Synchro-Phasor Vision for New England

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New England Synchro-phasor system

- 5 PMUs in-service
  - All functioning as Dynamic Disturbance Recorder (DDRs)
    - Event detection & recording at high rate (720 per second)
    - Continuous recording of synchro-phasor at slow rate (60 per second)
  - 2 of 5 streaming synchro-phasor to TVA SPDC (30 per second)

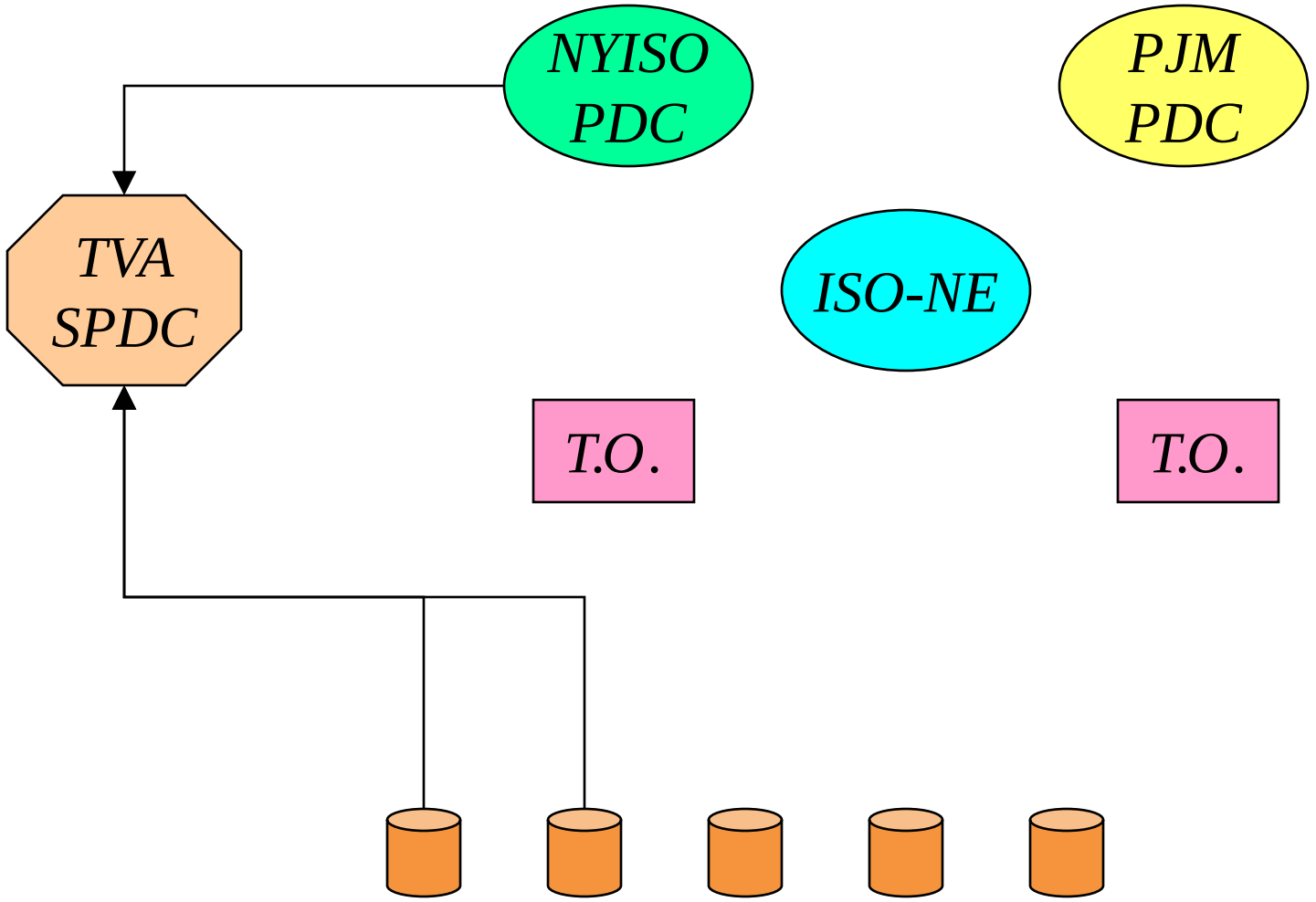
New England Synchro-phasor system

- No direct access to synchro-phasors
  - Historical data available from TVA
  - ISO-NE & Transmission Owners (TOs) cannot deploy applications
  - ISO-NE & TOs need access to synchro-phasors from neighbors

