SciDB

www.scidb.org

SciDB and the EPICS Channel Archiver

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a passion for discovery

U.S. DEPARTMENT OF ENERGY | Office of Science

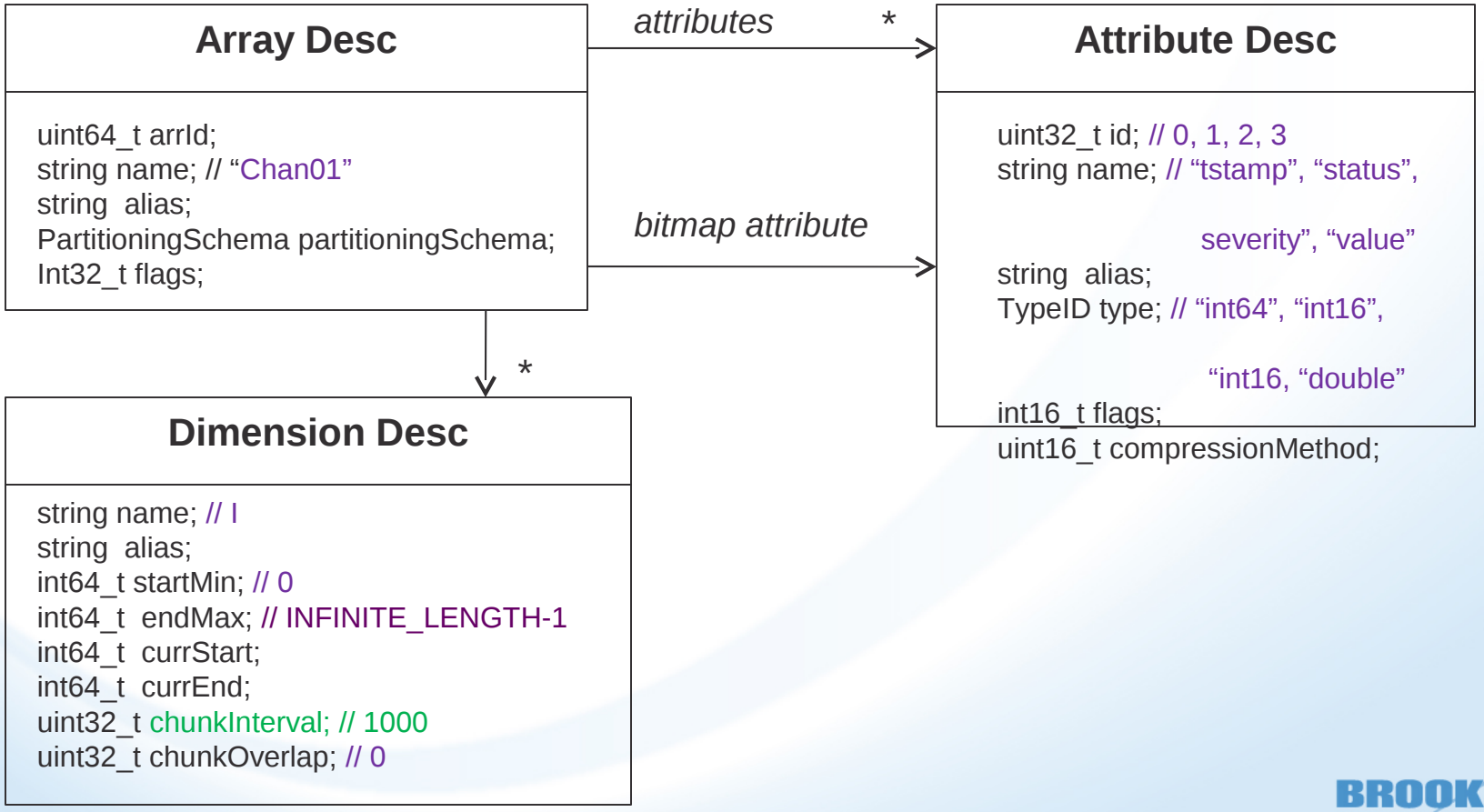
Three Major SciDB-based Use Cases

- Control System Archiver
- Light Source DAQ System
- ITER DAQ System

SciDB Array-Oriented Model - Metadata

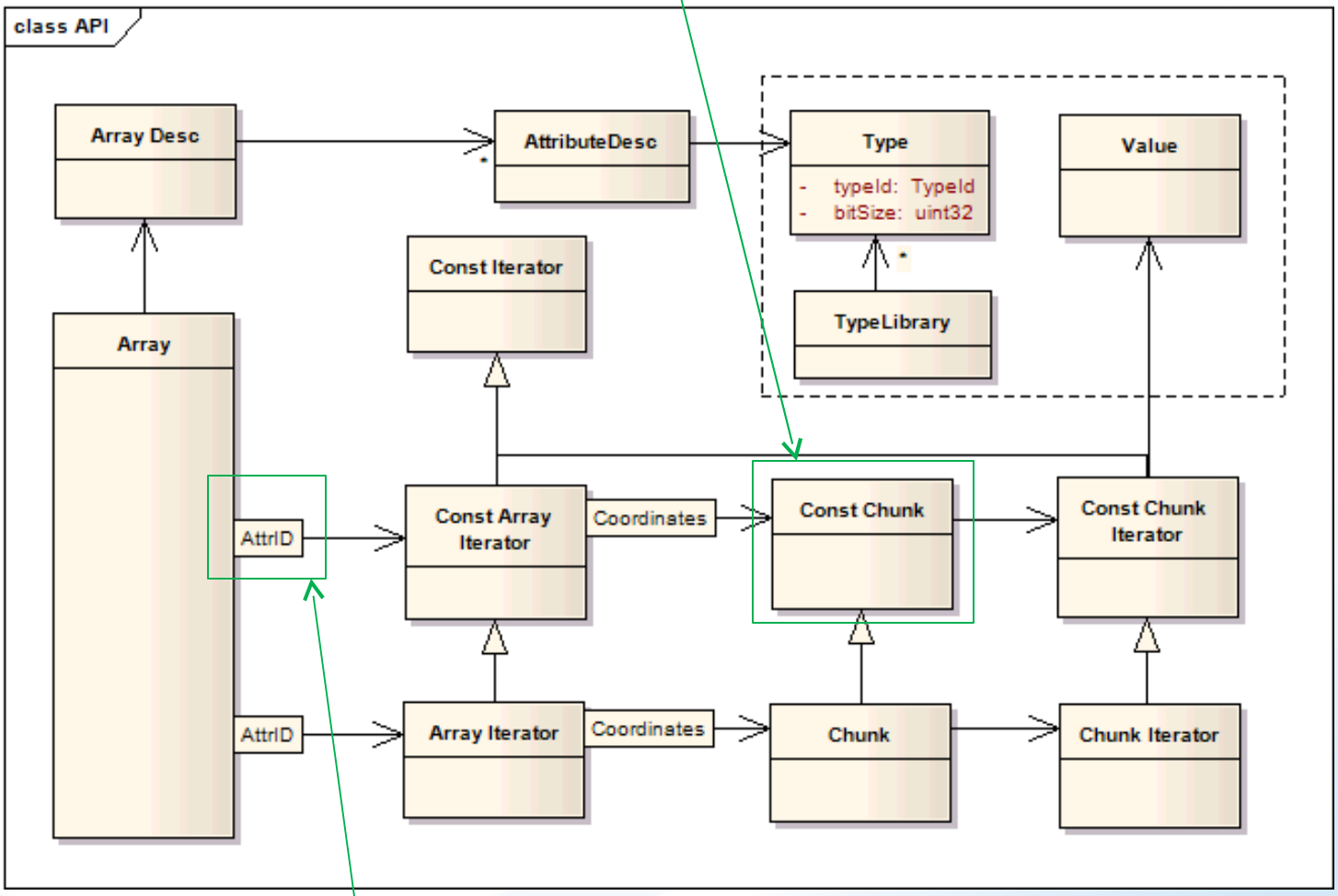
Creating an 1D array for storing dbr_time_double(s)

CREATE ARRAY Chan01 < tstamp: uint64, status: int16, severity: int16, value: double> [I = 0:*,1000, 0]



SciDB Array-Oriented Model – API

chunk-based partitioning



attribute-based (column-oriented) partitioning

SciDB 0.5 Benchmark: dbr_time_double

http://sourceforge.net/projects/epics-archbench/

Repositories list

Name	Description	Contact	Last modified		
epics-archbench	unknown	unknown	5 weeks ago	RSS	Atom
epics-java-bench	unknown	unknown	3 days ago	RSS	Atom
epics-mysqltableperpv-bench	unknown	unknown	4 days ago	RSS	Atom
epics-pb-bench	unknown	unknown	4 weeks ago	RSS	Atom
epics-scidb-bench	unknown	unknown	2 hours ago	RSS	Atom

- **Scenario:**
  - 1000 channels
  - 100 chunks/channel
  - 1000 samples/chunk
  - 1 sample : status(int16), severity (int16) , time stamp (int64), and value(double)

- **Writing of 1000 channels: 96 s (~ 1 M samples/sec)**

- **Reading of 4 channels : 0.13 s (~ 3 M samples/sec)**

SciDB 0.75 Benchmark: dbr_time_complex

http://sourceforge.net/projects/epics-archbench/

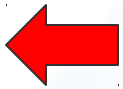
- **Scenario:**
  - 1000 channels
  - 100 chunks/channel
  - 1000 samples/chunk
  - 1 sample : status(int16), severity (int16) , time stamp (int64), and Complex

```
struct Complex {
  double re;
  double im;
};
```

