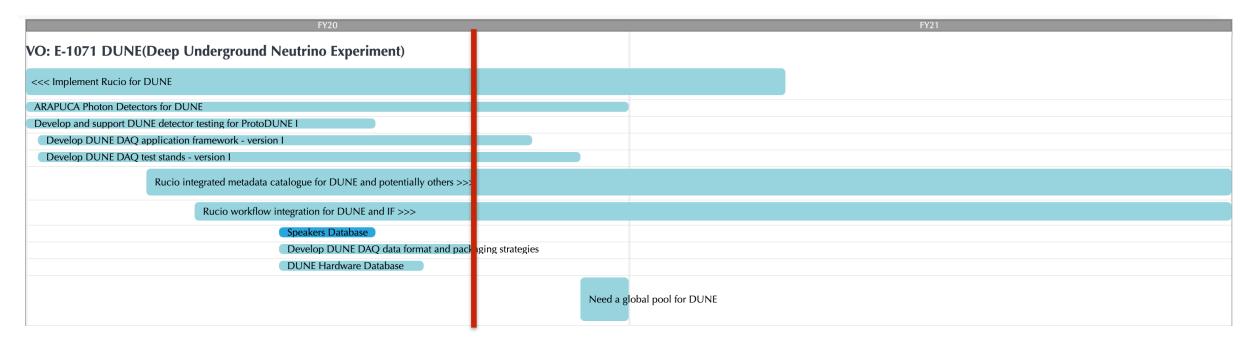
Fermilab ENERGY



DUNE Computing Projects

Michael Kirby, Fermilab/SCD July 2, 2020

DUNE Projects in Service Now



- Not all of these fall under the guise of the Computing Consortium (DAQ, ARAPUCA, Speakers Database)
- Some projects not part of Service Now yet Conditions and Slow Controls DB
- As well, there are several projects happening outside of SCD/FNAL (DB interface, Documentation, Tutorials, etc)



Four main thrusts of projects

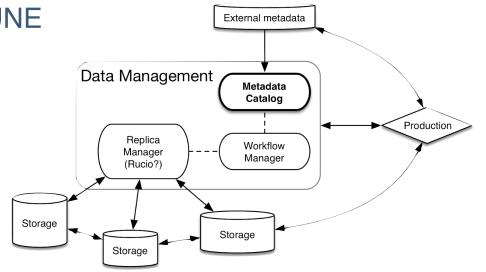
- Data management
- Databases
- DAQ
- Production/Ops
- Frameworks (counting is not my strong suit)



Slides from Steve Timm with help from Robert Illingworth

DUNE Data Management Project work @ FNAL

- Overall goal: replace all functions of SAM in time for ProtoDUNE II run, currently scheduled Jan 2022.
- File Replica Catalog and Data Movement-> Rucio
- Metadata Catalog -> New metadata server "MetaDB"
- Project Management (Workflow)-> Currently being specified
- Data Ingest (FTS replacement) -> Currently being specified
- Already other customers identified for both Rucio and MetaDB.
- Biggest driver is proposed DUNE data structure in which one trigger record may be split across many files and/or parts of many trigger records may be contained in one file.

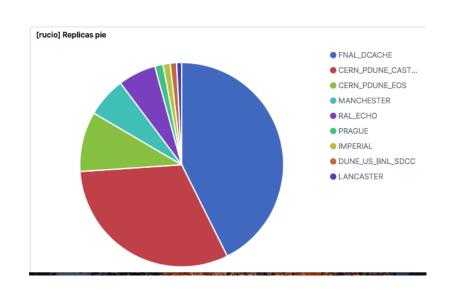


Fermilab

Slides from Steve Timm with help from Robert Illingworth

Rucio Development and Deployment

- Features needed to transfer into tape-backed "non-deterministic" path hosts
- configuration flexibility (J. Perry)
- Quality of Service
- Deployment of OKD-based containerized Rucio [when] (Brandon)
- Adding significant monitoring
- In current deployment Rucio used to distribute files from FNAL and CERN to 16 other Rucio Storage Elements around world.
- Automation of more types of data ingest into Rucio.





Slides from Steve Timm with help from Robert Illingworth

Metadata server MetaDB (Igor M.)

