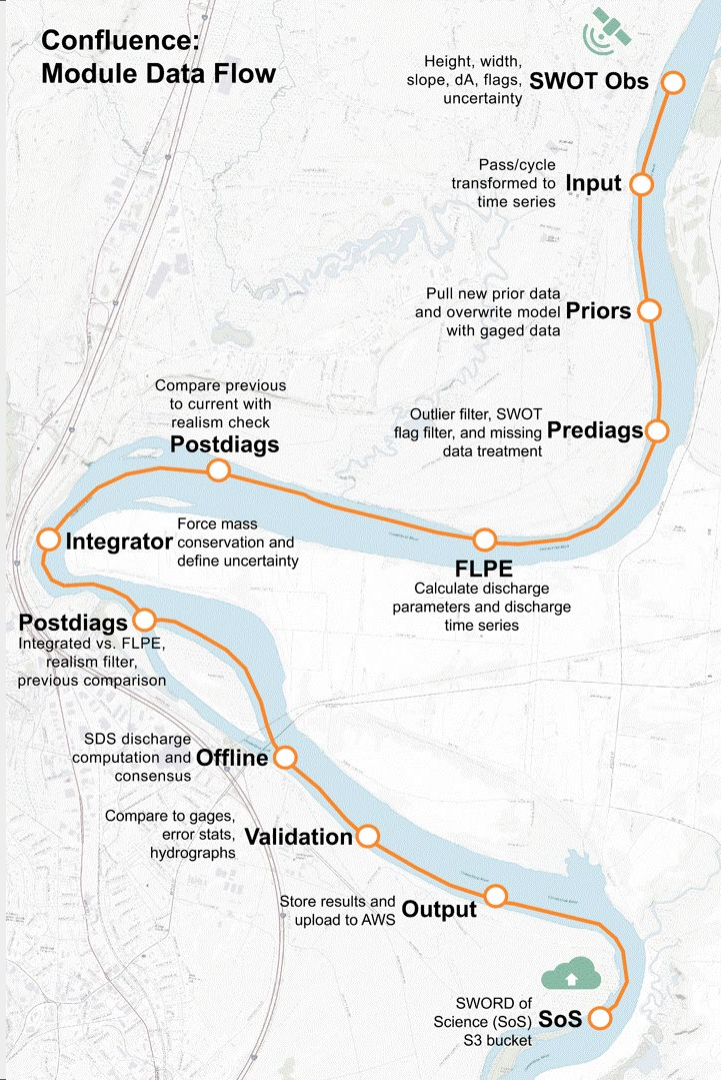
The Basic Confluence Pipeline



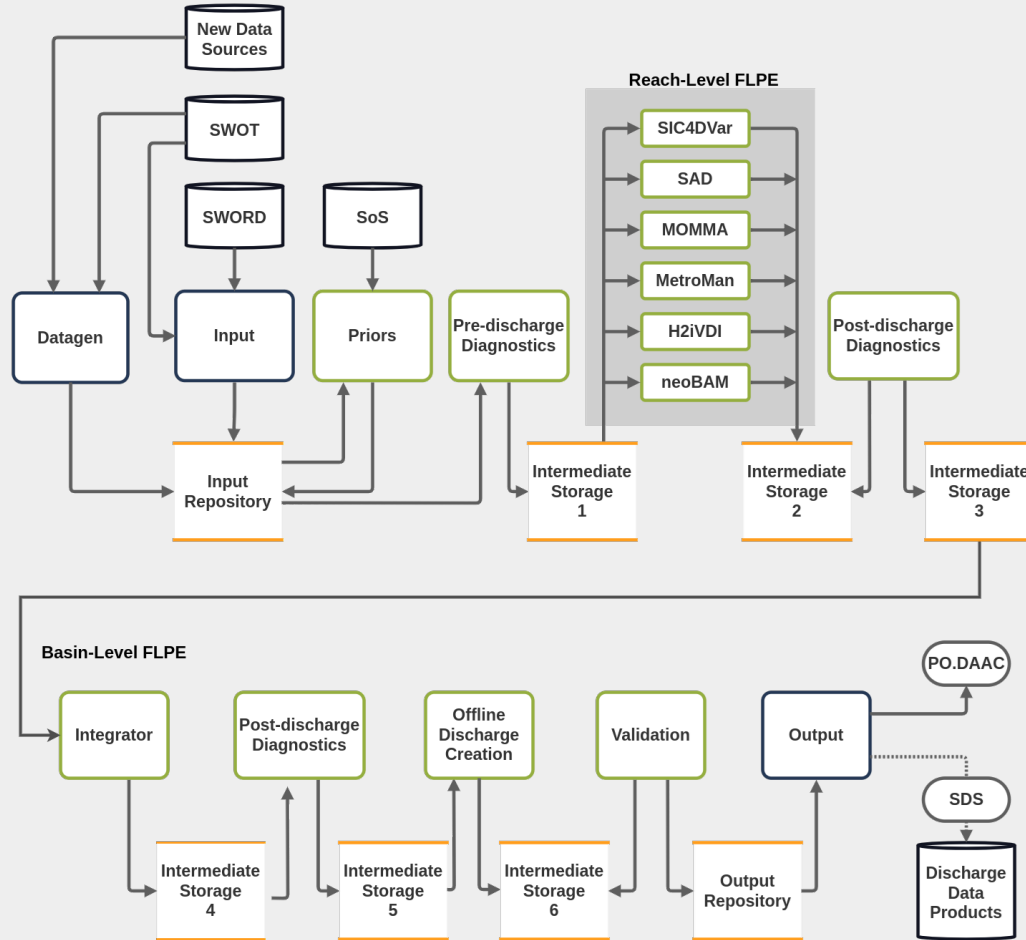
The Basic Confluence Pipeline



Confluence: Module Data Flow

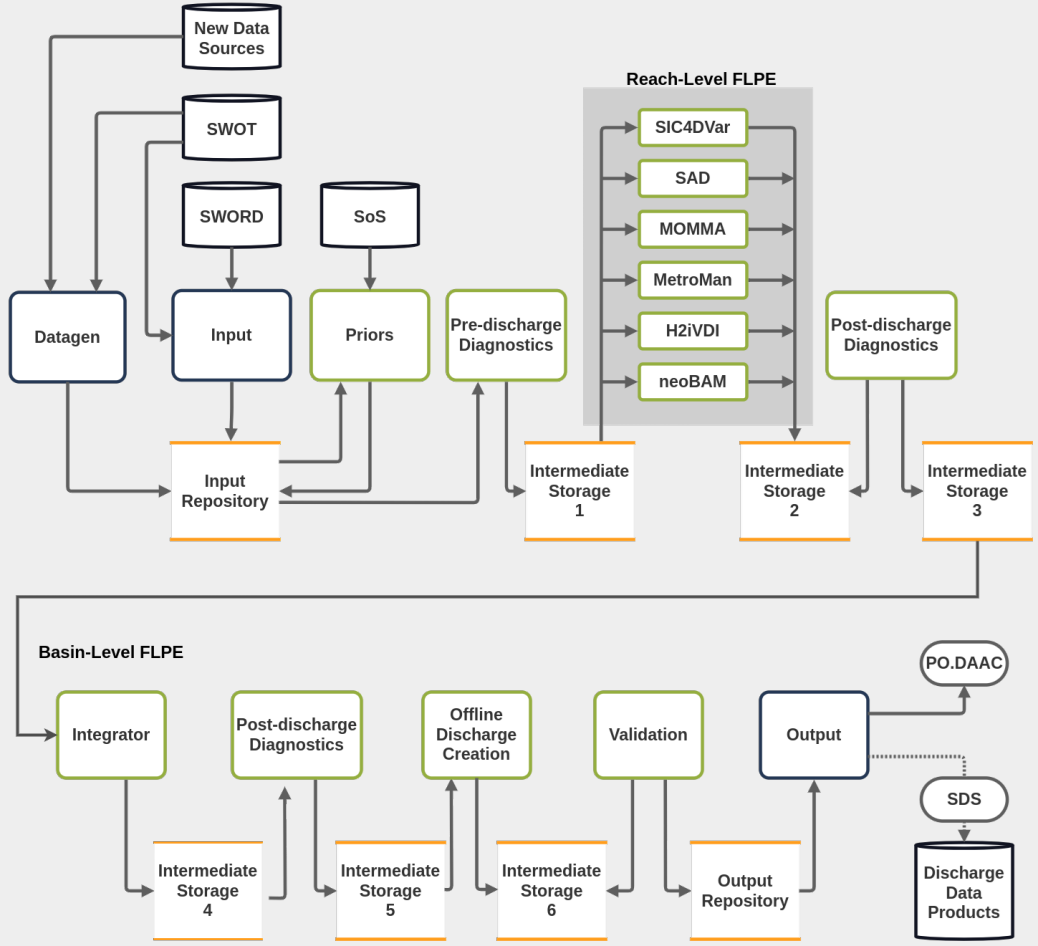


Confluence Data Flow Diagram



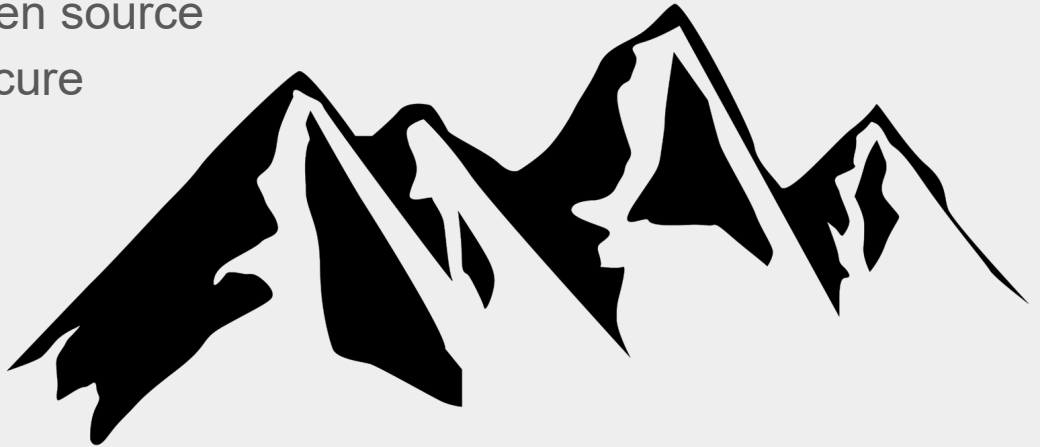
