



*ACAT 2008
Advanced Computing and Analysis Techniques in Physics Research
November 3-7, 2008*

**Dedicated Services
to Support Data Replication
over GRID using ATLAS Distributed Data
Management System**

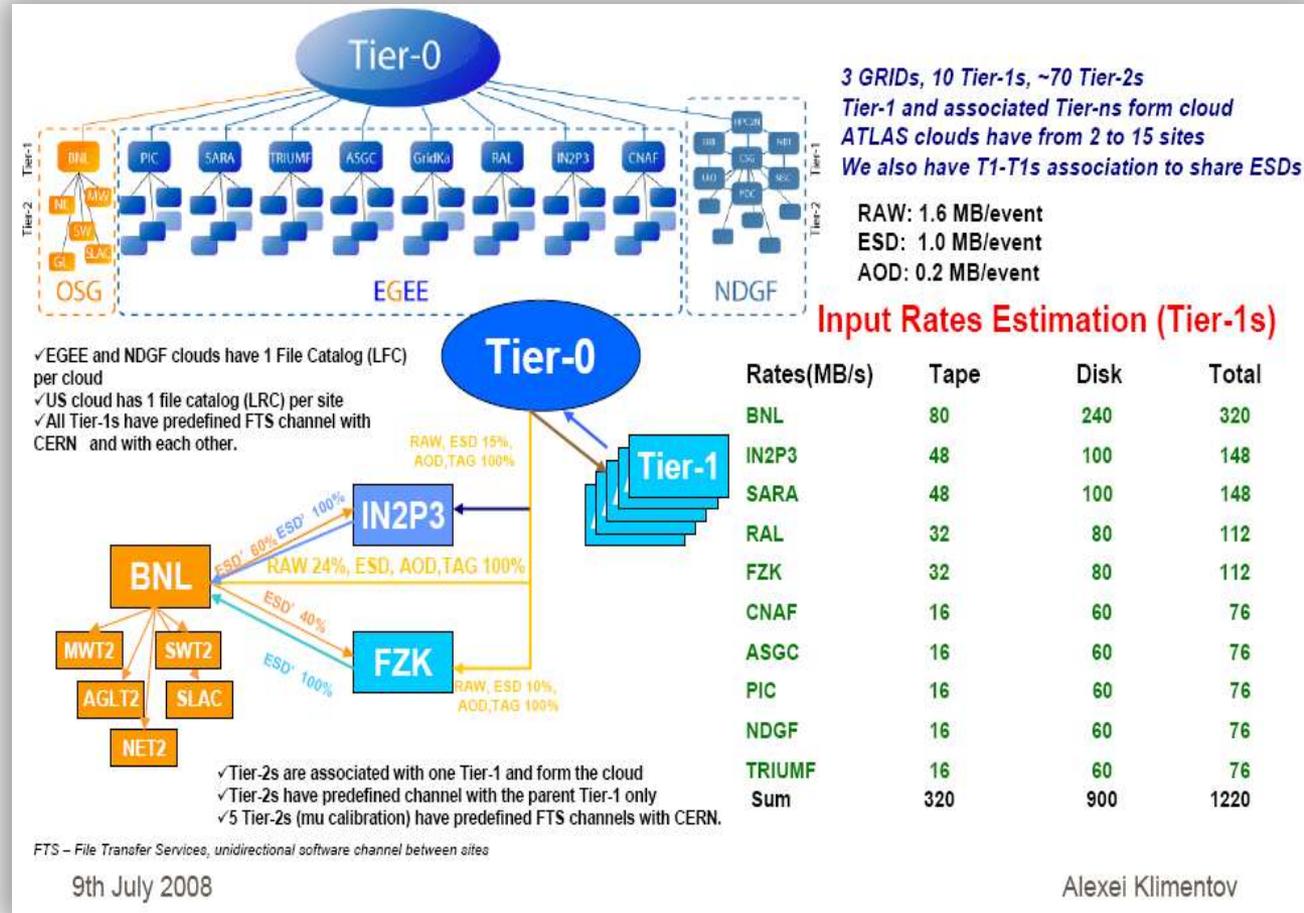
Mikhail Titov (MEPhI)



ATLAS Data Flow

Centralized data flow is defined according to *the ATLAS computing model*.