- Requirements document complete and being reviewed by stakeholders
- Proof of principle demonstration has been constructed and successfully ingested all existing DUNE Metadata
- Joint taskforce between DAQ, Data Mgmt, DB, and Offline is being formed to specify the contents of the metadata
- Remaining SAM functionality (sam project, sam get_next_file, etc) currently being specified.
 - This is not meant to be a full workflow management solution for DUNE, rather just a way to replace current SAM project and file location delivery solutions.



Databases

- HardwareDB (Components DB in SCD terms) Steve White, Vladimir Podstavkov
 - We have a development (prototype) server up and running and soon to be available to DUNE DB members -- <u>https://rexdbsrv4.fnal.gov:9443/cdb/login/</u>
 - Working on toughest part of the web forms This is very near done 90%.
 - Adding Component types
 - Adding Components, includes adding child components and traversing the entire component structure.
 - We will be duplicating the above work for tracking testing of components.
 - Dynamic form generation, based on the json fields is nearly complete.
 - Security
 - who can login is currently Idap because its easy but will be Shibboleth
 - who can edit what component and role is working for component types and compnents.
 - Just starting on design of an API for adding/updating components via the web and possibly a CSV file.
- Conditions and Slow Controls Databases Igor Mandrichenko

Home	Edit Component type					
	Component Type	MOBO01				
Batches	Comments	MOBO type	e 1			
Cable Structures	Managed by	×tester				
Component Test Types	Manufacturers	×Stiedemar	nn-Hill			
Component Tests Component Types	Created	2020-06-2	4 17:58:43			
Components	Created by	Vladimir Po	odstavkov			
Geographic Locations	Specifications	Gain:				
Images	Specifications	- v0 - v1				
Manufacturers		- v2				
Purchase Orders		- v3 Size: null				
Structures		Type: null Array: []				
Admin <		Xtype: x-pcl Version: nul				
	Connections	s0: FEB001	~			
Logout		s1: FEB001 s2: FEB001				
		s3: FEB001 s4: FEB001				
		s5: FEB001				
		s6: FEB001 s7: FEB001				
		s8: FEB001				
DELECTION DE LA COMPANYA DE LA COMPA	Compo					
DEEP UNDERGROUND NEUTRINO EXPERIMENT Home	Edit Component		a042-11ea-9345-0cc47a331e14	ļ		
DEEP UNDERGROUND NEUTRINO EXPERIMENT	Edit Component	b78e4afa-a	a042-11ea-9345-0cc47a331e14	1		
DEEP UNDERGROUND NEUTRINO EXPERIMENT Home Batches	Edit Component SPECS LOG ST Contained in	b78e4afa-a	a042-11ea-9345-0cc47a331e14	1		
DEEP UNDERGROUND NEUTRINO EXPERIMENT Home Batches Cable Structures	Edit Component	b78e4afa-a	a042-11ea-9345-0cc47a331e14	1		
DEEP UNDERGROUND NEUTRINO EXPERIMENT Home Batches Cable Structures Component Test Types	Edit Component	b78e4afa-a	a042-11ea-9345-0cc47a331e14 G CONTAINER LOG 042-11ea-9345-0cc47a331e14	1		
DEEP UNDERGROUND NEUTRINO EXPERIMENT Home Batches Cable Structures Component Tests Component Tests Component Types Component Types Components	Edit Component SPECS LOG ST Contained in Component Type External ID Serial Number	b78e4afa-a RUCTURE LO N/A MOBOO1 b78e4afa-ad SN0cc47a3:	a042-11ea-9345-0cc47a331e14 G CONTAINER LOG 042-11ea-9345-0cc47a331e14 31e14	1		
