

CloudTurbine

Stream Sharing

NASA Phase II SBIR
Contract: NNX16CD06C

Project Review
August 15-16 2017

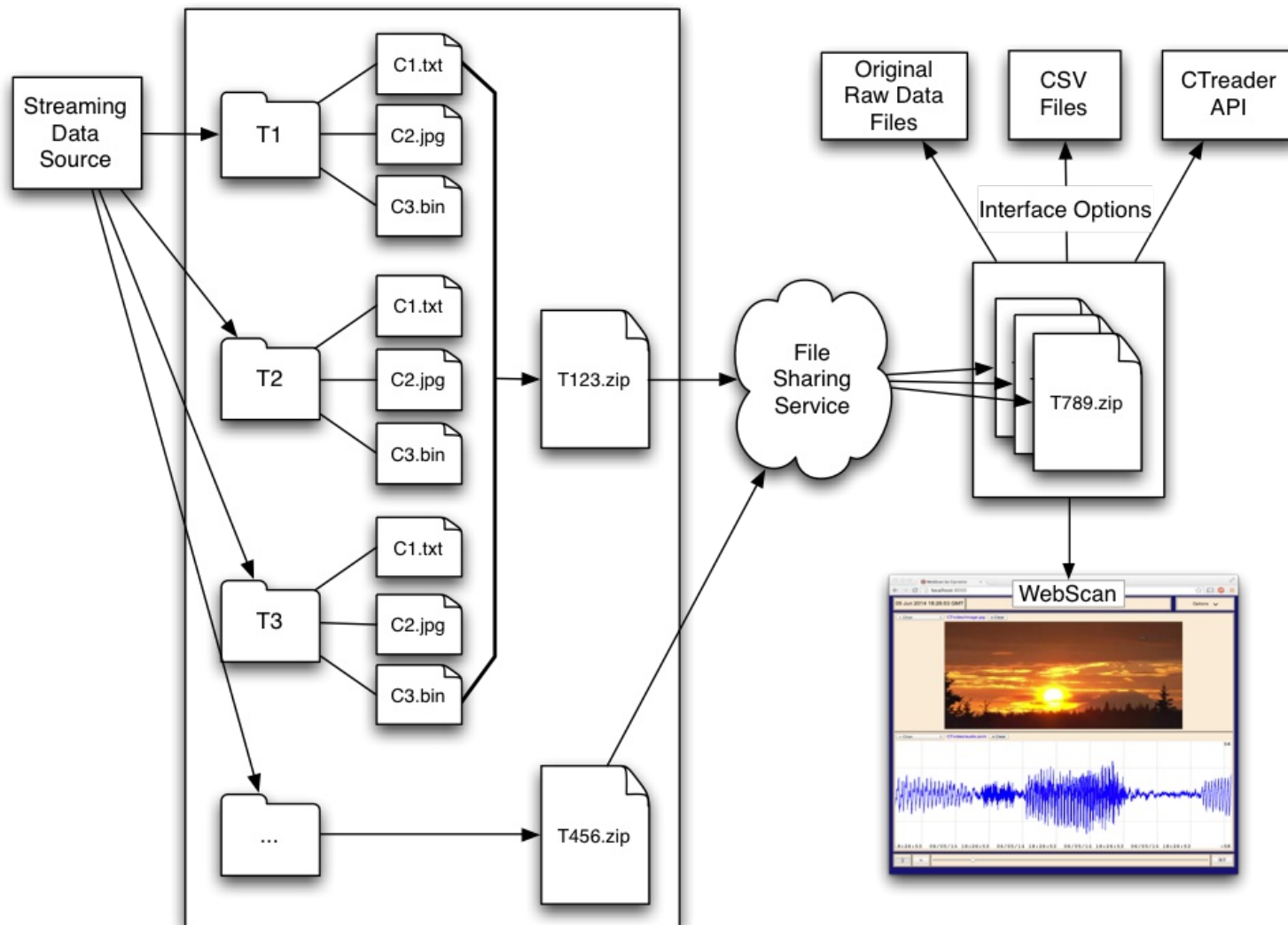
Matt Miller, Cycronix
John Wilson, Erigo

CloudTurbine Overview

“Stream Sharing”

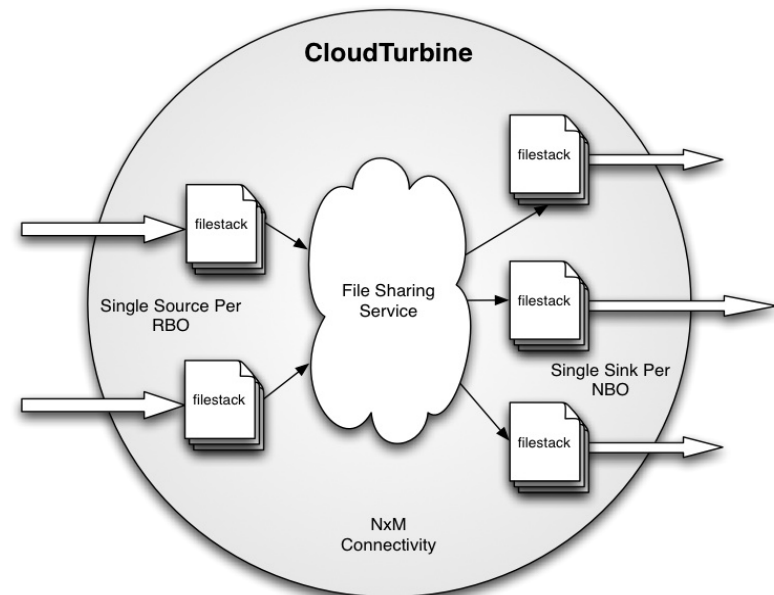
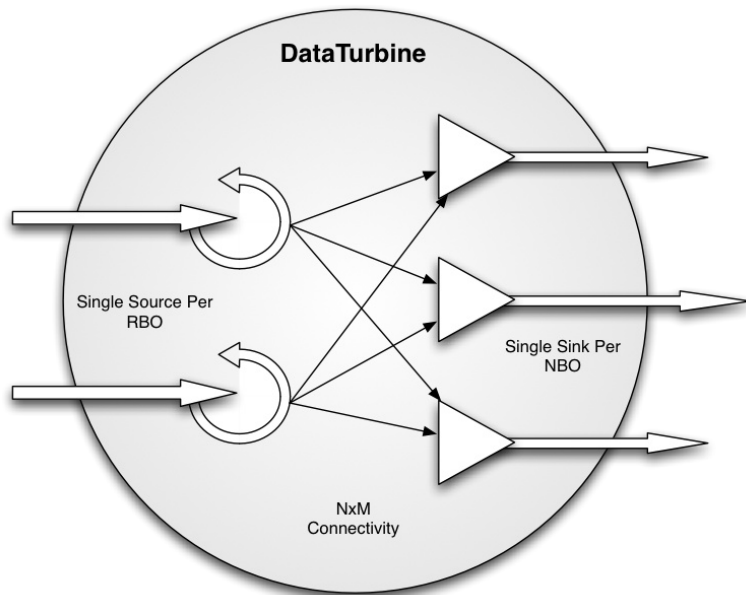
<https://www.cloudturbine.com>

<https://www.cloudturbine.com/ct-white-paper/>



CloudTurbine Vs DataTurbine

- DataTurbine: proprietary central server, custom archives
 - Low-latency: <1ms versus 10ms – 1s latency
- CloudTurbine: third-party file sharing services, user-format files
 - Transparent - self-describing file format
 - Portable - your choice of file sharing service
 - Robust - no server to run out of memory or crash
 - Simple - no server to setup and administer
 - Resilient - non-volatile files, automatic mirrors