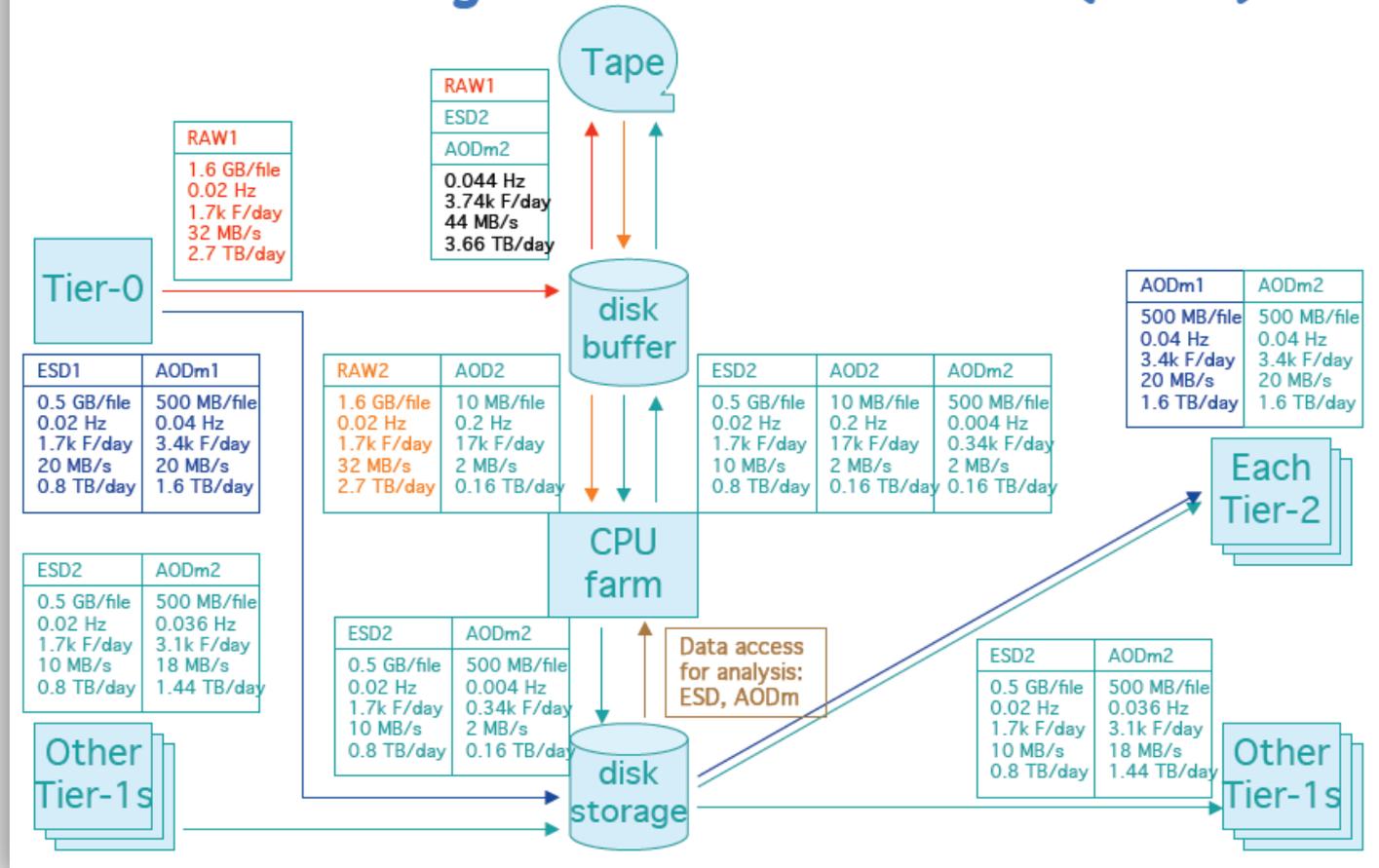
Also we have data replication During various tests, such as Functional, Throughput tests (FT, TT) etc.





ATLAS Data Flow

ATLAS "average" Tier-1 Data Flow (2008)



by Dario Barberis



ATLAS Distributed Computing Components and Services

- LFC (catalogue services)
- FTS (transfer services)
- Dashboard
- Sites services
- T0 services
- Panda Services
- etc.



