

CADC: An Integrated VO-Enabled Framework

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Canadian Astronomy Data Centre

- National facility for open access
- Telescope collections:
 - Multiple missions, facilities and wavelengths
 - Pointed and survey observations
 - 12 telescopes
 - 6 advanced data collections
- Services
 - Archive services
 - Data curation
 - Community projects
- Many international collaborations
- Development and operations hub for CANFAR

The screenshot shows the Canadian Astronomy Data Centre (CADC) website. At the top, there is a blue header with the text "Canadian Astronomy Data Centre" and a red maple leaf logo. To the right of the header is the "Canada" logo. Below the header is a navigation bar with links for "Telescope Data Products", "Advanced Data Products", "Services", "Advanced Search", and "Login". The main content area features a search bar with the text "Search for data by target" and a "Search" button. Below the search bar is a link for "Advanced Search". The main content is organized into three columns: "Telescope Data Products", "Advanced Data Products", and "Services". Each column contains a grid of icons representing various astronomical facilities and data collections. The "Telescope Data Products" column includes icons for Gemini, CFHT, ICMT, HST, BLAST, MOST, DAQ, MACHO, OMM, FUSE, and UKIRT. The "Advanced Data Products" column includes icons for MegaPipe, HLA, IRIS, CGPS, CFHTLS, and WIRwolf. The "Services" column includes icons for Meetings, Community, SSOIS, and CANFAR. At the bottom of the page, there is a footer with a red maple leaf logo and the text "Date modified: 2014-04-28". The footer also contains links for "Terms and conditions", "Transparency", "About us", "News", and "Contact us".

Advanced Search

- Enabled by CAOM (Common Archive Observation Model)
- Single query interface to “all” CADC collections
- With proprietary metadata and data access
- Support VO DAL/DM with views
- Released September 2013

Canadian Astronomy Data Centre

Canada

Telescope Data Products | Advanced Data Products | Services | Advanced Search | Login

CADC Home > Advanced Search

Advanced Search

Search Results Error ADQL Help

Search Reset

Observation Constraints

- ▶ Observation ID
- ▶ P.I. Name
- ▶ Proposal ID
- ▶ Proposal Title
- ▶ Proposal Keywords

Science and Calibration data

Spatial Constraints

- ▶ Target
- ▶ Pixel Scale
- Do Spatial Cutout

Temporal Constraints

- ▶ Observation Date
- ▶ Integration Time
- ▶ Time Span

Spectral Constraints

- ▶ Spectral Coverage
- ▶ Spectral Sampling
- ▶ Bandpass Width
- ▶ Rest-frame Spectral Coverage
- Do Spectral Cutout

Additional Constraints

Band	Collection	Instrument	Filter	Calibration Level	Data Type	Observation Type
All (8)	DAOPLATES	All (9)	All (584)	All (3)	All (2)	All (1)
Gamma-ray	FUSE	ACS	182NM_MBP	(1) Raw Standard	image	object
Infrared	HST	FOC	191NM_MBP_(CIII)	(2) Calibrated	spectrum	
Millimeter	HSTHLA	FOS	270NM_MBP	(3) Product		
Optical	IRIS	HRS	280NM_NBP(MGI1)			
Radio	JCMT	NICMOS	Blank			
UV	MACHO	STIS	CLEAR_FOC/96			
X-ray	OMM	WFPC3	CLEAR_HRC			
Unknown	UKIRT	WFPC	CLEAR_NIC1			
	VGPS	WFPC2	CLEAR_NIC2			

Date modified: 2014-05-01

Terms and conditions | Transparency

News

About us
Our mandate
Acknowledgements

Contact us
Email
Address

Canadian Advanced Network for Astronomical Research

- A science platform
- A cloud ecosystem for data intensive astronomy
- User services
 - Store and share data
 - Create and share VMs
 - Run VMs close to data
 - Interactive for data exploration
 - Persistent for SaaS
 - Batch processing in Virtual Clusters
- Federated research cloud resources
 - Compute Canada
- Integrated:
 - Authentication and authorization
 - Access to telescope data
 - Access to user storage
- In operation since 2011