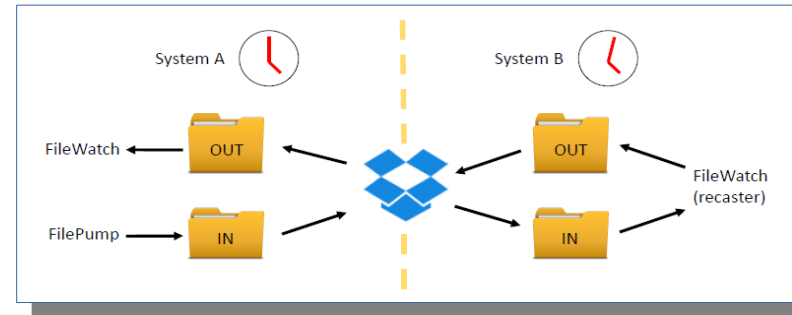


Phase II Tasks

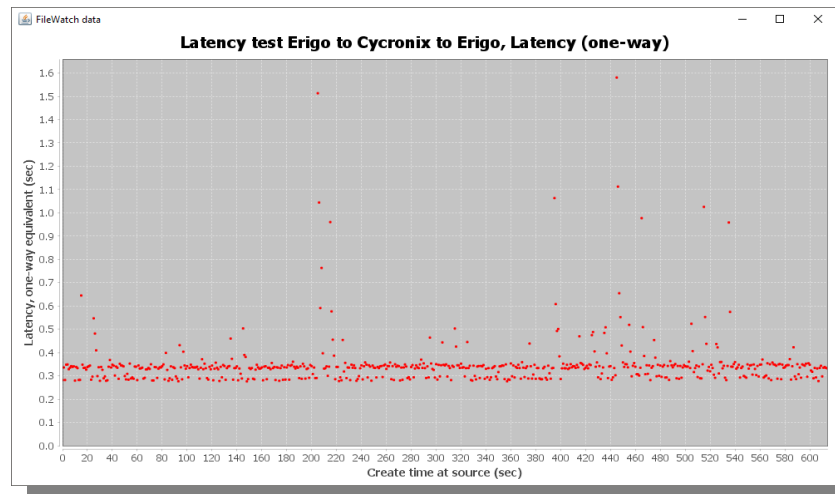
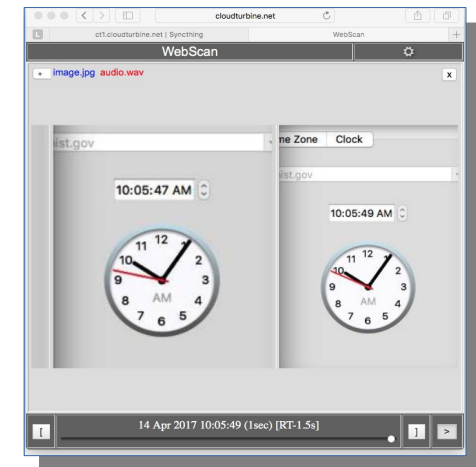
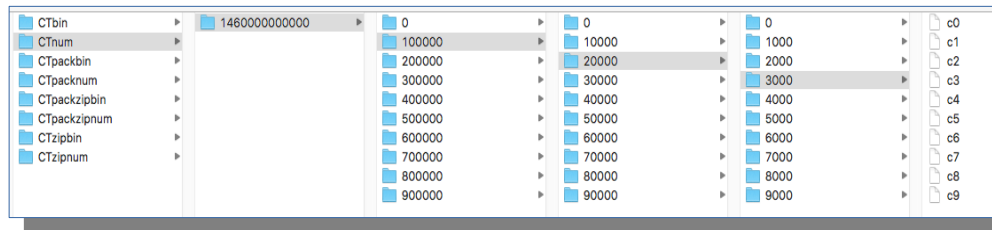
- Task 1: Assess and QA
- Task 2: Software Development
- Task 3 Web Portal
- Task 4: Support and Doc
- Task 5: Data Security
- Task 6: NASA Applications
- Task 7: Third Party Apps
- Task 8: Project Management

Task 1: Assess and QA

FilePump



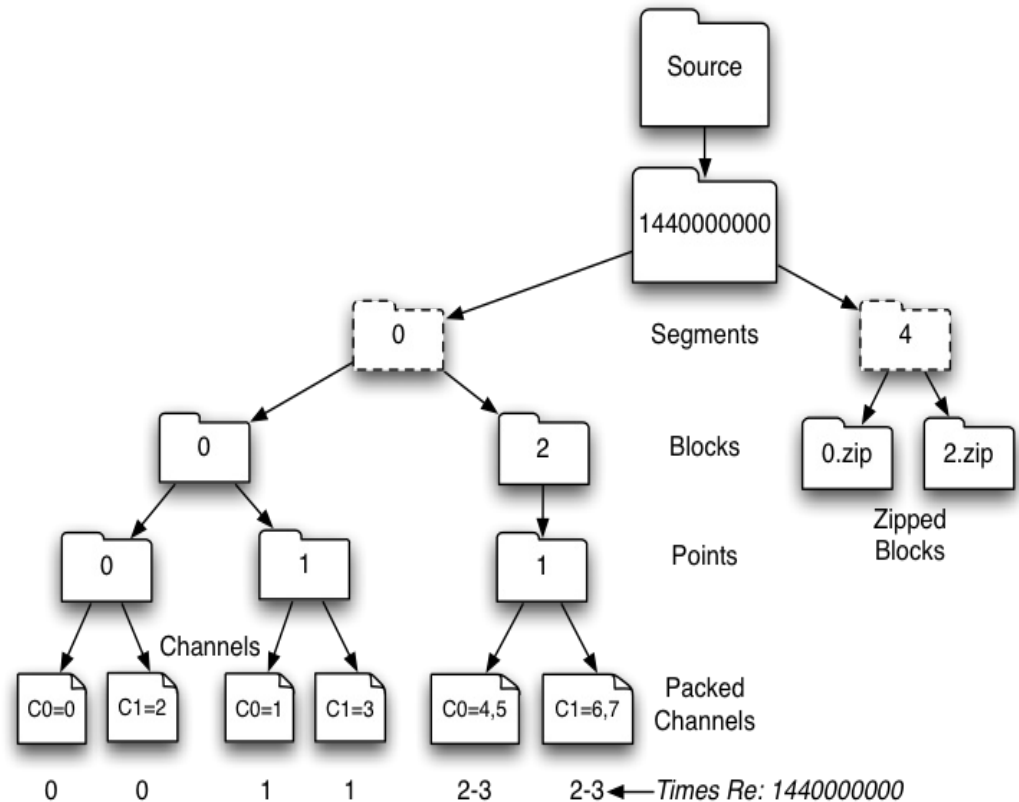
CTblocktest



Round-trip CTstream

Task 2: Software Development

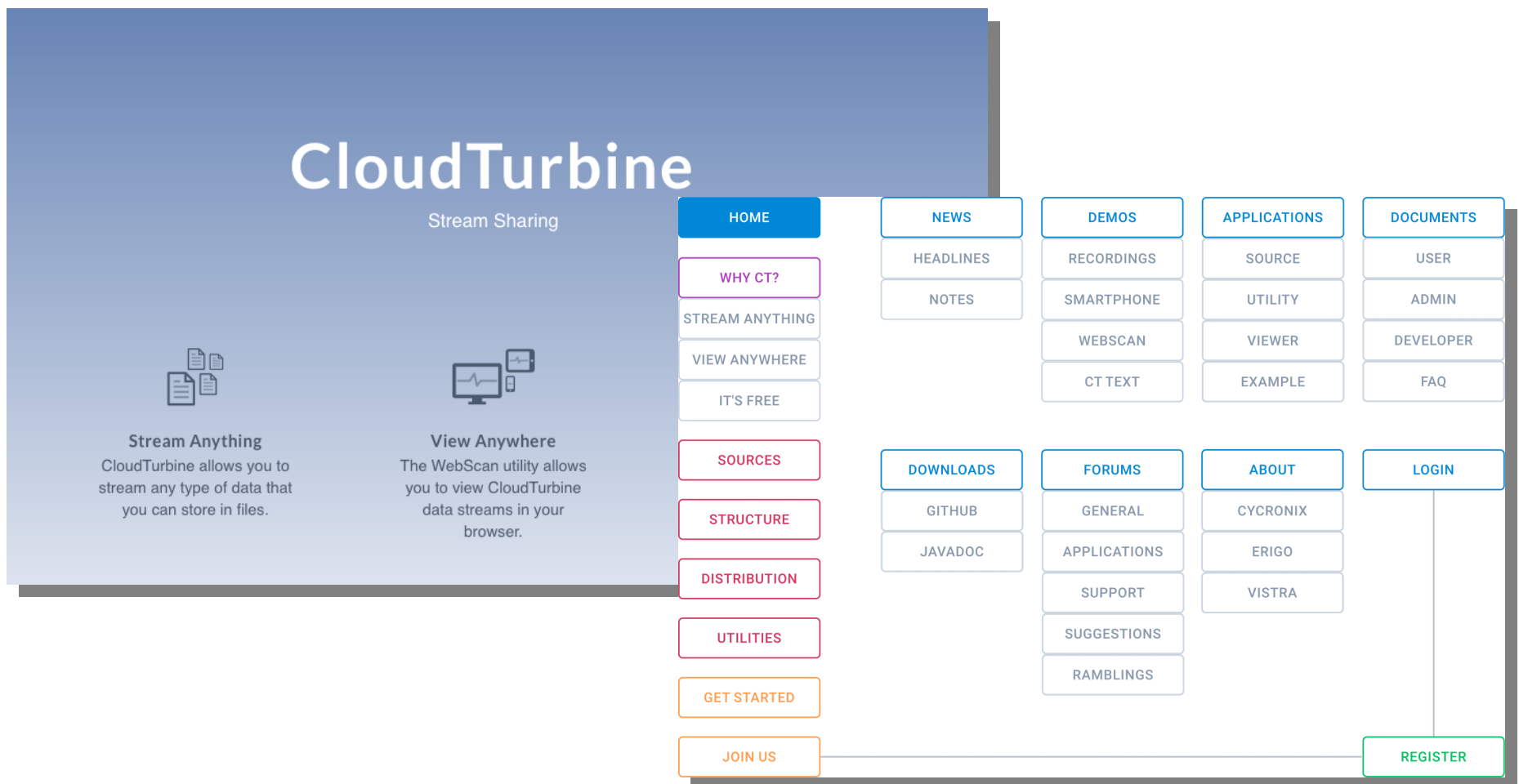
- Modular Software:
 - CT API Library
 - CTreader, CTwriter
 - CT apps
 - CTweb, CTstream, CTadmin, ...
- Refinement:
 - Relative Timestamps
 - Code Optimization