Distributed Data Management (DDM)

- The system consists of a **bookkeeping system** (dataset-based) and a set of local **site services** to handle data transfers, building upon Grid technologies. The software stack is called DQ2.
- **DQ (*Don Quijote, Don Quijote Dms2*)** is the ATLAS Experiment Data Management System. Its goal is to integrate all Grid data management services used by the ATLAS Experiment, providing production managers and physicists access to file-resident event data, implementing the data flow as defined by the ATLAS Computing Model.



DQ2

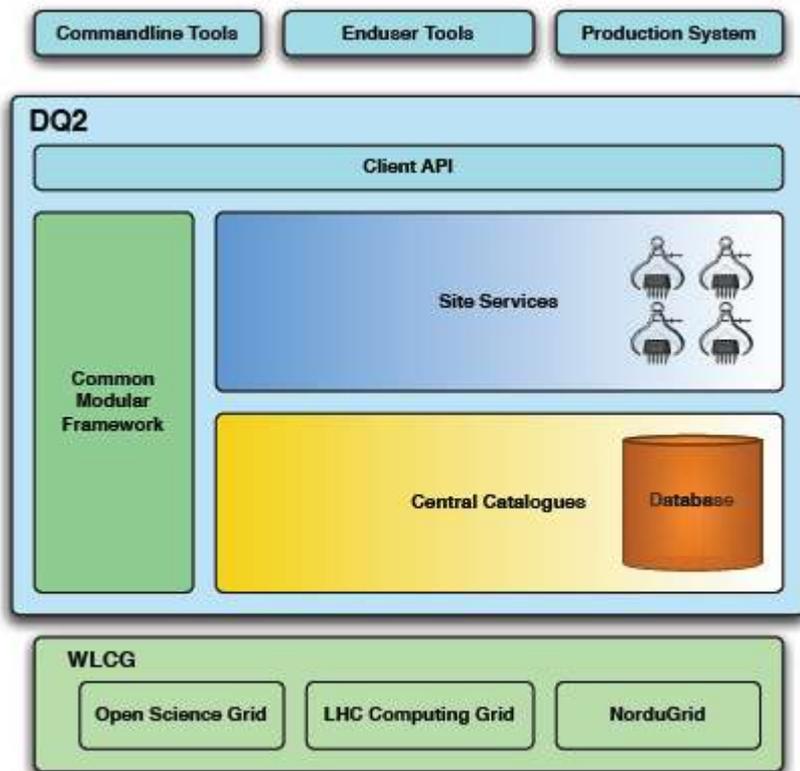
(Don Quijote 2)

DQ2 has four main components:

- *Central Dataset Catalogues*, responsible for bookkeeping information.
- *Site services*, responsible for fulfilling data movement requests (subscriptions).
- *Client tools* to interact with central dataset catalogues and site services.
- *The LCG/ARDA Dashboard* for monitoring data movement requests.



DQ2 (*Don Quijote 2*)



System overview

International Conference on
Computing in High Energy and
Nuclear Physics (CHEP'07)

Journal of Physics: Conference
Series 119 (2008) 062017

ADC Development Group



User tools for data replication

- DQ2 client API
- DQ2 command line utilities
- DQ2 end-user tools
- Web-based interface for user's requests
(which is using internally DQ2 user tools)

For replication control uses DDM/DQ2 data transfer monitoring (Dashboard, Panda monitor)



ATLAS Distributed Computing

- Development group, main activities:
 - Evolution of the Distributed Data Management system (DDM)
 - Evolution of the Tier0 system
 - Evolution of the Production system (Simulation and Data processing)
 - Evolution of the distributed analysis system (Ganga and pAthena)
 - Evolution of the monitor system for operations and ATLAS users
- Operations group, main activities:
 - MC Production and data re-processing
 - Operation of Distributed Data Management system - DDM
 - ADC Central Services Expert on Call
 - Operations and Users Support
 - Data Replication Monitoring package for centralized ATLAS subscriptions (FT,CR,FDR)
 - ADCoS (ADC Operations World Wide Shift Team)
 - ADC@P1 (ADC shifts in ATLAS Point1)
 - Data reprocessing