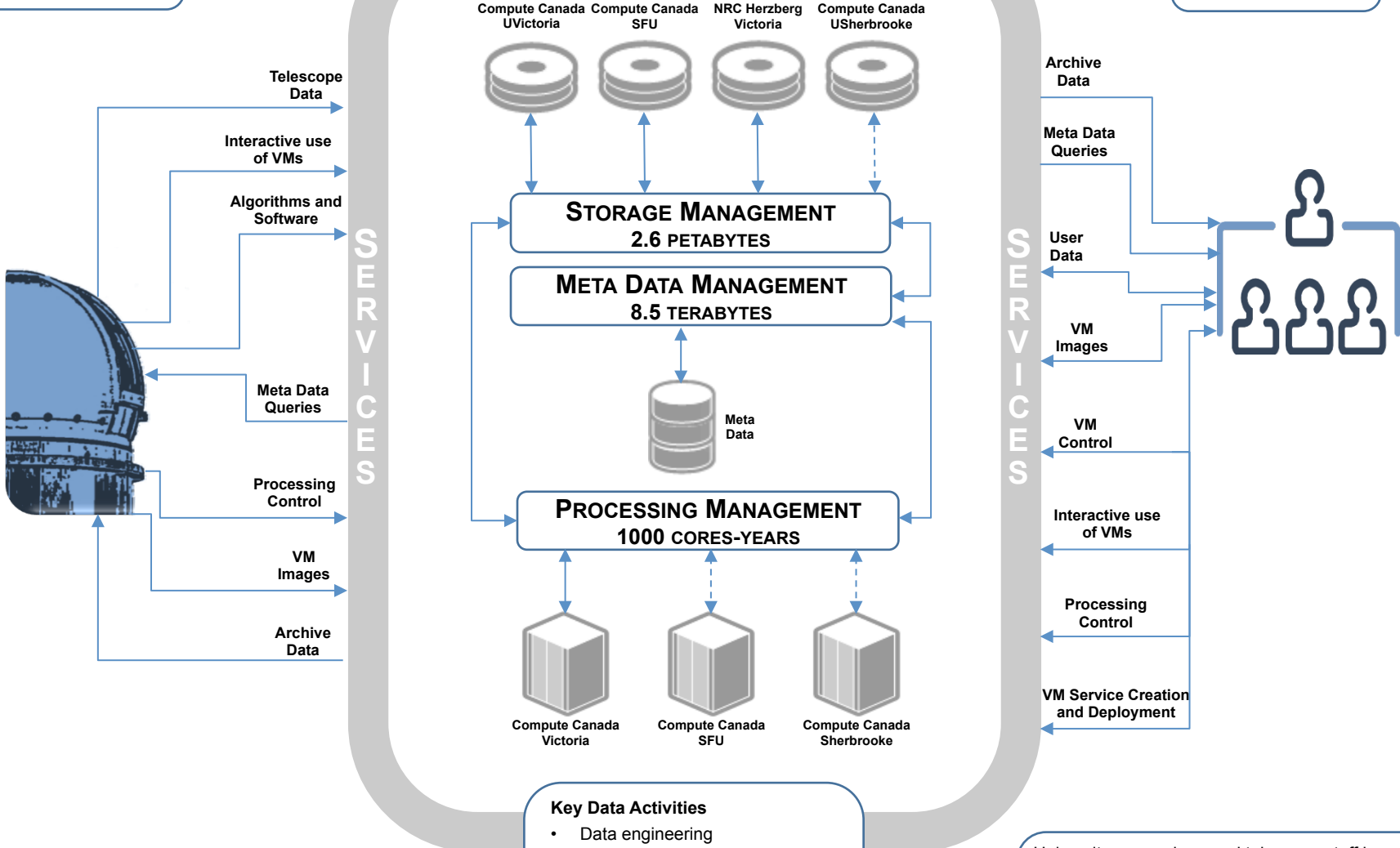
The screenshot displays the CANFAR website interface. At the top, the CANFAR logo is on the left, and navigation links for 'Nodes', 'Resources', 'Documentation', 'About', and 'Register' are on the right. A 'Get started with CANFAR!' button is prominently displayed. The main content area is divided into several service cards:

- OpenStack Cloud:** Run your own virtual machines on Compute Canada cloud. Default is 10 VMs sharing 20 CPUs, 50GB RAM, 1TB disk and 1 public IP. Includes links for User Documentation and Go to service portal.
- Storage:** Manage your own large storage for astronomy data. Default is 500GB, can accommodate up to 100TB per project. Includes links for User Documentation, Reference API, and Go to service portal.
- Group Management:** Manage access permission to your data or data located with the Storage service. Includes links for User Documentation, Reference API, and Go to service portal.
- Digital Object Identifiers:** Set a Digital Object Identifier for your data. Includes links for User Documentation and Go to service portal.
- Batch Processing:** Access large resources for batch processing on the cloud. Up to 16 CPUs, 120GB RAM per VM and up to 2,000 VMs. Includes links for User Documentation, Reference API, and Go to service portal.
- CADC Data Collections:** CADC Data Discovery and Access. Includes links for User Documentation, Reference API, and Go to service portal.