DEEP UNDERGROUND NEUTRINO EXPERIMENT Home Batches Cable Structures Component Tests Component Tests Component Types Component Stypes Components Geographic Locations	Edit Component SPECS LOG ST Contained in Component Type External ID Serial Number Manufacturer	b78e4afa-a RUCTURE LO N/A MoB001 b78e4afa-al SN0cc47a32 Daugherty, B	a042-11ea-9345-0cc47a331e14 G CONTAINER LOG 042-11ea-9345-0cc47a331e14	1		
DEEP UNDERGROUND NEUTRINO EXPERIMENT Home Batches Cable Structures Component Tests Component Tests Component Types Component S Geographic Locations Images	Edit Component SPECS LOG ST Contained in Component Type External ID Serial Number Manufacturer Batch ID	b78e4afa-a RUCTURE LO N/A MOBOO1 b78e4afa-au SN0cc47a33 Daugherty, Bu 1237	a042-11ea-9345-0cc47a331e14 IG CONTAINER LOG 042-11ea-9345-0cc47a331e14 31e14 eehan and O'Hara	1		
DEEP UNDERGROUND NEUTRINO EXPERIMENT Home Batches Cable Structures Cable Structures Cable Structures Camponent Tests Component Types Component S Geographic Locations Images Manufacturers	Edit Component SPECS LOG ST Contained in Component Type External ID Serial Number Manufacturer Batch ID Created	b78e4afa-a TRUCTURE LO N/A MOBOO1 b78e4afa-a SNOcc47a33 Daugherty, Bi 1237 2020-05-27	a042-11ea-9345-0cc47a331e14 IG CONTAINER LOG 042-11ea-9345-0cc47a331e14 31e14 eehan and O'Hara	1		
DEEP UNDERGROUND NEUTRINO EXPERIMENT Home Batches Cable Structures Cable Structures Cable Structures Camponent Tests Component Tests Component Types Component S Geographic Locations Images Manufacturers Purchase Orders	Edit Component SPECS LOG ST Contained in Component Type External ID Serial Number Manufacturer Batch ID Created Created by	b78e4afa-a RUCTURE LO N/A MOBOO1 b78e4afa-au SN0cc47a33 Daugherty, Bu 1237	a042-11ea-9345-0cc47a331e14 IG CONTAINER LOG 042-11ea-9345-0cc47a331e14 31e14 eehan and O'Hara	1		
DEEP UNDERGROUND NEUTRINO EXPERIMENT Home Batches Cable Structures Cable Structures Cable Structures Camponent Tests Component Types Component S Geographic Locations Images Manufacturers	Edit Component SPECS LOG ST Contained in Component Type External ID Serial Number Manufacturer Batch ID Created	b78e4afa-a TRUCTURE LO N/A MOBOO1 b78e4afa-a SNOcc47a33 Daugherty, Bi 1237 2020-05-27	a042-11ea-9345-0cc47a331e14 IG CONTAINER LOG 042-11ea-9345-0cc47a331e14 31e14 eehan and O'Hara	1		
DEEP UNDERGROUND NEUTRINO EXPERIMENT Home Batches Cable Structures Component Tests Component Types Component Types Components Geographic Locations Images Manufacturers Purchase Orders Structures Admin <	Edit Component SPECS LOG ST Contained in Component Type External ID Serial Number Manufacturer Batch ID Created Created by	b78e4afa-a TRUCTURE LO N/A MOBOO1 b78e4afa-a SNOcc47a33 Daugherty, Bi 1237 2020-05-27	a042-11ea-9345-0cc47a331e14 IG CONTAINER LOG 042-11ea-9345-0cc47a331e14 31e14 eehan and O'Hara	ļ.		
DEEP UNDERGOUND NEUTRINO EXPERIMENT Home Batches Cable Structures Cable Structures Cable Structures Component Tests Component Tests Component Types Component Structures Manufacturers Purchase Orders Structures	Edit Component	b78e4afa-a TRUCTURE LO N/A MOBOO1 b78e4afa-a SNOcc47a33 Daugherty, Bi 1237 2020-05-27	a042-11ea-9345-0cc47a331e14 IG CONTAINER LOG 042-11ea-9345-0cc47a331e14 31e14 eehan and O'Hara	•	8	