Confluence Data Flow Diagram

Ready to predict discharge and discharge parameters on all 213,000 SWORD reaches, in parallel, in the cloud, in a reproducible, cost effective, and modular way.



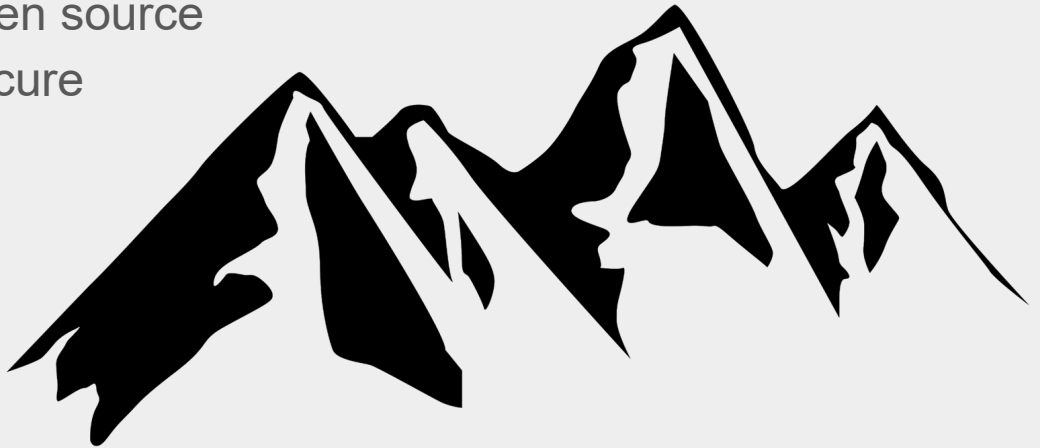
The Overwhelming Landscape of Technical Challenges

- 200+ AWS Services
- Managing SWOT Data Ingestion
- 1400 Real Time Gauge Records to Ingest
- Managing Inter-Agency and International Development Cycles
- How will you keep all of this open source
- How will you keep all of this secure
- How much will it cost
- How long will it take to run
- How will you scale it