New England Synchro-phasor system

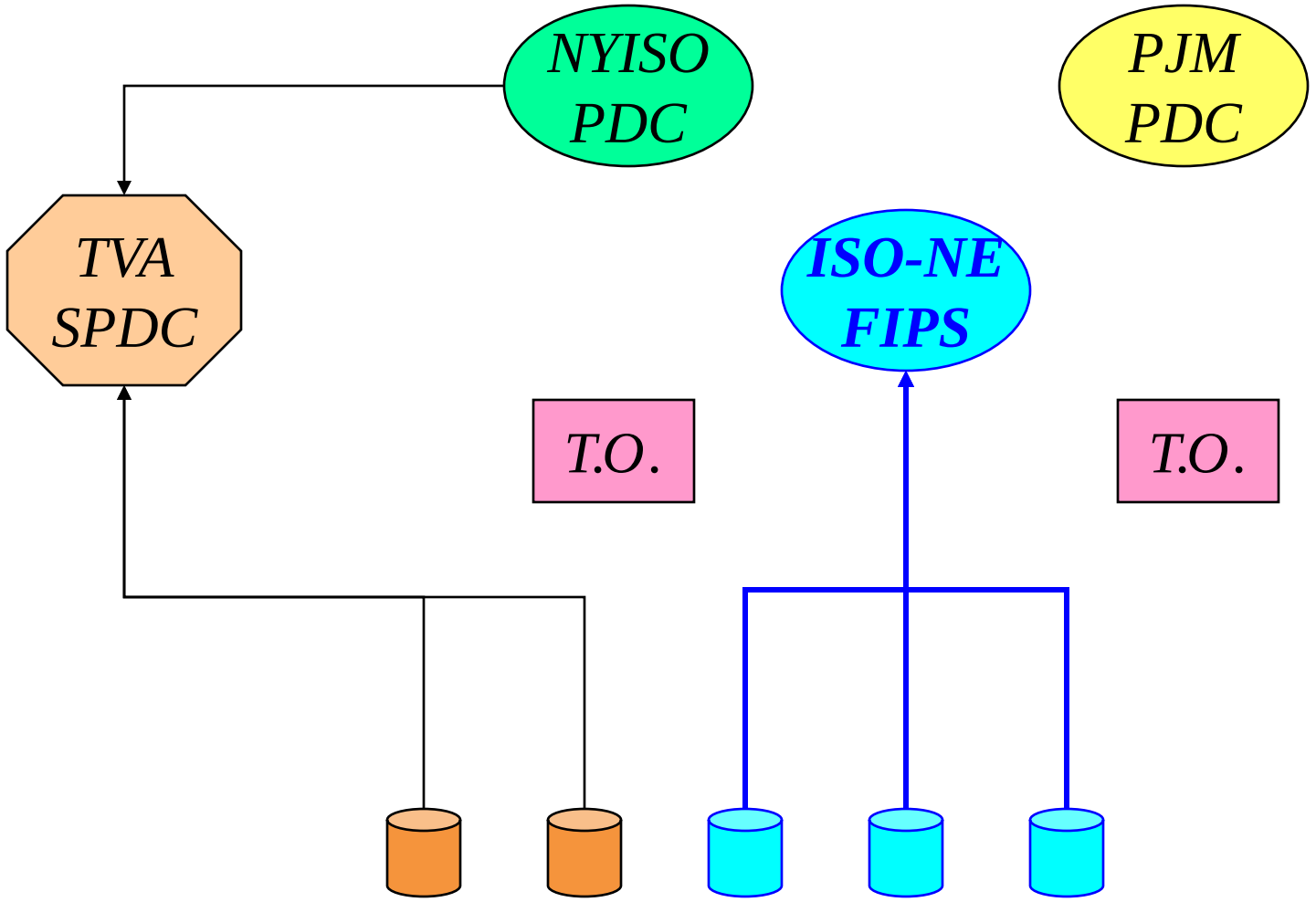
- Flexible Integrated synchro-Phasor System (FIPS)
  - Provides some functions of NASPInet
  - Two year development & deployment timeframe
  - ISO-NE & TOs will gain knowledge & experience