Task 3: Web Portal

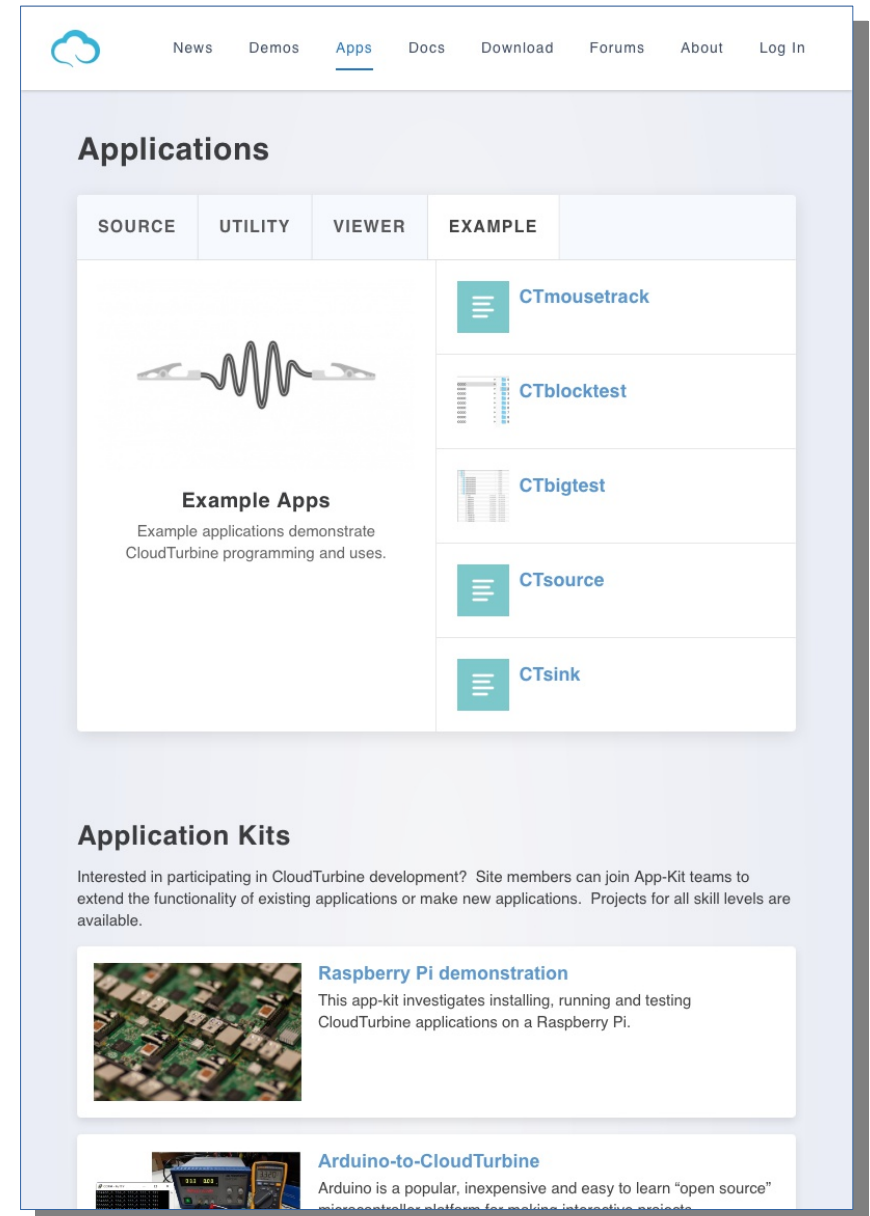
<http://www.cloudturbine.com>

“If you build it, they will come”



Task 4: Support and Doc

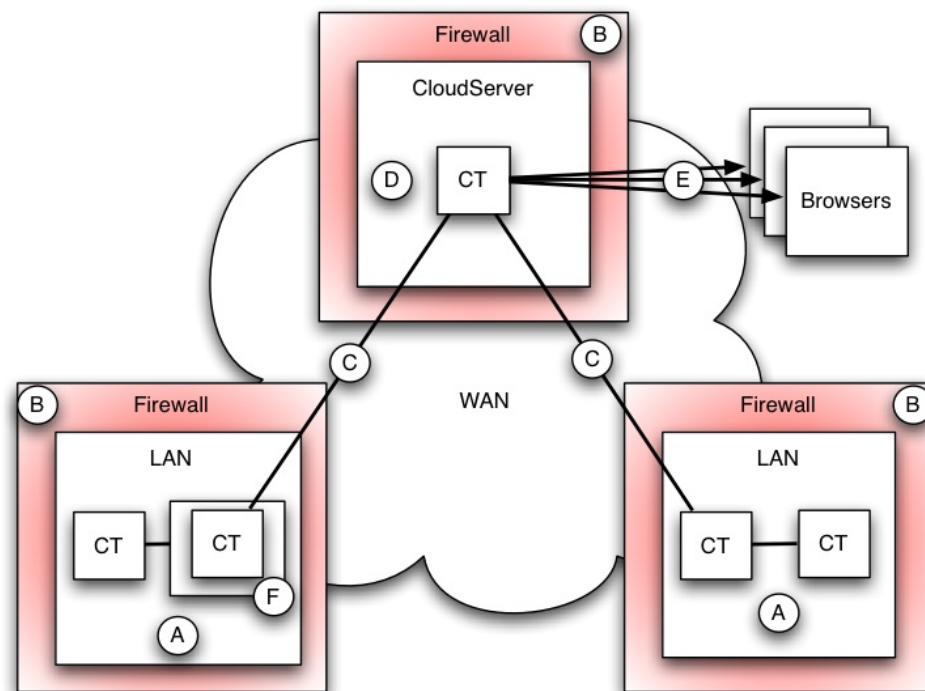
- Web portal
- Intro / Landing Page
- Demos
- Apps / “App-Kits”
- Docs
- Download
- Forums
- Users
 - Register, Login, Roles



Task 5: Data Security

File Security

- A) Firewalls secure each site including connection authorization and authentication.
- B) Internet (WAN), data secured in-flight with TLS, SSL, VPN; via file-sharing service.
- C) Trusted cloud service. Data at rest unencrypted (enabling path (E)), or encrypted at source (A).
- D) Distributed browser access, secured in-flight with HTTPS, site certificates, password access.
- E) Local Area Network, data inside secure local network. Optional data encryption at source.
- F) Locally encrypting file layer; limits interoperability