TELESCOPE CLIENT

CADC/CANFAR

UNIVERSITY RESEARCHER CLIENT



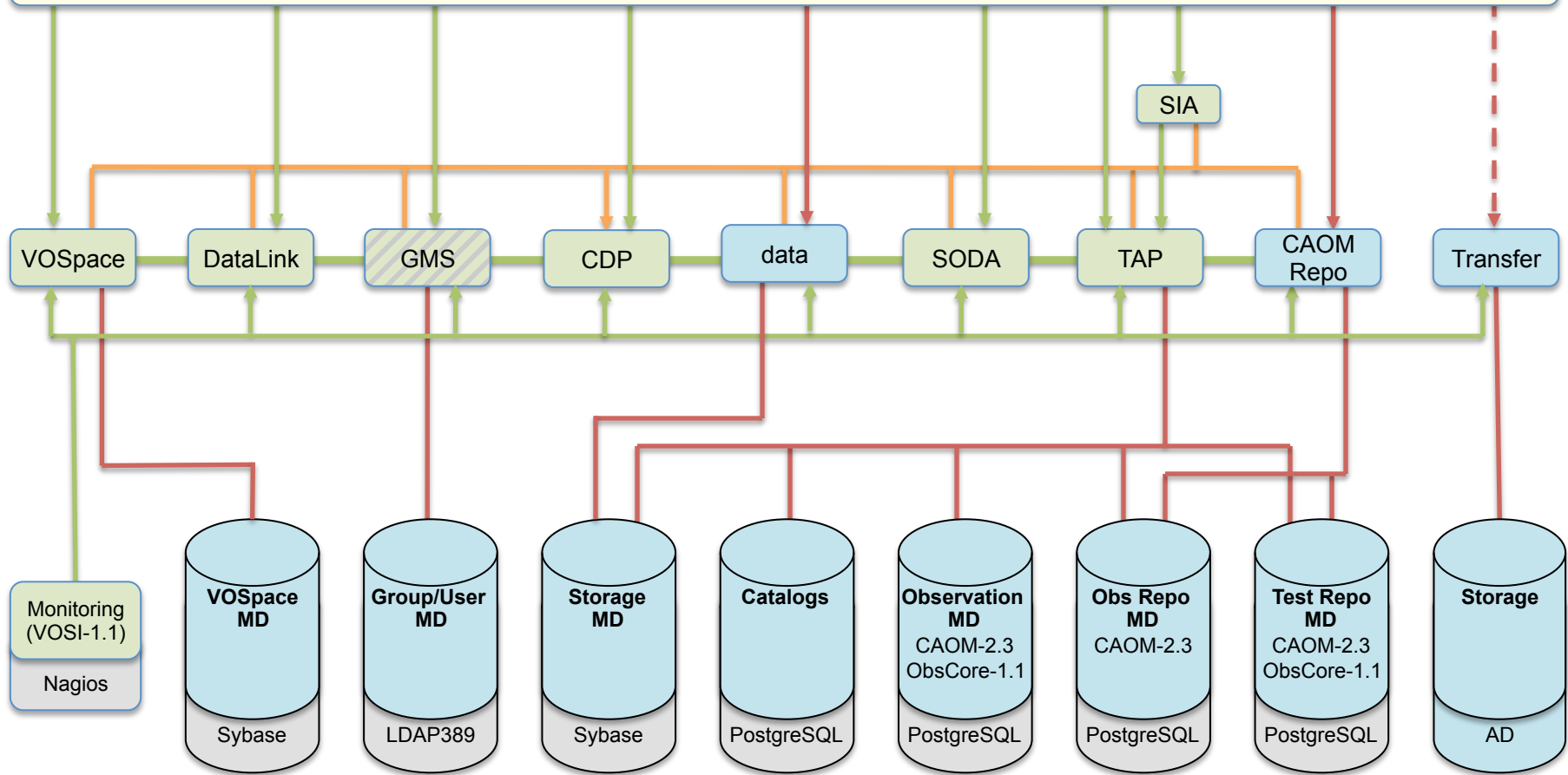
	Data In		Data Out	
	# of files	Terabytes	# of files	Terabytes
Peak per day	2,169,190	8.0	648,093	16.8
Avg per day	130,952	0.4	99,253	2.6