- **Writing of 1000 channels: 127 s (~ 0.8 M samples/sec)**

```
REGISTER_TYPE(complex, 0); // 0 – for variable size data
…
Complex v;
v.re = 1.0*ic;
v. im = 1.0*(ie+1);

value.setData(&v, 16);
chunkIterator->writeItem(value);
```



Plain language binding is good for users,
but for generic frameworks

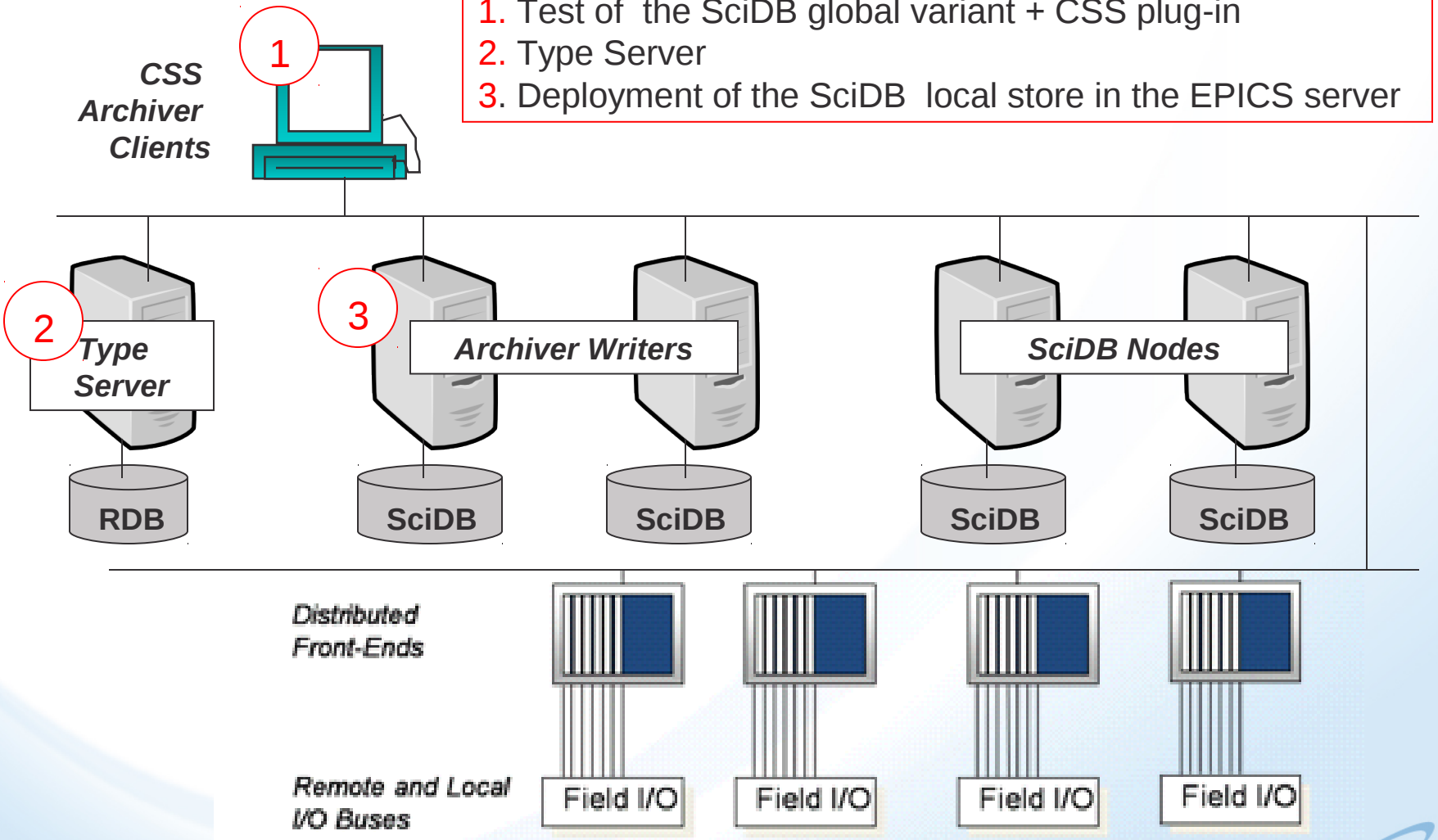
- **Reading of 4 channels : 0.12 s (~ 3 M samples/sec)**

```
Value& v = chunkIterator->getItem();
Complex* data = (Complex*) v.data();
```

Prototype of the SciDB-based Archiver

EPICS Collaboration Meeting, 3-7 October, 2011 at PSI, Switzerland

1. Test of the SciDB global variant + CSS plug-in
2. Type Server
3. Deployment of the SciDB local store in the EPICS server



Next

- **SciDB 1.0** : June, 2011
- **Prototype of the EPICS Archiver:** EPICS Meeting, 3-7 October, 2011
  - Scope: 1 M channels
  - Rate: 1M events/s
- **SciDB-HDF5 driver**: soon …