End to end encryption

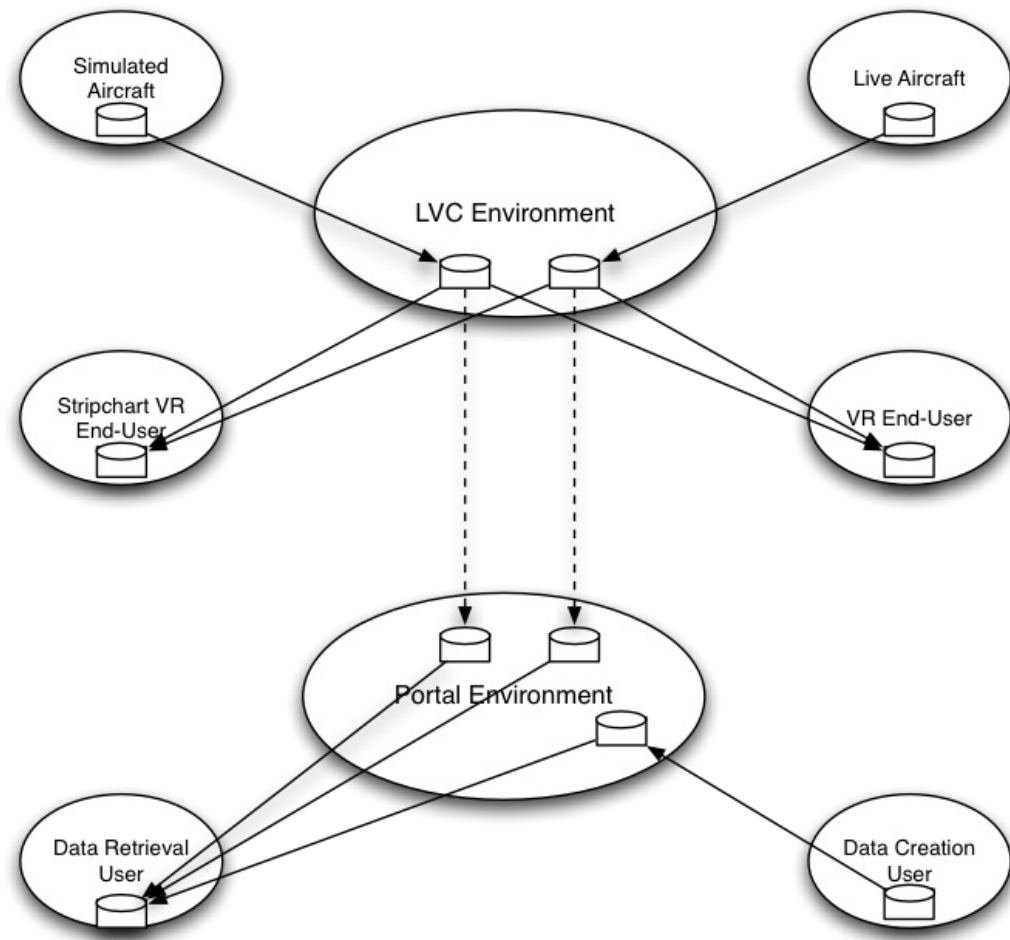
- Open source java.crypto, AES encryption
- Data encrypted in memory by CT API
- Only data owner knows password/key
- Layer on top of OS/File/Cloud security

Central data server - *Not*

- CT leverages and relies upon security via file and file sharing services
- “CTweb” HTTP/S browser access with simple password security, designed to be data portal to local files

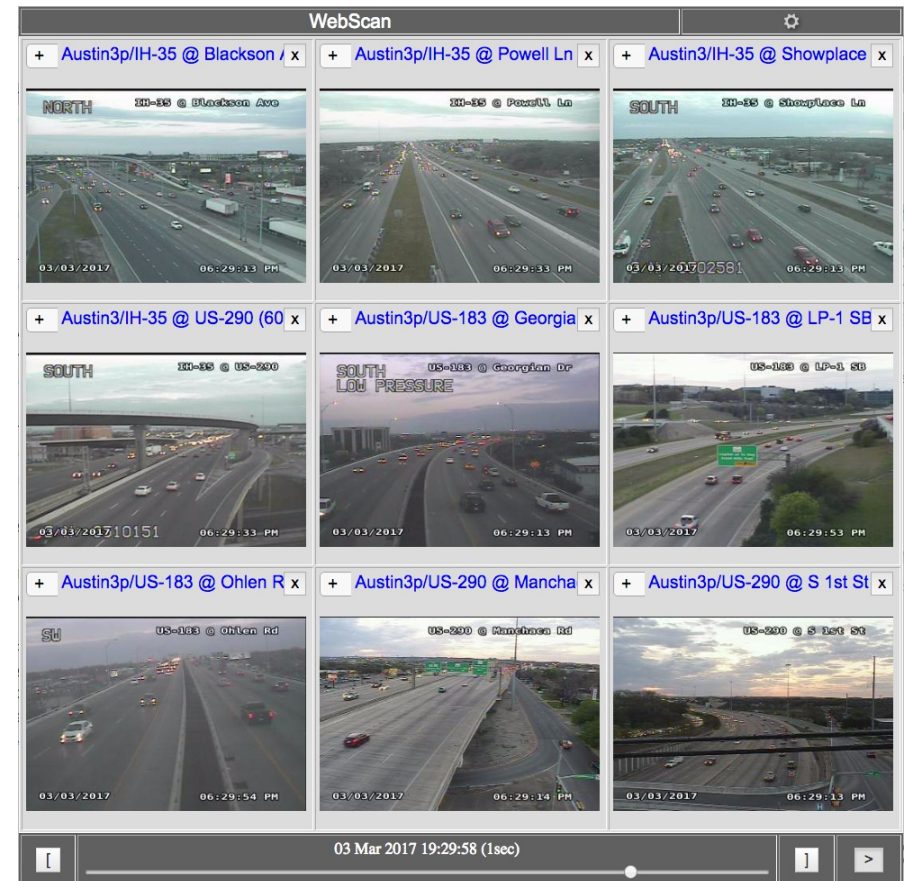
Task 6: NASA Applications

- Airvolt Study
- CT for LVC
- OpenMCT
- HDF5 / FDAS
- Unity VR
 - ATTRACTOR



Task 7: Third Party Apps

- Erigo TiStop Monitor
- Transcend Collaborate
- Texas Traffic Monitor
- Engage communities:
 - Unity
 - Synching
- App Kits:
 - Arduino, RaspPi, Android



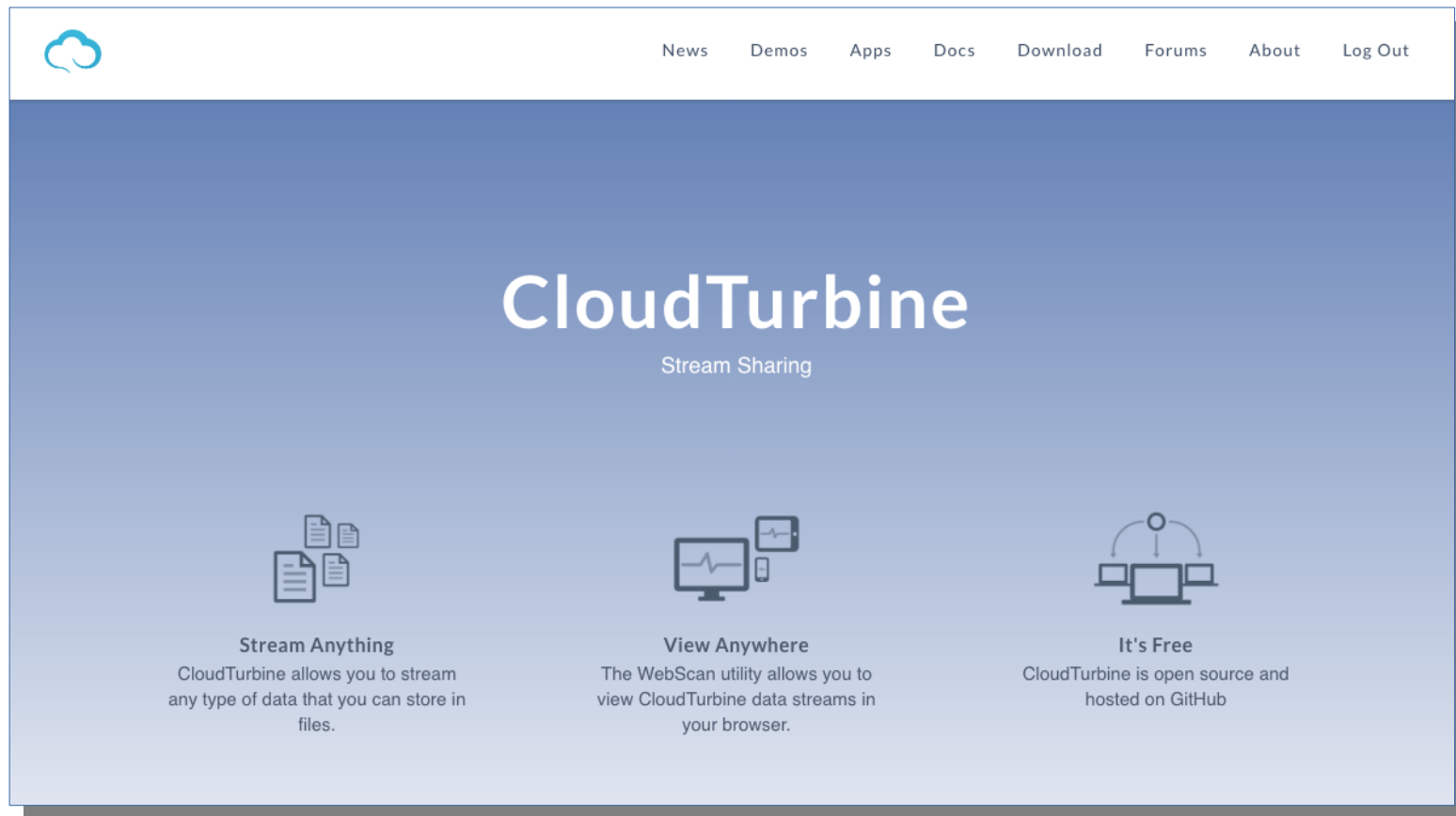
Task 8: Project Management

- Tasks / Planning / Schedule
- Project documents:
 - Reports
 - Website
 - GIT Portal