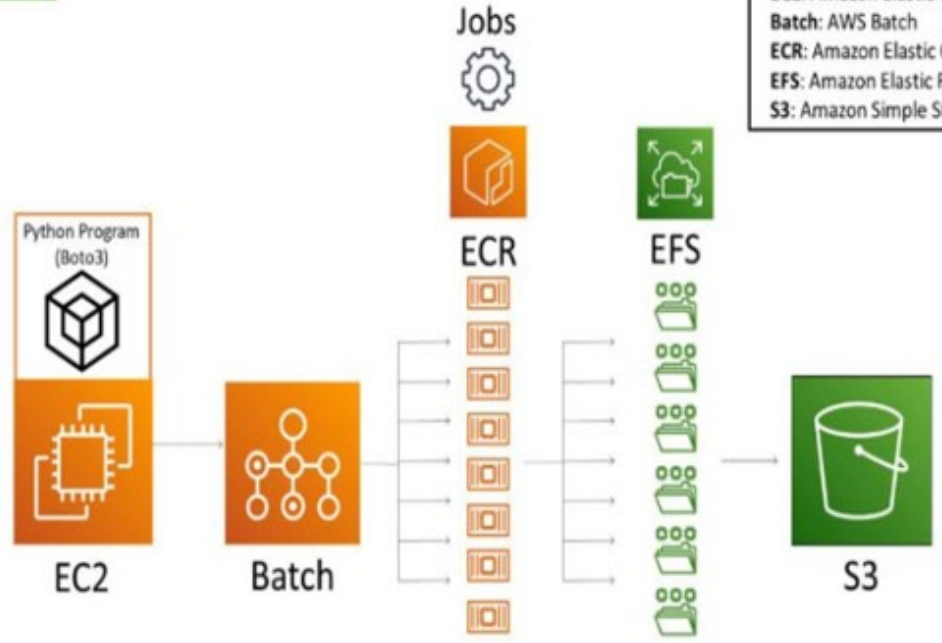
The Overwhelming Landscape of Technical Challenges

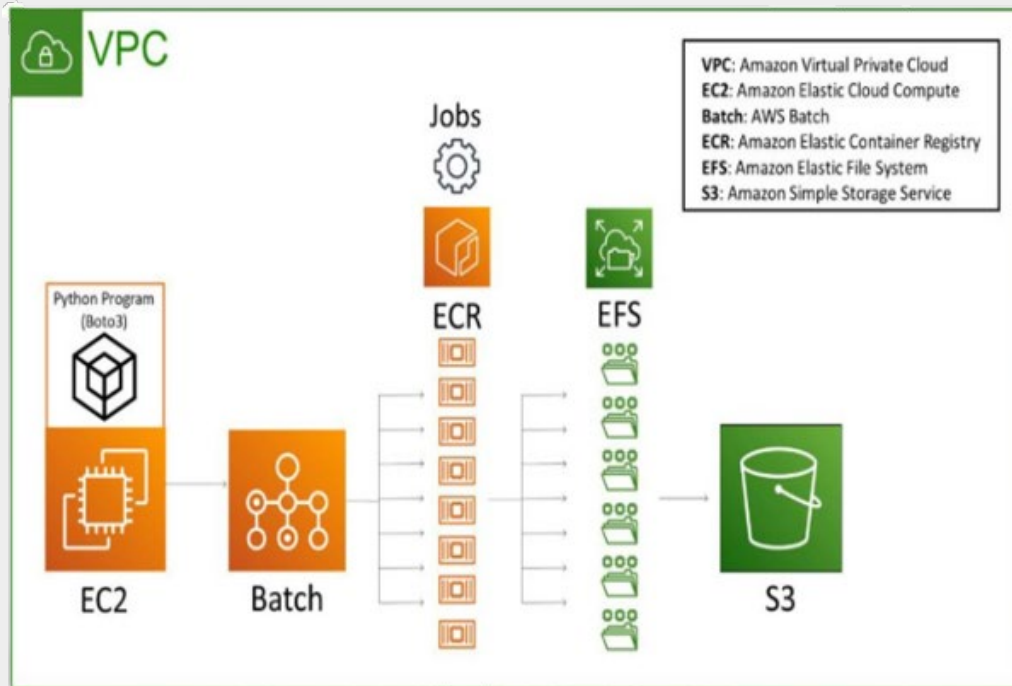
- 200+ AWS Services
- Managing SWOT Data Ingestion
- 1400 Real Time Gauge Records to Ingest
- Managing Inter-Agency and International Development Cycles
- How will you keep all of this open source
- How will you keep all of this secure
- How much will it cost
- How long will it take to run
- How will you scale it
- Also, you have no data yet