- Key Data Activities**
- Data engineering
 - Operations and user support
 - Software development
 - Software integration
 - Data processing
 - Data management
 - User web services
 - User web interfaces

University researchers and telescope staff have privileges to upload data, create VMs and install science applications, run interactive VM sessions, submit batch processing jobs to VMs, share their VMs, control the life-cycle for their VMs, offer software-as-a-service applications in their VMs.

Definition: VM – Virtual Machine

Users: client applications, browser-based applications, scripts, tools, etc.



Legend

Service API			
Private API			
Internal			

IVOA Standard Draft Standard
 CADC Future Standard
 Off-the-shelf

IVOA Standards

ADQL

CDP

DALI

DataLink

ObsCore

RegistryInterfaces

SIA

SimpleDALRegExt

SODA

SSO

TAP

TAPRegExt

UWS

VODataService

VOResource

VOSI

VOSpace

VOTable

VO Discovery and Access

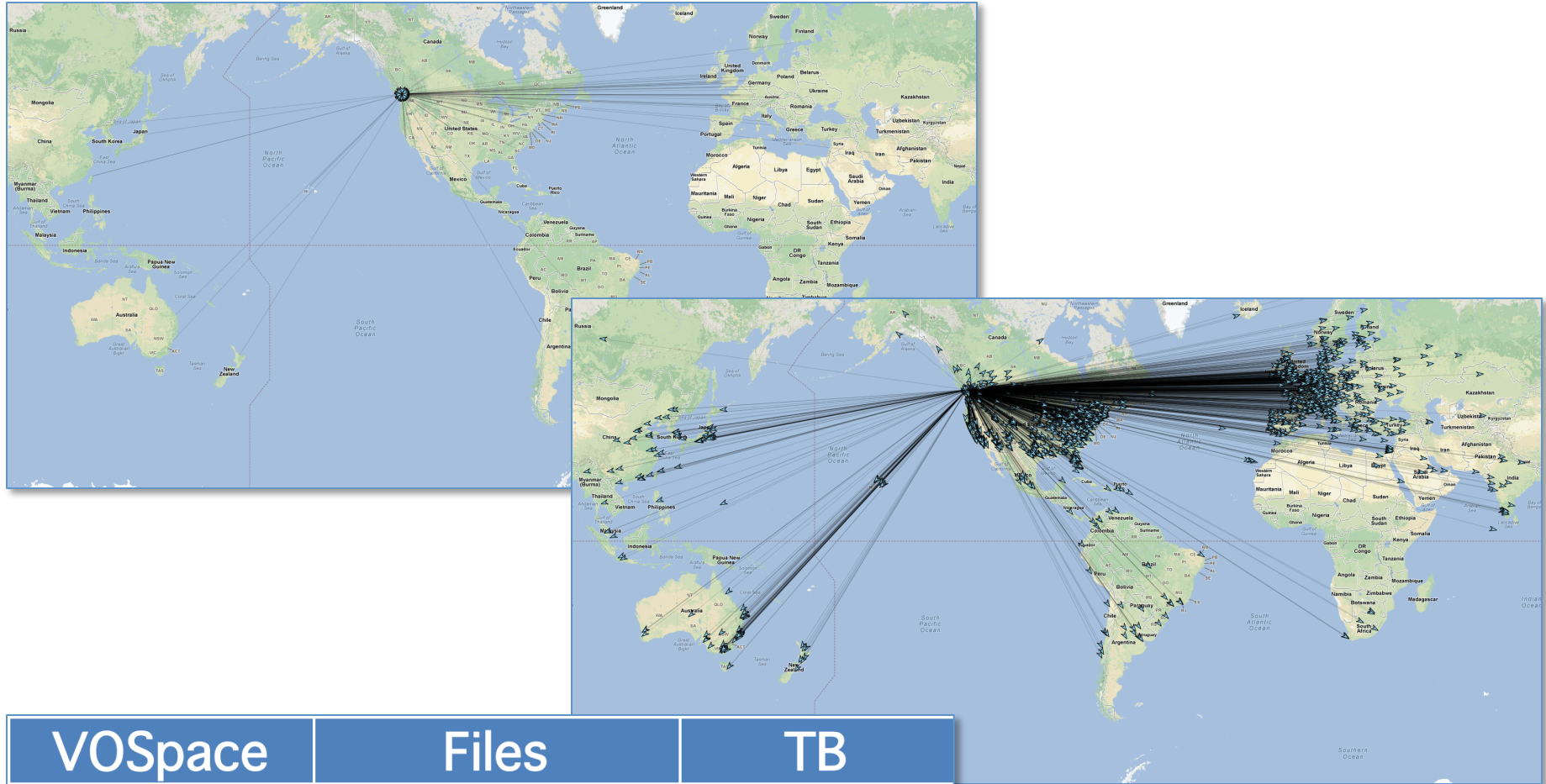
- The VO models are views on CAOM:
 - **ObsCore**: observation.intent = "science" and plane.calibrationLevel is not null
 - **SIAv2**: ObsCore and plane.dataProductType in ('image', 'cube')
 - **SIAv1**: observation.intent='science' and plane.calibrationLevel > 1 and plane.dataProductType = 'image' and artifact.productType = 'science'