Table 1. Phase II Schedule.								
	Quarter After Award							
Tasks	1	2	3	4	5	6	7	8
1. Assess requirements, QA								
2. Develop and refine software								
3. CloudTurbine Web Portal								
Prototype		◆						
Beta				◆				
Production						◆		
4. Community support & documentation								
5. Data Security								
6. NASA Applications								
7. Non-Government Applications								
8. Project Management								
AFRC Site Visit (TBD)			◆		◆		◆	
Progress Reports	◆	◆	◆	◆	◆	◆	◆	
Final Report								◆

Website Tour

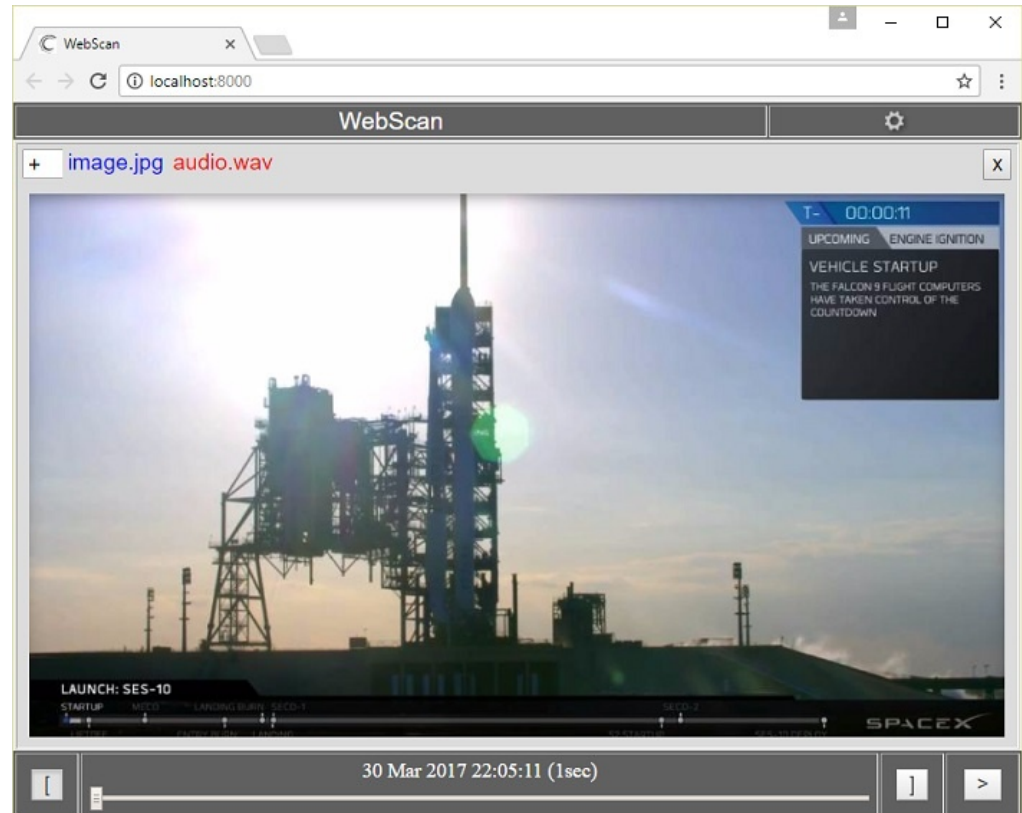
<https://www.cloudturbine.com>



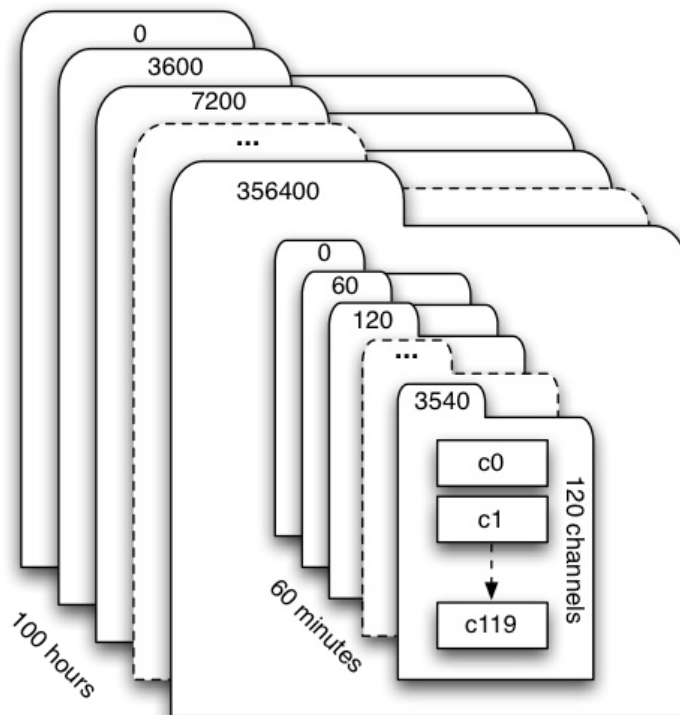
CT Recorded Data Demos

<http://www.cloudturbine.com/category/demos/>

- CT intro video
- SpaceX launch
- Texas traffic cams
- High speed welding
- CTtext demo
- Airvolt study

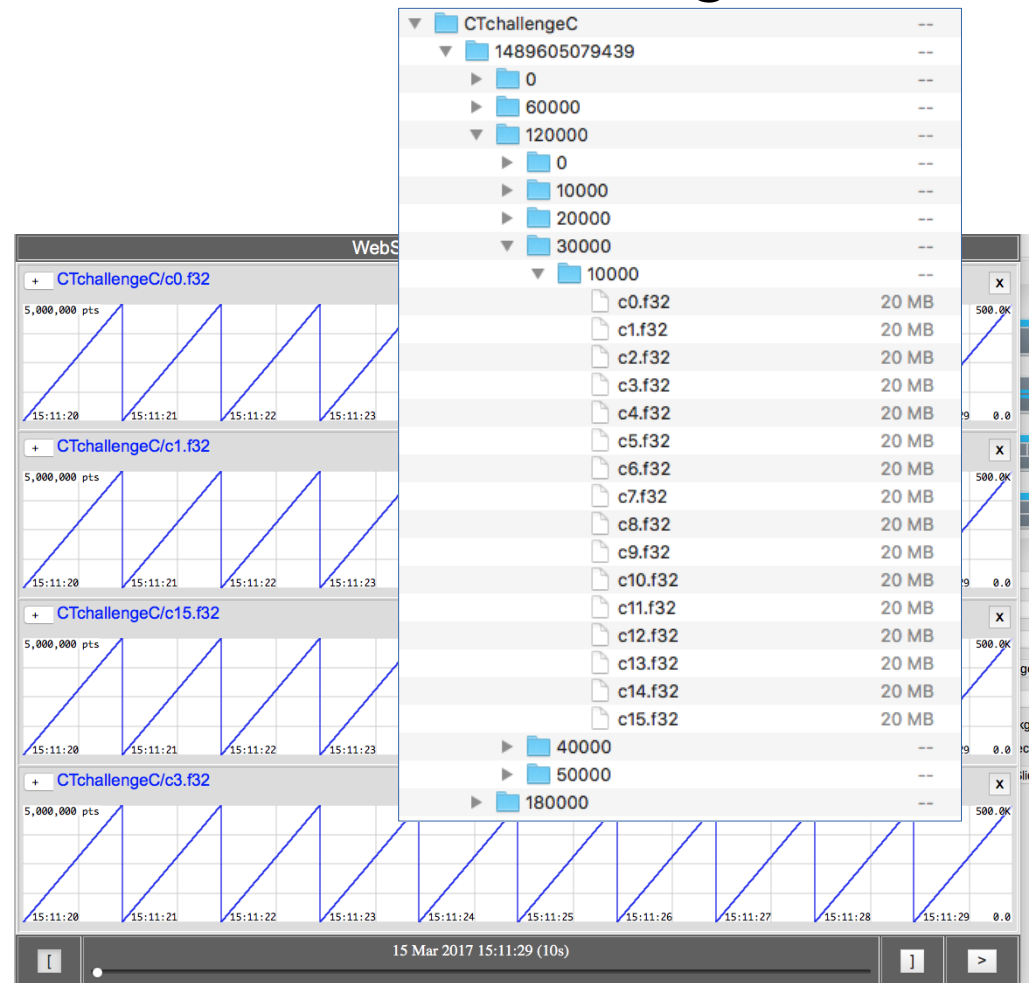


AirVolt Large-Volume Data Study



Demo 1: 120 Chan @ 40Ksa/sec
(4.8Msa/sec)