Panda monitor (DDM Request I/F integration)

Datasets - search
Dataset browser
Aborted MC datasets
Panda subscriptions
Datasets Distribution
DDM Req
Req list
AODs
EVNTs
RDOs
Conditions DS
DB Releases
Validation Samples
Functional Tests
ATLAS Data
FDR_Datasets
Reprocessed_Datasets
Sites - see all
BNL BU IU OU SLAC
UC UMICH UTA LCG

“DDM Request”:

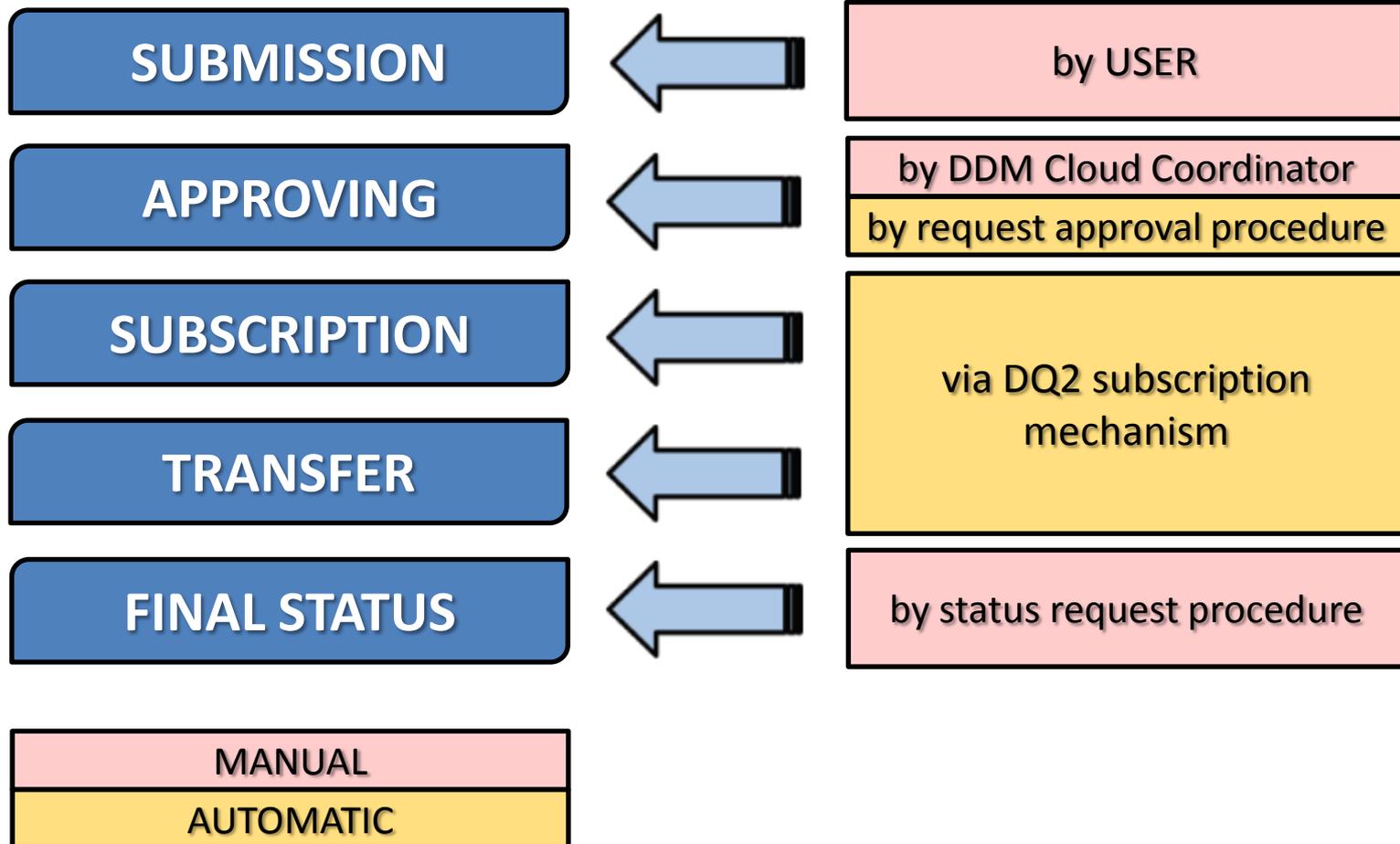
- Request verification and registration
- Approval policy control
- Subscription procedure