DEEP UNDERGROUND NEUTRINO EXPERIMENT Home Batches Cable Structures Cable Structures Component Tests Component Types Component Types Component Types Component Structures Manufacturers Purchase Orders Structures	Edit Component	b78e4afa-a RUCTURE LO N/A M08001 b78e4afa-ai SN0cc47a3: Daugherty, Bt 1237 2020-05-27 Vladimir Por	a042-11ea-9345-0cc47a331e14 G CONTAINER LOG 042-11ea-9345-0cc47a331e14 31e14 eahan and O'Hara 7 12:52:23 dstavkov		8	
DEEP UNDERGROUND NEUTRINO EXPERIMENT Home Batches Cable Structures Cable Structures Component Tests Component Types Component Types Component Types Component Structures Manufacturers Purchase Orders Structures	Edit Component	b78e4afa-a RUCTURE LO N/A M08001 b78e4afa-ai SN0cc47a33 Daugherty, Bi 1237 2020-05-27 Vladimir Por	a042-11ea-9345-0cc47a331e14 G CONTAINER LOG 042-11ea-9345-0cc47a331e14 31e14 eahan and 0'Hara 7 12:52:23 dstavkov dfcd52dc-4f6a-11ea-97b0-e35629e15589			
DEEP UNDERGROUND NEUTRINO EXPERIMENT Home Batches Cable Structures Cable Structures Component Tests Component Types Component Types Component Types Component Structures Manufacturers Purchase Orders Structures	Edit Component	b78e4afa-a RUCTURE LO N/A MOBO01 b78e4afa-al SN0ce47a33 Daugherty, Bł 1237 2020-05-27 Vladimir Pod S0:FEB001 S1:FEB001	a042-11ea-9345-0cc47a331e14 G CONTAINER LOG 042-11ea-9345-0cc47a331e14 31e14 eahan and 0'Hara 7 12:52:23 dstavkov dfcd52dc-4f6a-11ea-97b0-e35629e15589			
DEEP UNDERGROUND NEUTRINO EXPERIMENT Home Batches Cable Structures Component Tests Component Types Component Types Component Types Component Structures Manufacturers Purchase Orders Structures Admin <	Edit Component	b78e4afa-a RUCTURE LO N/A MOBOO1 b78e4afa-al SNOce47a33 Daugherty, B 1237 2020-05-27 Vladimir Por S0:FEB001 S1:FEB001 S2:FEB001	a042-11ea-9345-0cc47a331e14 G CONTAINER LOG 042-11ea-9345-0cc47a331e14 31e14 eahan and 0'Hara 7 12:52:23 dstavkov dfcd52dc-4f6a-11ea-97b0-e35629e15589			
DEEP UNDERGROUND NEUTRINO EXPERIMENT Home Batches Cable Structures Component Tests Component Types Component Types Component Types Component Structures Manufacturers Purchase Orders Structures Admin <	Edit Component	b78e4afa-a RUCTURE LO N/A MOBOO1 b78e4afa-al SN0cc47a33 Daugherty, B 1237 2020-05-27 Vladimir Poo S0:FEB001 S1:FEB001 S2:FEB001 S3:FEB001	a042-11ea-9345-0cc47a331e14 G CONTAINER LOG 042-11ea-9345-0cc47a331e14 31e14 eahan and 0'Hara 7 12:52:23 dstavkov dfcd52dc-4f6a-11ea-97b0-e35629e15589			
DEEP UNDERGROUND WEUTRING EXPERIMENT Home Batches Cable Structures Cable Structures Cable Structures Component Teytes Component Types Component Types Components Geographic Locations Images Manufacturers Purchase Orders Structures	Edit Component	b78e4afa-a RUCTURE LO N/A MOBOO1 b78e4afa-al SN0cc47a33 Daugherty, B 1237 2020-05-27 Vladimir Poo S0:FEB001 S1:FEB001 S3:FEB001 S4:FEB001 S4:FEB001	a042-11ea-9345-0cc47a331e14 G CONTAINER LOG 042-11ea-9345-0cc47a331e14 31e14 eahan and 0'Hara 7 12:52:23 dstavkov dfcd52dc-4f6a-11ea-97b0-e35629e15589			
DEEP UNDERGROUND LEUTININO EXPERIMENT loome atches able Structures component Tests component Types component Types components teographic Locations mages lanufacturers urchase Orders tructures dmin <	Edit Component	b78e4afa-a RUCTURE LO N/A MOBOO1 b78e4afa-al SN0cc47a33 Daugherty, B 1237 2020-05-27 Vladimir Poo S0:FEB001 S1:FEB001 S2:FEB001 S3:FEB001	a042-11ea-9345-0cc47a331e14 G CONTAINER LOG 042-11ea-9345-0cc47a331e14 31e14 eahan and 0'Hara 7 12:52:23 dstavkov dfcd52dc-4f6a-11ea-97b0-e35629e15589			