Demo 2: 16 Chan @ 500Ksa/sec



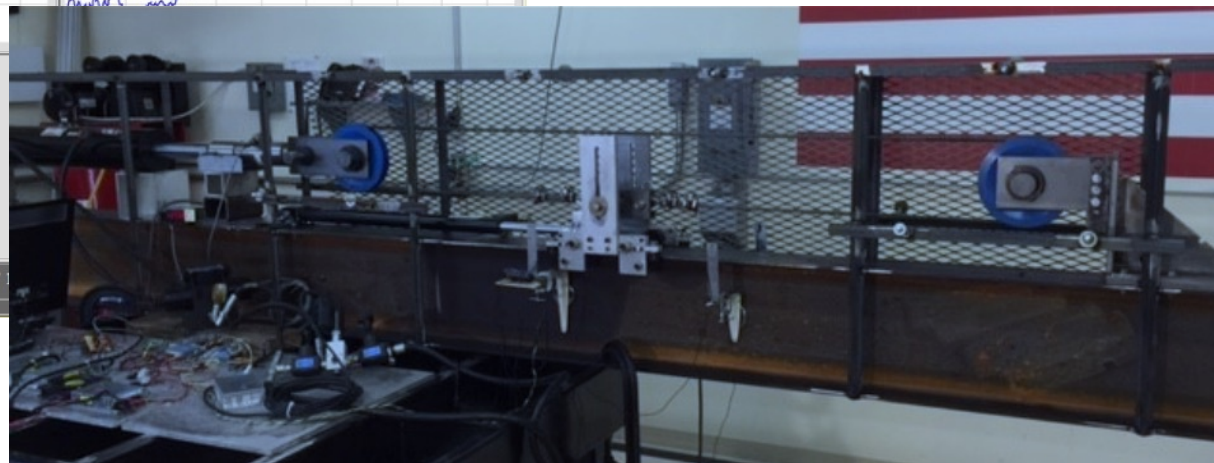
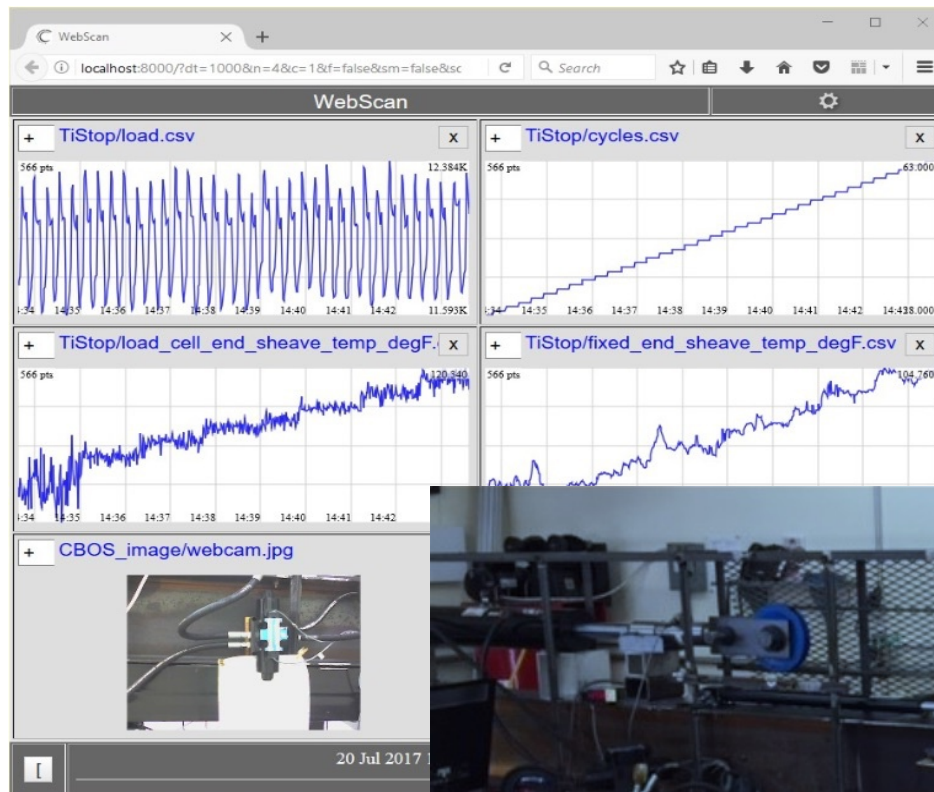
WebScan Display 10sec of 4 chan @ 500Ksa/sec
(2Mpts per update)

CT Applications/Demos

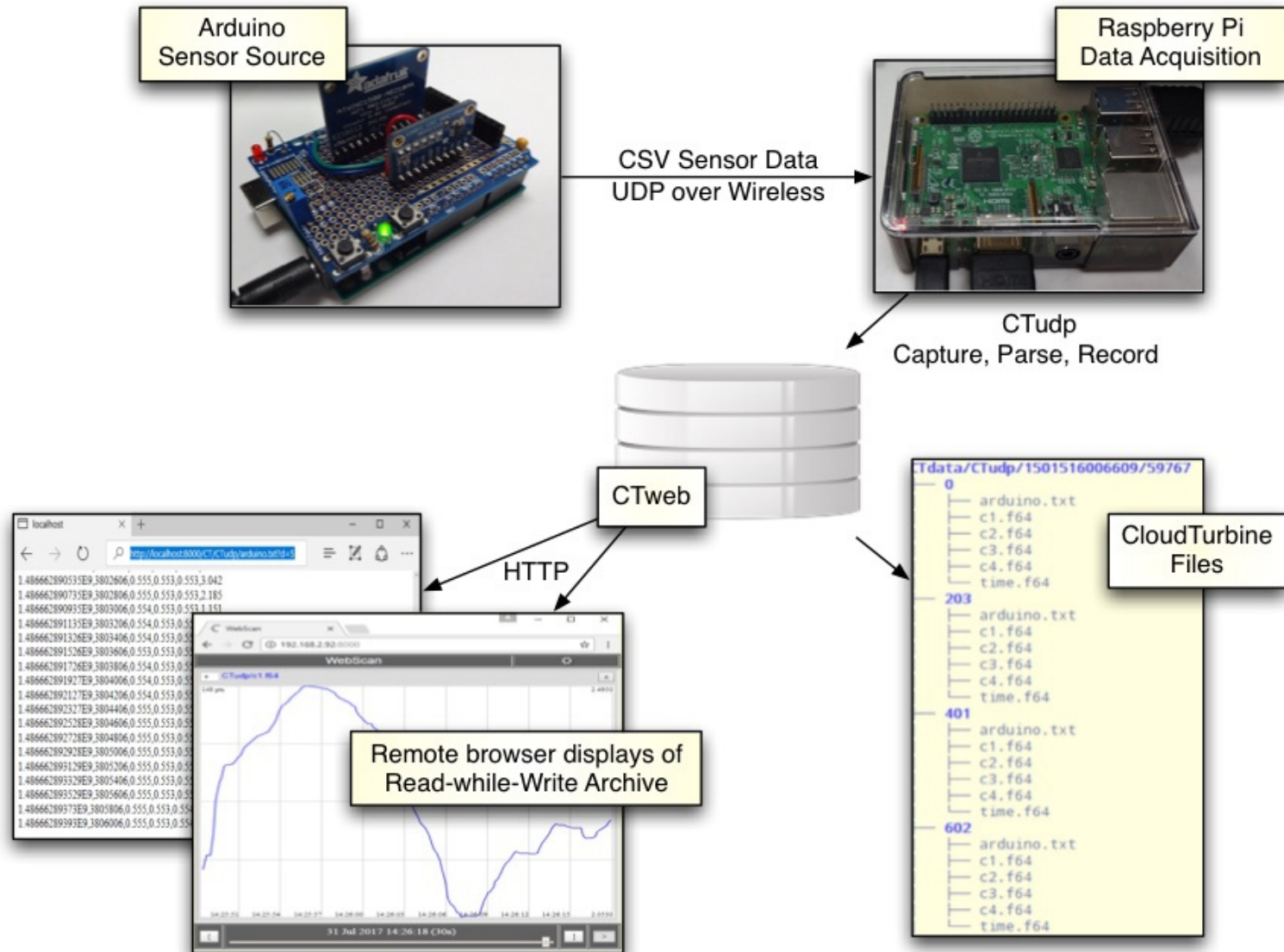
- Erigo TiStop Endurance Test
- Arduino/RP App-Kit
- CT to Open MCT live streaming
- HDF5 to CT data export
- CT to Unity VR live streaming
- CTstream audio, video, screencap, chat
 - CT streaming over Syncthing