“Requests list”:

- List of exists requests, their status



Lifecycle of DDM Transfer Request





“DDM Request”

Subscribe datasets for replication

Windows Internet Explorer
las.bnl.gov:25880/server/pandamon/query?mode=reqsubs0

Production Clouds DDM PandaMover AutoPilot Sites Analysis Physics d

Select Parameters For Subscription Request

[For more Information click here](#)

Request Parameters	Dataset Pattern	<input type="text"/>
	Software Version	0.0.0.0
	Data Format	AOD
	Destination (as in TiersOfAtlas)	<input type="text"/>
Control Parameters	Req Type	1beam
	Data Management Mode	DataTransfer
	Validity (transfer only)	OneTimeCopy
	Priority	Immediate
	Transfer Volume	100 %
	Comments	<input type="text"/>
userid		<input type="text"/>

Continue

For more Information click here

- **Dataset pattern** : Preferably PhysicsShort (Icase sensitive!). Wild cards (*) are allowed (f.e. *Atlas). You can add dataset format to the pattern (PhysicsShort is the 3rd field in dataset name). *If the search is for a specific user, then it is necessary to specify "user" in the beginning of pattern (like "user*pattern")*
- **Software Version** : version of the SW. 0.0.0.0 means any version or there is no version field in dataset name
- **Destination Tier** : as in ToA (Consult [Tiers Of Atlas](#) for details), but it must be **DISK storage** according to policy. Tier-2s are subscribed from the parent Tier-1, if dataset is missing on parent Tier-1, then Tier-2 is subscribed to it as well.
- **Mode** : you can submit request for data staging or data transfer
- **Validity** : **OneTimeCopy** - only existing datasets are subscribed, and subscription is done only once. **Periodic** - the request is checked periodically and datasets matched to the pattern are subscribed. DQ2 option **multiple sources** is used for both modes
- **Transfer Volume** : fraction of dataset (in percent) to be replicated. The particular files within the dataset are selected randomly. The Transfer Volume can be changed only if Validity is 'OneTimeCopy'.
- **Userid** : If you are not registered yet, please proceed to the [registration form](#) to get one
- **To submit request valid userid must be provided**
- **New Request** can be added by cloning the existing request. Click **Req list** , select request you want to clone and click **AddRequest**
- **Approval process** : before subscription is started the request must be approved by Regional DDM Operations. In case of data transfer to Tier-2 the corresponding Tier-1 authorities are contacted to check availability and data transfer policy. Data transfer request for data volume 500+GB must be approved by Physics Coordinator. All **staging** requests must be approved by Physics Coordinator (It's available to define parameters for staging in [limitsList](#) for Physics Coordinator)
- **request can be rejected by Regional DDM Operations**
- **request priority can be changed by Regional DDM Operations**
- **all requests are processed daily**



“DDM Request”

Automatic request approval policy

Requests can be approved automatically by a procedure which uses approval rules (policy).

Policy rules are defined by cloud responsible persons.

If request parameters do not match the rules then requests has to be approved manually by the cloud responsible person via web interface.

The screenshot shows a web browser window titled "Panda monitor and browser - Windows Internet Explorer". The address bar shows the URL: <http://gndu06.usatlas.bnl.gov:25880/server/pandamon/query?mode=defimits0>. The page content includes a navigation menu on the left, a table of sites, a comments section, and a table of policy rules.

Category	Value
NL SITES	Hung-Chun LEE
SPAIN SITES	Xavier Espinal, Andres Pacheco
TAIWAN SITES	Hong-Liang Shih
UK SITES	Frederic Michel BROCHU
US SITES	Kaushik De

Control Parameters for defining policy

Cloud : ATLAS
UserID :