DAQ Work - Kurt Biery

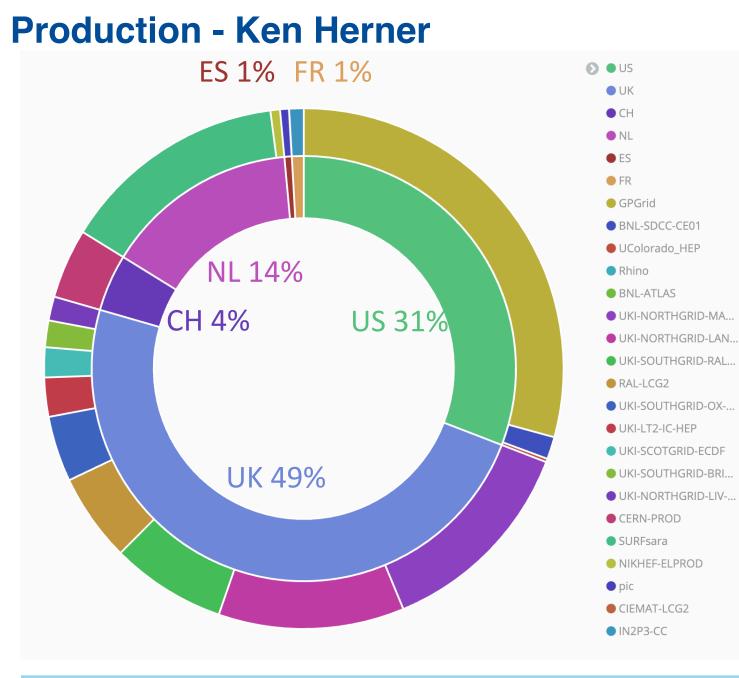
- protoDUNE Single Phase will be drained of LAr around 20-July-2020
- protoDUNE-II will run in 2022(?), DAQ goal is to be ready by Sep 2021
- v1 of the DAQ Application Framework released last week. Good start, but not full functionality. Inter-process communication interfaces and wrappers to existing technologies next. Logging and configuration also next. [Eric Flumerfelt, John Freeman, Ron Rechenmacher]
- software management topics like builds and deployments under active discussion & development [JohnF, Pengfei]
- HDF5 data format demonstrated at PDSP; needs further joint offline/online validation; goal is to pick a PD-II raw data format in Nov 2020 [Kurt, Kirby, others]
- online computing coordination (e.g. sysadmin of PDSP DAQ servers at CERN) going well [BonnieK, Pengfei]
- good interactions with facilities and networking about needs and plans (space and power still quite tight) [Bonnie]
- requirements being gathering for DAQ storage and compared to existing technologies

Fermilab

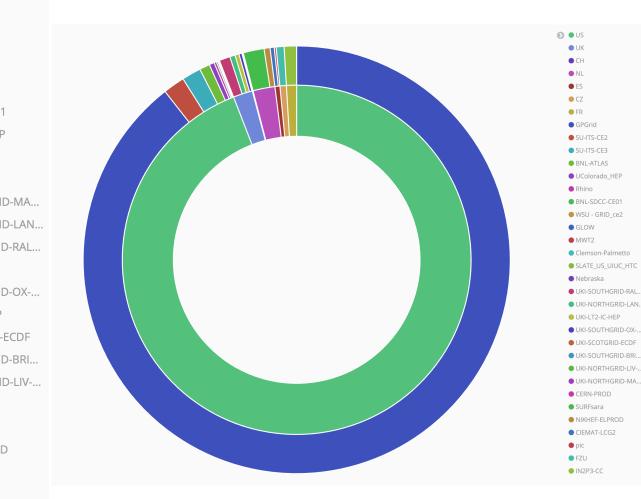
Software Framework Requirement Task Force - Andrew Norman

- Finalizing transformation from a use case document into a requirement document
- most requirements are inline with current frameworks
- some interesting requests coming from Dave Adams
- memory management/clean up requirements are interesting large event size makes for discussion of transient memory objects and intermittent clean up during processing
- anticipate a first version at the end of this week





Analysis



‡ Fermilab