Erigo Ti Cable Test

Fatigue test light-weight (Ti) aircraft carrier arresting gear cable

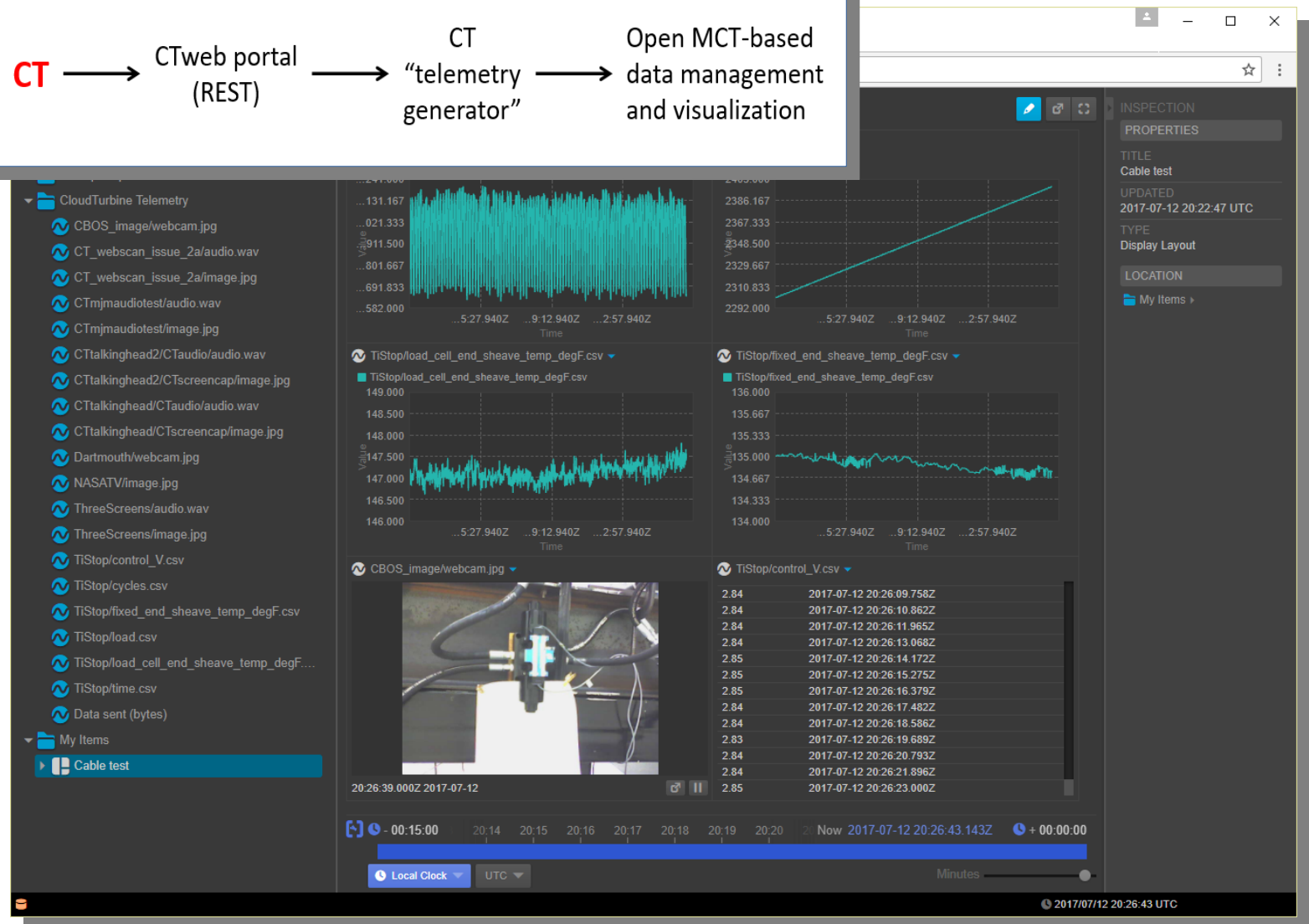
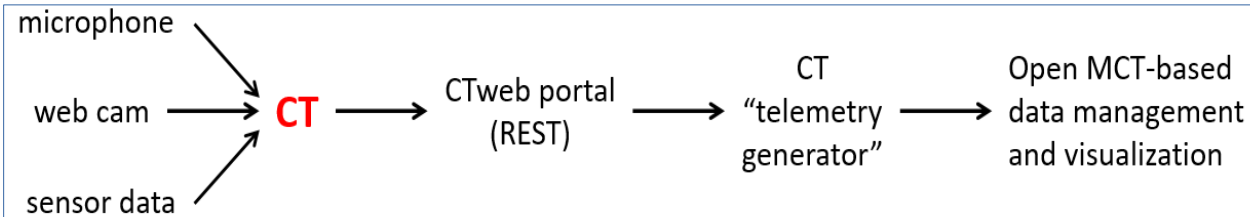