 VPC

VPC: Amazon Virtual Private Cloud
EC2: Amazon Elastic Cloud Compute
Batch: AWS Batch
ECR: Amazon Elastic Container Registry
EFS: Amazon Elastic File System
S3: Amazon Simple Storage Service





AWS Services Used



Batch



Fargate



EC2



ECR



Lambda



S3



EFS



Step Functions



Event Bridge



Cloud Watch



Systems Manager



KMS



IAM

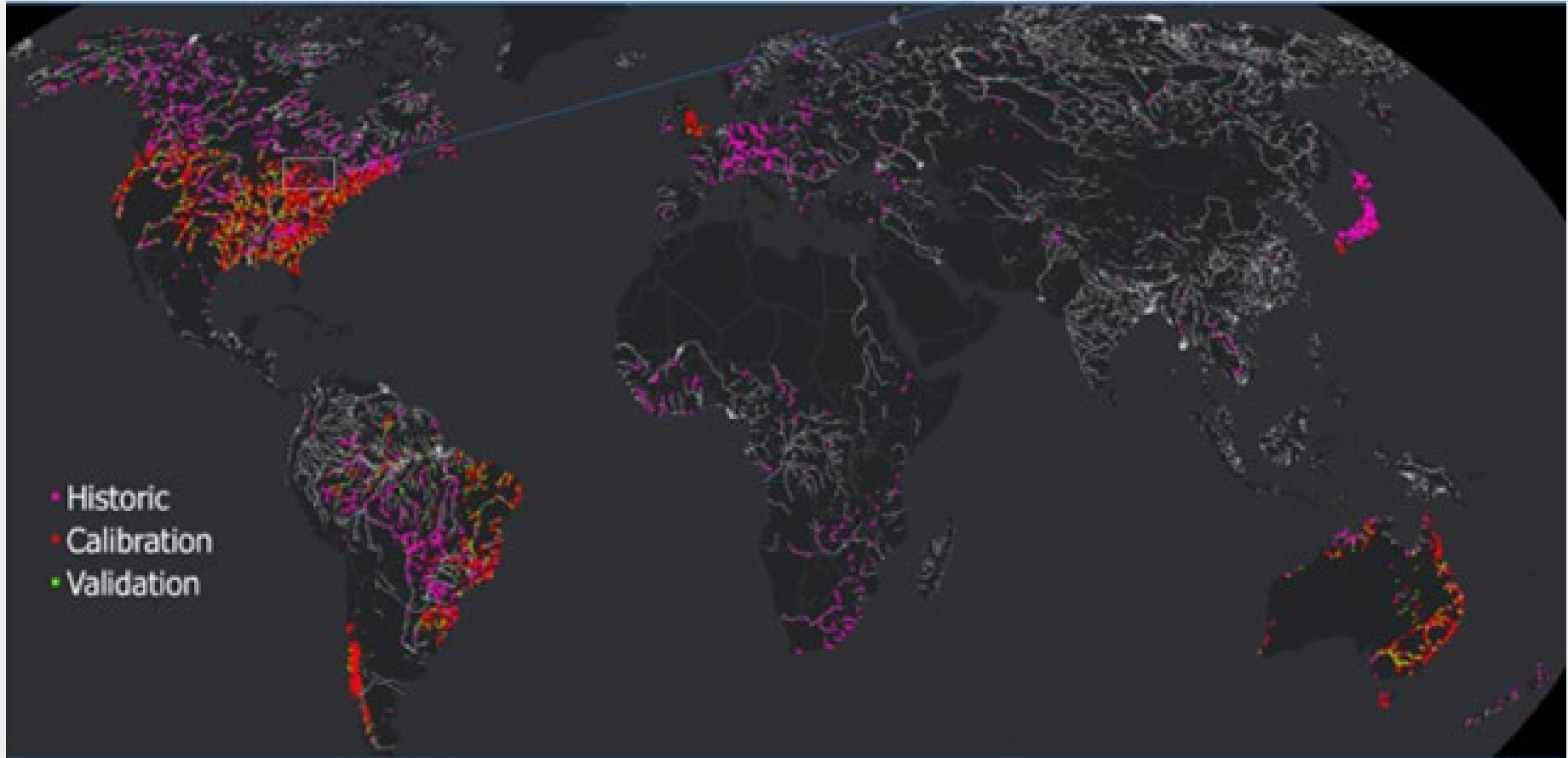


Cost Explorer

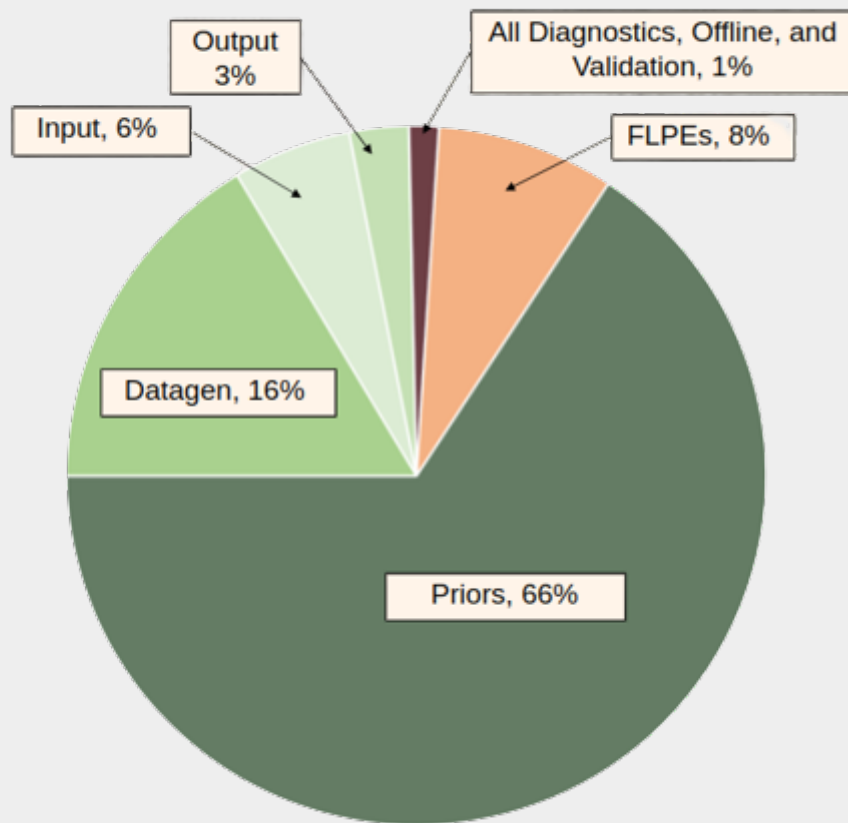


VPC

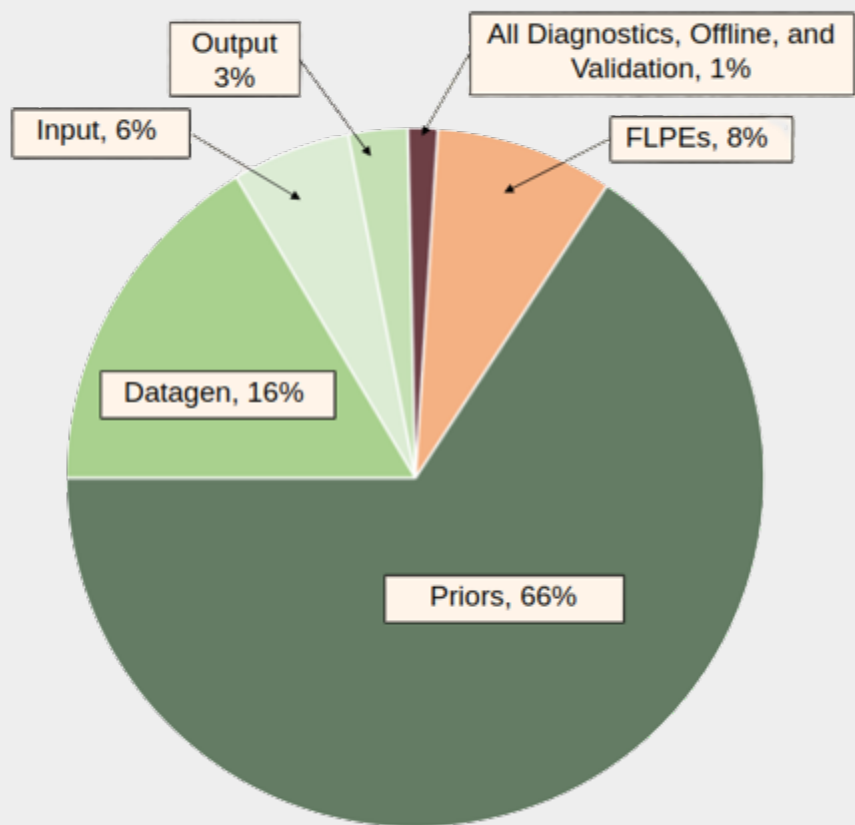
Global Gauge Network



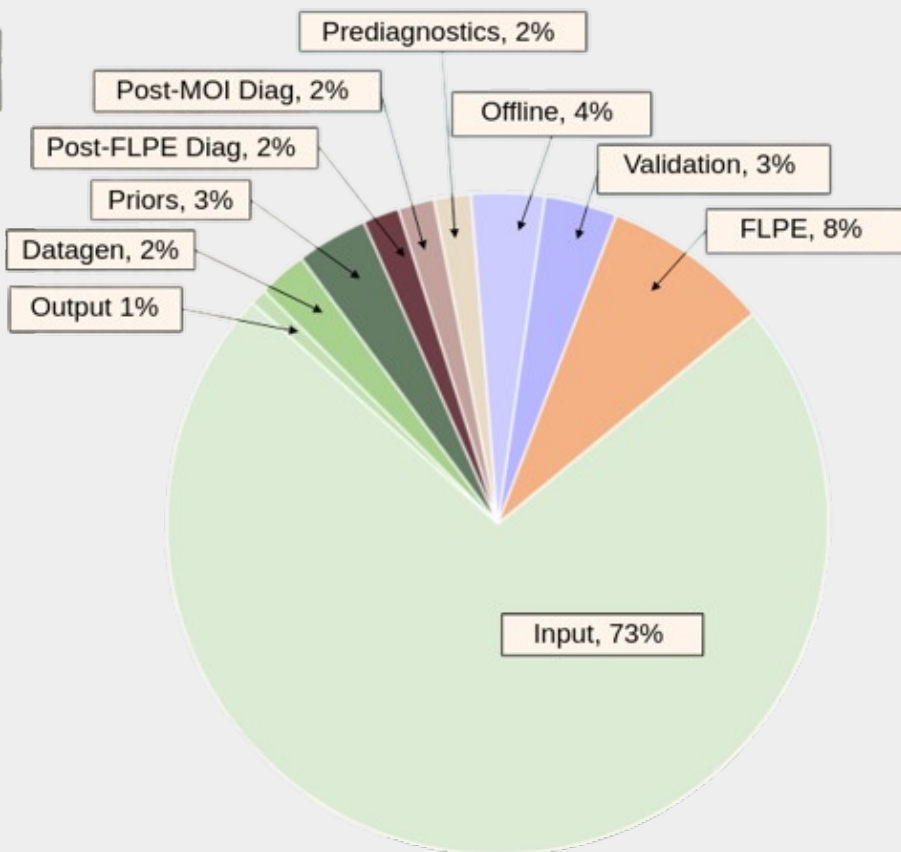
Module Runtime by Group



Module Runtime by Group



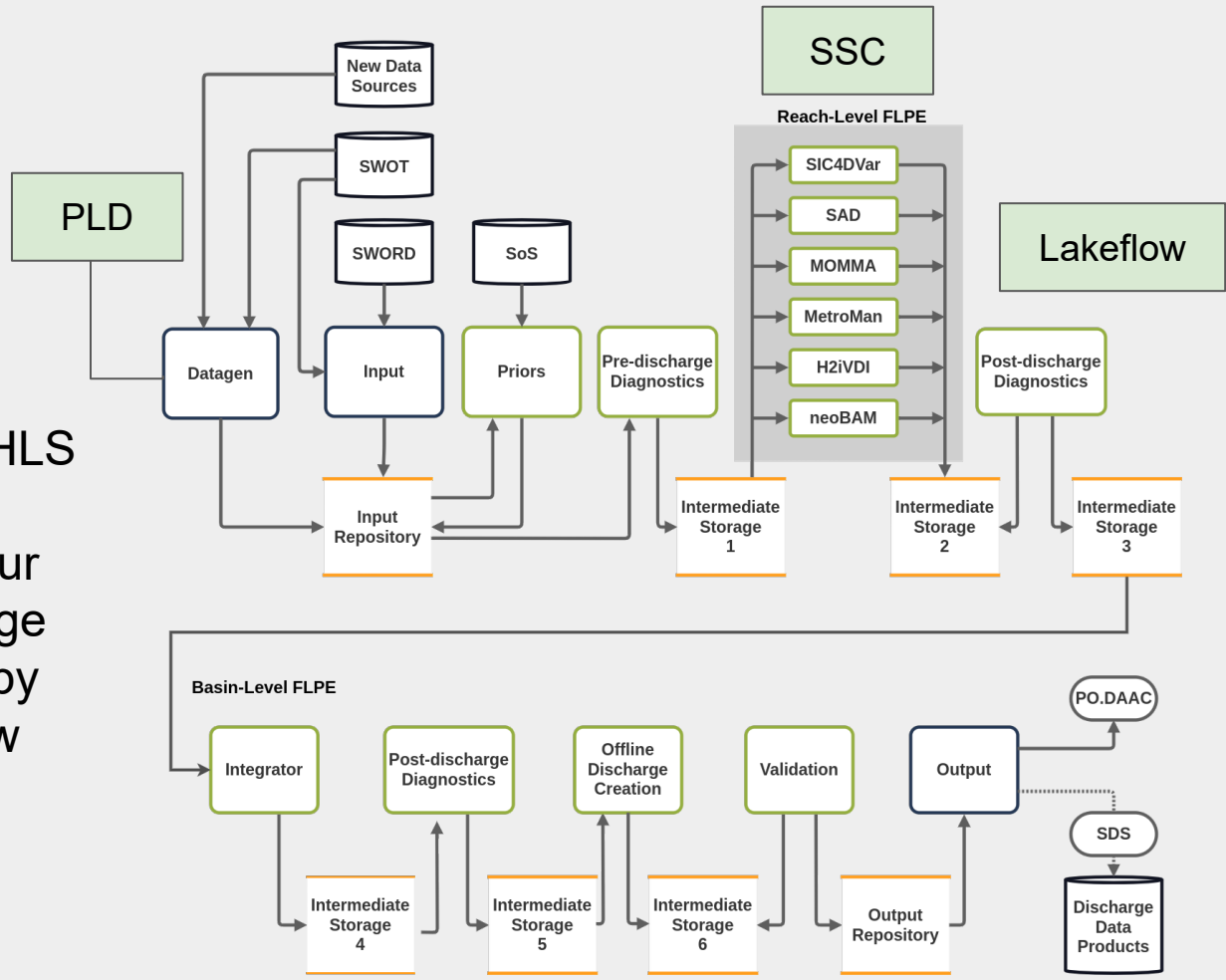
Module Cost by Group



Confluence Data Flow Diagram

Modular and Extensible

- SSC estimation co-aligned with SWOT measurements using HLS data and CV methods
- Considering lakes in our discharge and discharge parameter estimation by incorporating LakeFlow



Why this can all happen

- SWOT Science Team Funding
- ESTO
 - AIST
- AWS



Technical Achievements

- Produced 1000's of discharge and discharge parameter estimates from SWOT measurements in the cloud
- Incorporating ~50 million gauge measurements into our discharge and discharge parameter estimations
- All data will be easily accessible through PO.DAAC
- Facilitating international science
20 years in the making