Data Model	All Collections	CFHT	HST	JCMT	HSTHLA	OMM
CAOM	13,118,527	3,081,962	2,755,294	1,529,584	885,869	482,072
ObsCore	9,043,794	2,063,268	1,883,121	1,341,637	885,869	385,644
SIAv2	6,167,429	1,836,478	1,587,047	488,155	885,869	385,644
SIAv1	3,871,814	904,394	1,252,961	270,429	959,220	81

Usage Numbers 2017

Service	Kibana query	2017	Average per day
CDP	service:"cred_ws" AND phase:"END"	128,564,537	4,147,243
TAP	service:"tap_ws" AND phase:"END"	9,611,478	310,048
UWS	method:"UWS"	345,376,526	11,141,178
SIA	service:"sia_ws" AND "/sia/query" AND phase:"END"	33,744	1,089
VOSpace	service:"vospace_ws" AND phase:"END"	269,941,400	8,707,787
DataLink	service:"caom2ops_ws" AND datapath:"/caom2ops/datalink"	2,003,966	64,644
SODA	msg:"cutout" AND msg:"http" AND !msg:"Cutout request."	804,229	25,943
GMS	(service:"ac_ws" OR service:"gms_ws") AND phase:"END"	1,153,129,592	37,197,729

Usage Numbers 2017



VOSpace	Files	TB
PUT	13,761,777	141.8
GET	92,865,705	789.0

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- Integrated group management for access control
 - Science platform, proprietary access, operations

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- Scalability
 - Multiple web and application servers; still cannot handle some peaks in usage
- Reliability – 92.5, 96.2, 99.9%?
 - Multiple database servers replicated or mirrored
 - Research cloud resource reliability
 - Many moving parts; many areas of responsibility

Center	Services		Fraction of successful tests: year ending end of			6 months ending
	Tested	Registered	April 2016	April 2017	April 2018	April 2018
CADC	4	6	95.3	98.1	96.2	92.5

Operational Issues

- Application support for CADC services
 - SIAv1 and SIAv2 services registered

```
<capability standardID="ivo://ivoa.net/std/SIA">  
  <interface role="std" version="1.0" xsi:type="vs:ParamHTTP">  
    <accessURL>http://www.cadc-ccda.hia-ihp.nrc-cnrc.gc.ca/sia/query</accessURL> ...
```

```
<capability standardID="ivo://ivoa.net/std/SIA#query-2.0">  
  <interface role="std" version="2.0" xsi:type="vs:ParamHTTP">  
    <accessURL>http://www.cadc-ccda.hia-ihp.nrc-cnrc.gc.ca/sia/v2query</accessURL>...
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- Authorized access to data and services
 - Supporting securityMethod
 - /tap/auth-sync, /tap/x509-sync

The background is a solid blue color with several abstract geometric elements. A large, dark blue circle is partially visible at the top. A lighter blue, semi-transparent circle is positioned in the lower-left quadrant. On the right side, there is a complex pattern of thin, light blue lines that form a grid of overlapping circles, creating a mesh-like effect. A thick, medium-blue arc is also visible in the lower-right area.

Questions?