Initial Configuration



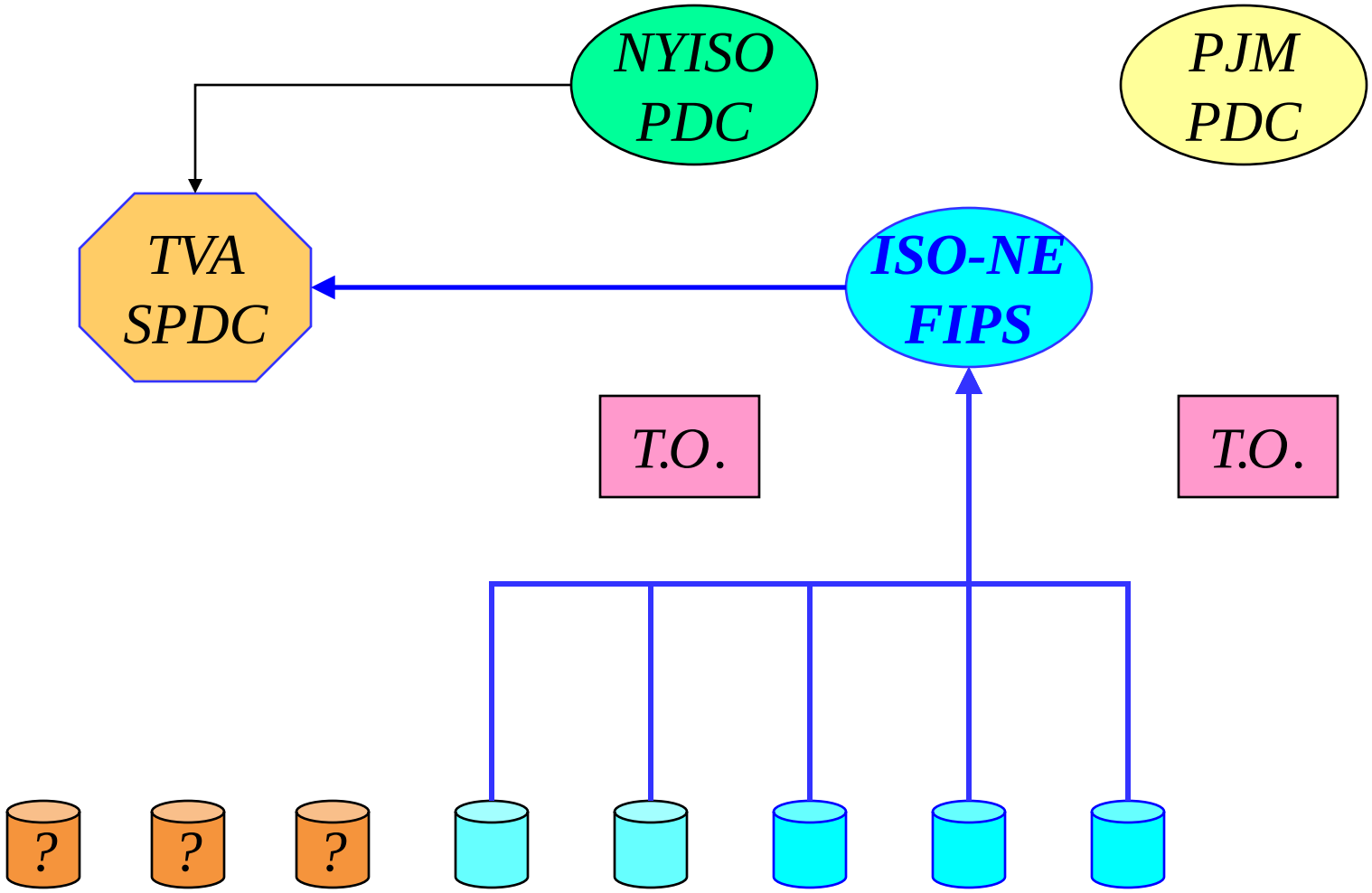
New England PMUs

Step 1



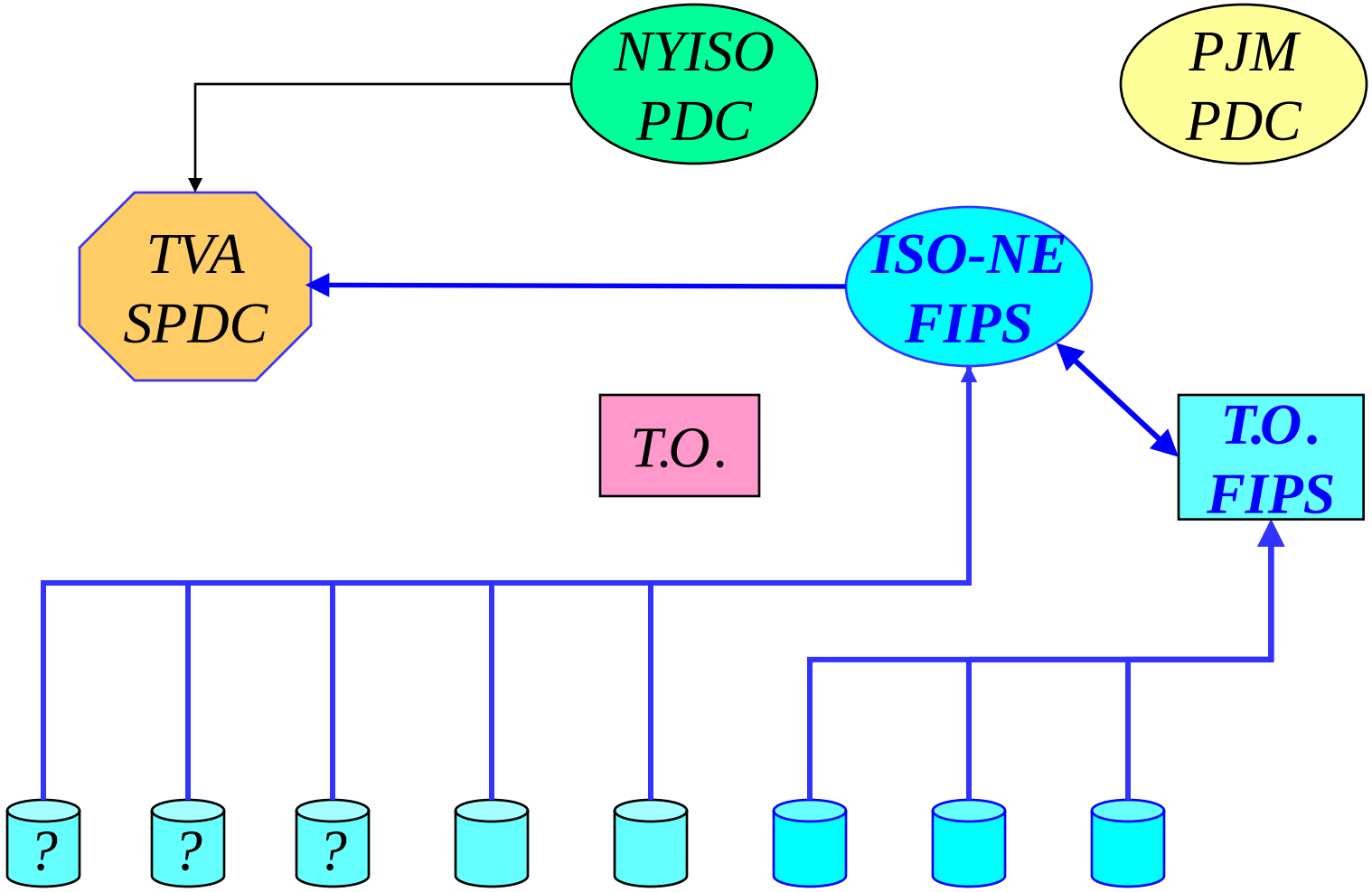
New England PMUs

Step 2



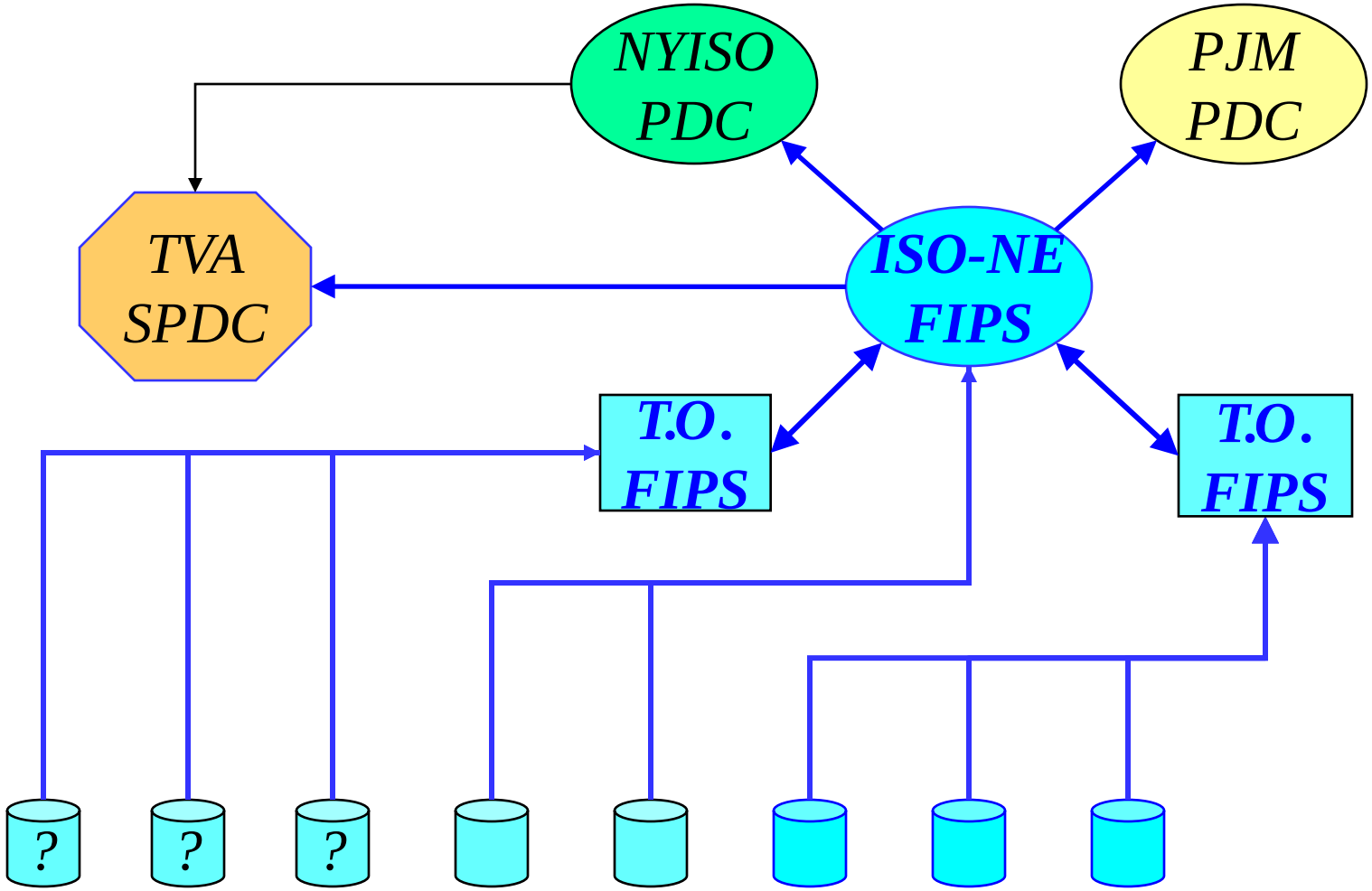
New England PMUs

Step 3



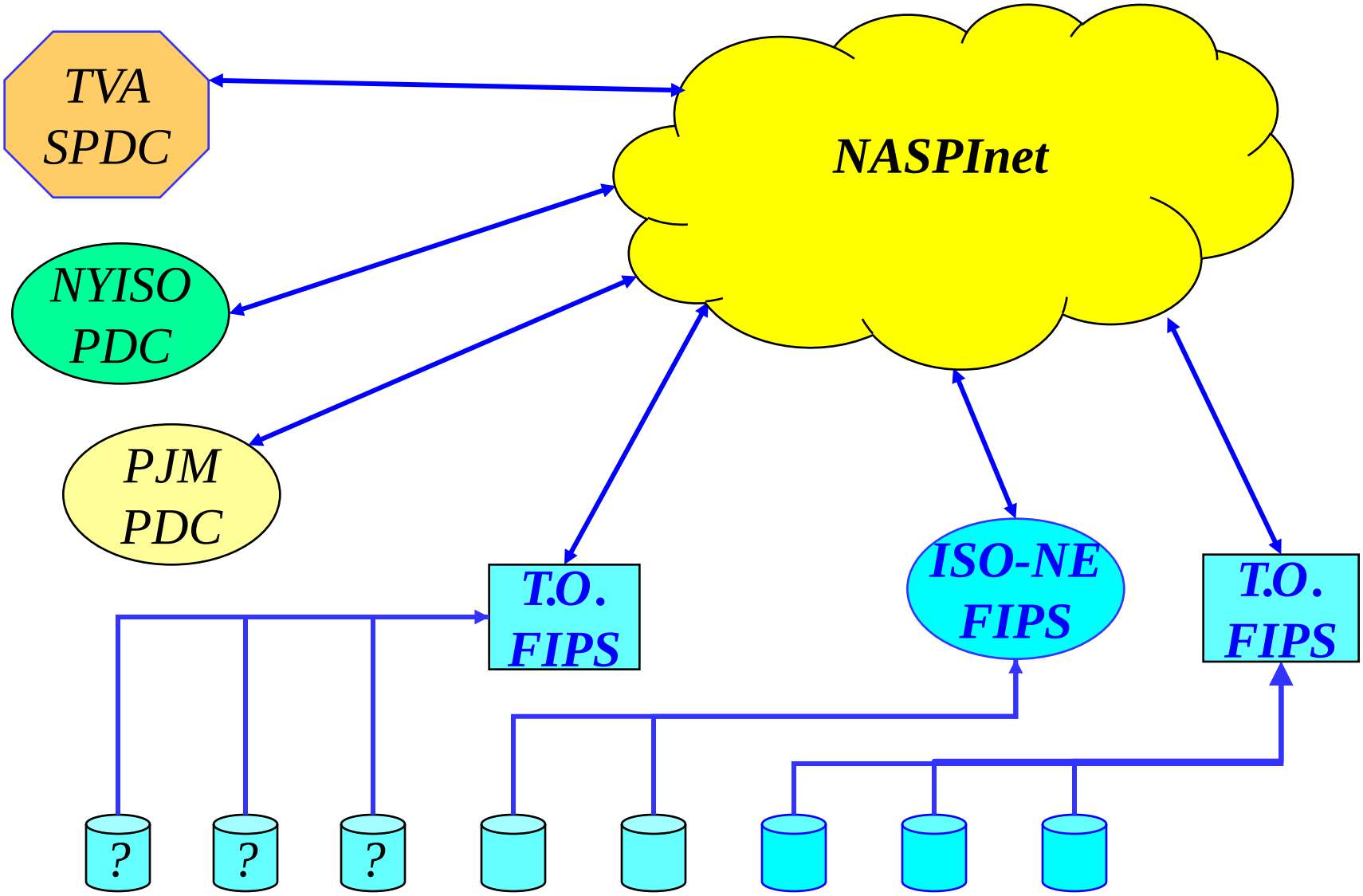
New England PMUs

Step 4



New England PMUs

Integration with NASPInet



New England PMUs

FIPS PDC Issues

- Data Storage in Databases
  - Data is fundamentally “2-D” : (time, channel) vs. (value)
  - Most existing databases don’t work well with this model
  - Simplifying assumption: ranges of consecutive data points

FIPS PDC Issues (continued)

- Dedicated Time-Series Storage
  - The data lends itself to a very simple data structure
    - Fixed length records in flat files
    - Use one flat file per channel (or split & index if file system limits arise)
    - Use binary search algorithm to find data

FIPS PDC Issues (continued)

- Data Interchange
  - Need to exchange channel IDs
  - Need a means to request streams or archived data from PMU
  - NASPInet may address these issues
    - Can it be done before NASPInet?

FIPS PDC Issues (continued)

- User Interface
  - Uses a “Model-View-Controller” framework
    - Provides a degree of extensibility
  - Add metadata to database: channel names, disturbance events, ...
    - Supports data export in many formats

FIPS PDC Issues (continued)

- "Quality of Service" can mean many things...
  - We really need 2 types of service
    - "Archival" - reliability
    - "Realtime" - timeliness
  - TCP vs. UDP vs. Custom "selective repeat" protocol

PDC Architecture for QoS