Buttons: EditRule, AddSiteRule

Policy name	Tier	Rules
ATLAS	ALL	Automatic request approval : ALLOWED Cloud period : 7 Time start period : Fri Oct 24 18:41:03 2008 OneTimeCopy Format Limits (nfiles) : AOD:-1,EVGEN:0,HITS:0,RAW:0,RDO:0 File Limits (nfiles) Amount of Sented Files : ALL:0,AOD:0 Periodic Format Limits (nfiles) : AOD:-1,EVGEN:0,HITS:0,RAW:0,RDO:0 File Limits (nfiles) Amount of Sented Files : ALL:0,AOD:0 Users Parameters for users : ALL:10 Users and sended data TIMESTAMP : Fri Oct 10 14:14:21 2008 MODIFIED BY : Mikhail Titov



“Requests list”

Get the list of requests by using filter

DDM Request ID: 1077
 Parameters ("data08_cosmag.00091591*MBTS*CBNT*", "CERN-PROD_DATADISK")
Destination, pattern and SW Release changes have effect for 'AddRequest' ONLY

User: Andreas Hoecker
 Request Time: Thu Oct 30 20:36:56 2008
 Pattern: data08_cosmag.00091591*MBTS*CBNT*
 SW Release: 0 0 0 0
 Destination: CERN-PROD_DATADISK
 Request Type: cosmica
 Data Management mode: DataTransfer
 Validity: OneTimeCopy
 Priority: 0
 Transfer Volume: 100%
 Total datasets: 1
 Request Status: approved
 Transfer Status: subscribed
 ChangeStatus Time: Thu Oct 30 20:40:00 2008
 Approved Time: Thu Oct 30 20:40:00 2008
 Approved by: Andreas Hoecker
 Modification Time: Thu Oct 30 20:40:00 2008
 Modified by: andreas.hoecker@cern.ch
 Comments: For RPC detector

ALL	CANADASITES	CERN	FRANCESITES	FZKSITES
NDGF	NLSITES	SPAINsites	TAIWANSITES	UKSITES

Parameters of filter: ALL Requests for ALL tiers (ALL), Name="*", SW release="any"

Patterns	Datasets	LastRequest	LastApproved	LastSubscribed
193	4971	Oct 31 18:00	Oct 30 20:57	Nov 2 00:20

ReqId	Pattern	Destination	ReqS
1081	user08.PaolaGiovannini.ganga.CBNT.J6TestNewData2000.003*	MPPMU_MCDISK	pending
1080	mc08.105200.T1_McAtNlo_Jimmy.recon.AOD.e357_s462_r541*	NIKHEF-ELPROD_MCDISK	pending
1079	data08*91007*L1Calo*CBNT*	CERN-PROD_DATADISK	do
1078	data08*91007*RPCwBeam*CBNT*	CERN-PROD_DATADISK	subsc
1077	data08_cosmag.00091591*MBTS*CBNT*	CERN-PROD_DATADISK	subsc
1076	data08_cosmag.00091007*L1Calo*CBNT*	CERN-PROD_DATADISK	dele
1075	data08_cos.00091007*RPCwBeam*CBNT*	CERN-PROD_DATADISK	dele
1074	data08_cosmag.00091639*L1Calo*CBNT*	CERN-PROD_DATADISK	do
1073	data08_cosmag.00091639*RPCwBeam*CBNT*	CERN-PROD_DATADISK	tran
1072	data08_cosmag.00090733*L1Calo*CBNT*	CERN-PROD_DATADISK	do

Windows Internet Explorer
 atlas.bnl.gov:25880/server/panda
 browser
 Production Clouds DDM
 Datasets Manag
 Information
 • Only for datasets reg
 • Dataset pattern nam
 SQL query exactly as
 • Queries in *italic* not

Filter for patterns

Cloud: ALL
 Tier: ALL
 SW Release: any
 ReqStatus: any
 Time period: last day last week last month All period

Continue



Links

- *ATLAS Development*
 - <https://twiki.cern.ch/twiki/bin/view/Atlas/ADCProjectActivities>
- *Distributed Data Management*
 - <https://twiki.cern.ch/twiki/bin/view/Atlas/DistributedDataManagement>
- *DQ2 End-User Tool*
 - <https://twiki.cern.ch/twiki/bin/view/Atlas/DDMEndUserTutorial>
- *ADC Operations*
 - <https://twiki.cern.ch/twiki/bin/view/Atlas/DDMOperationsGroup>
- *DDM Transfer Request I/F*
 - <http://panda.atlascomp.org?mode=reqsubs0>



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