Arduino/RP App-Kit



CloudTurbine / OpenMCT

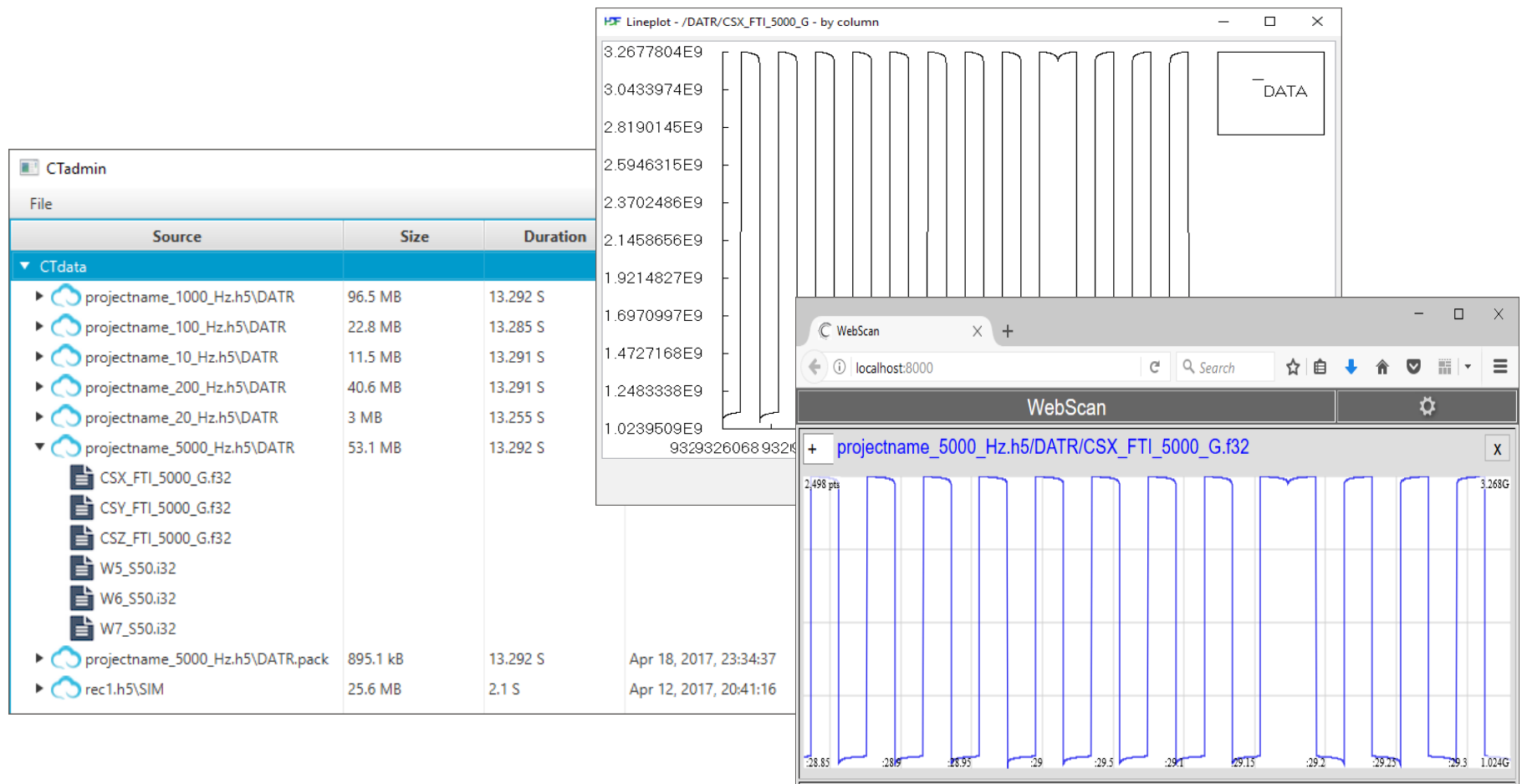
<https://nasa.github.io/openmct/>



CloudTurbine / HDF5

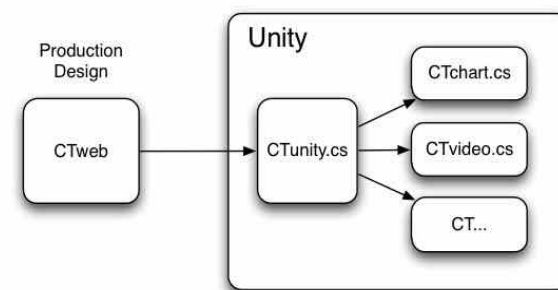
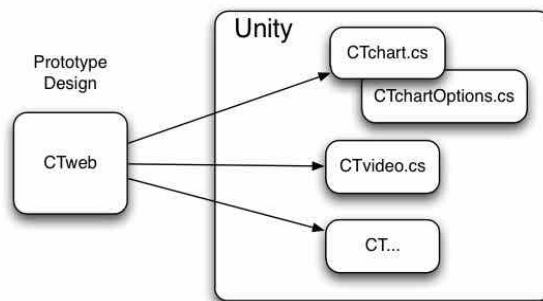
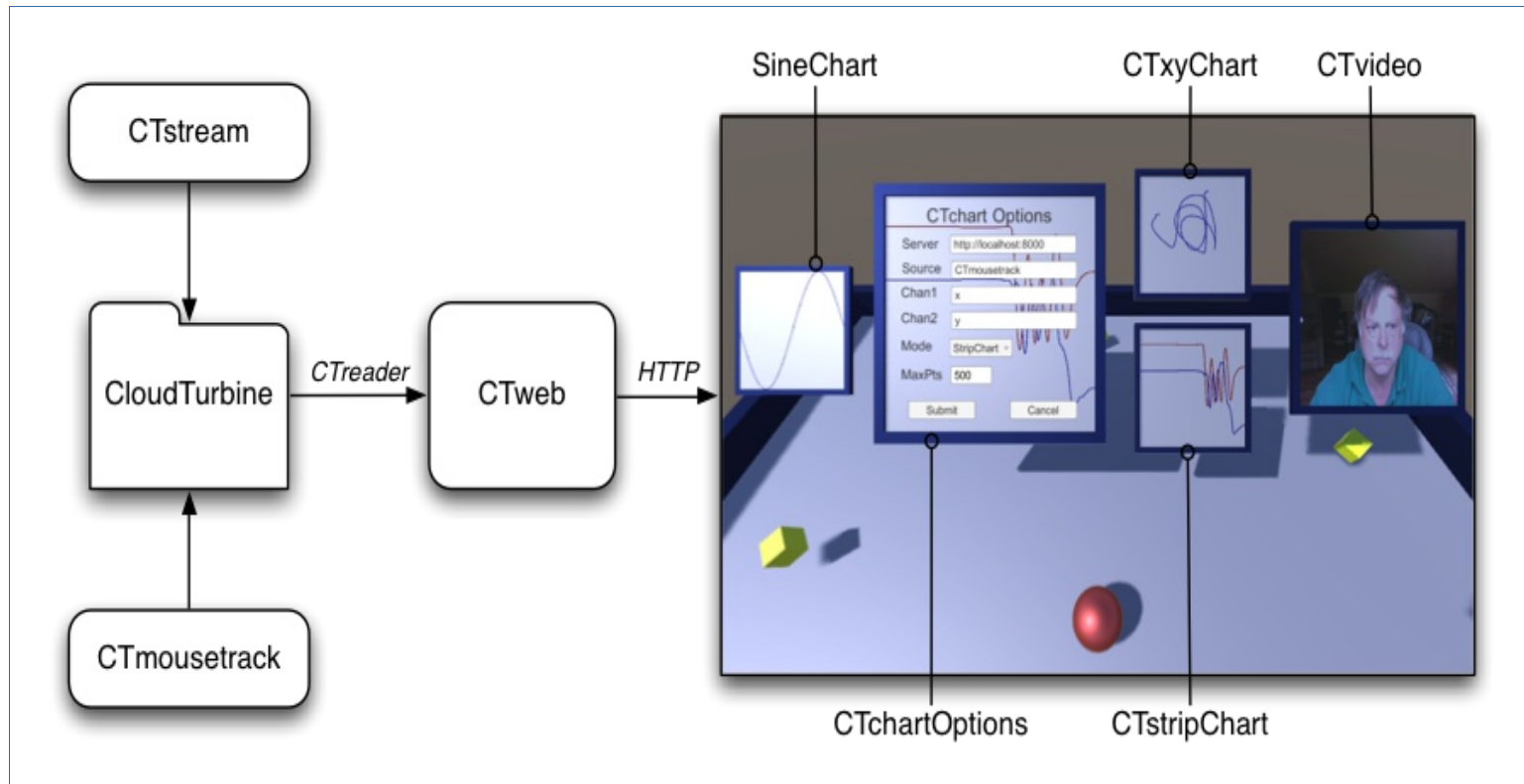
<https://www.hdfgroup.org>

Export HDF5 Data To CloudTurbine



CloudTurbine / Unity

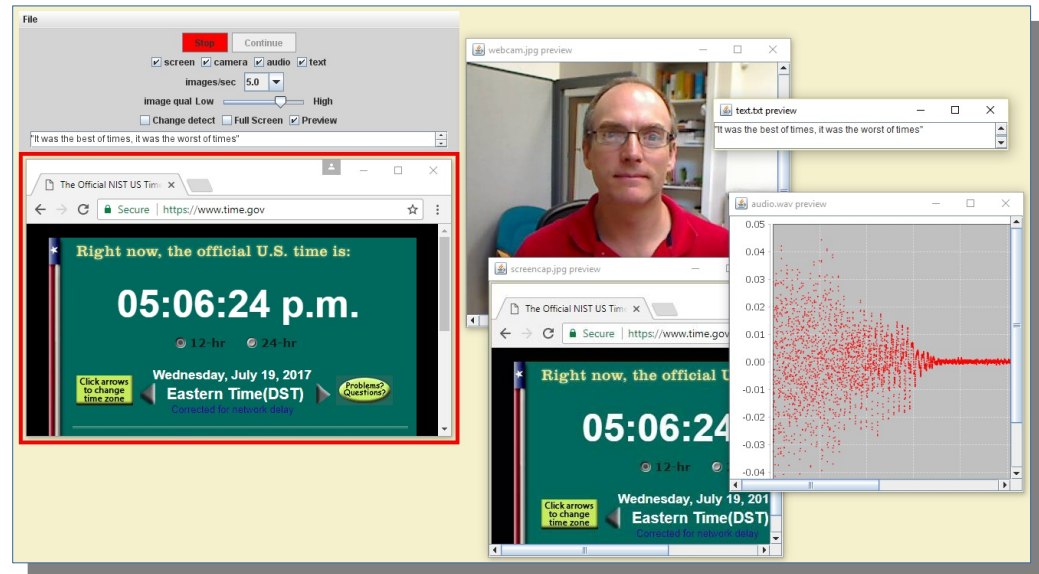
“VR Stream Sharing”



CTstream Demo

- CT streaming data source:

- Screencap
- Webcam video
- Audio
- Text (chat)



- “Skype” demo over Syncthing

Looking Forward

- NASA Applications and Issues
- Balance of Phase II
- Phase II E/X, Phase III
- On going community

Phase II Contracts with Phase II E/X Submission Period Open			
Contract Details	Phase II-E	Phase II-X	Due Date
NNX16CD06C (SBIR 2015-II) (AFRC) A2.01-9858 CloudTurbine: Streaming Data via Cloud File Sharing	Status: Not Yet Started Action: Start	Status: Not Yet Started Action: Start	02/23/18