Getting all of your data into PI

or: Teach yourself to be an interface expert in 7 days…

Everyone here has an EMS/DCS

- You have at least one PI interface collecting data (hopefully) from this system.
- At PJM the EMS is Siemens Spectrum and the interface is currently ICCP.
- *Collect as much data as your system can reasonably handle – someone will want it eventually.*

But what about the rest of it?

EMS related data

- UDS
- SE
- SA
- Day ahead forecast
- Dispatcher actions

Market and other data

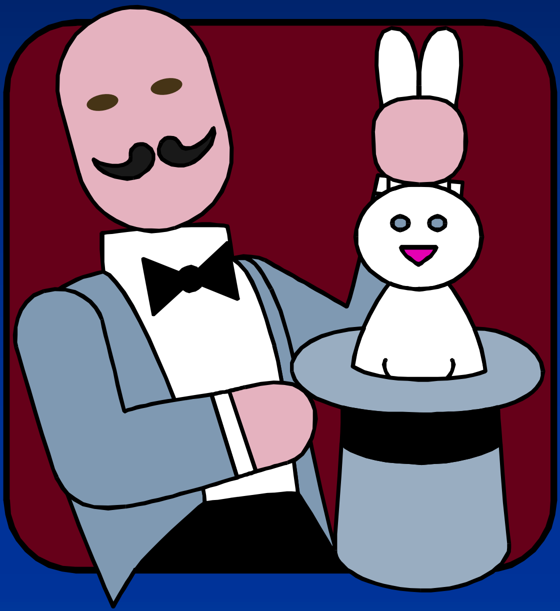
- LMP
- Weather
- Computer system and network performance
- other?

Remember to send a Christmas card to the developer of Batch File Interface

- EMS = Elderly Mainframe System
- UNIX systems love ASCII files
- Files can hold a surprising amount of data is a reasonable amount of space (if you don’t keep them around for too long)
- Files can be easily manipulated before being passed to BFI – which is good because BFI can be a bit particular…

Batch File Interface Magic

1. Batch Files are not antiquated technology – they are proven technology.
2. Format, Format, Format.
3. Run multiple instances of BFI on one machine. Increases throughput and allows the use of multiple directories.
4. BFI clusters well – although it may not be supported.



BFI in use at PJM

- UDS
  - Data is generated every 5 minutes
  - Custom parsing routine runs prior to BFI
- SE / SA
  - ~300,000 tags
  - 5 min to 1 hour samples of data
- Backload of data from previous historians

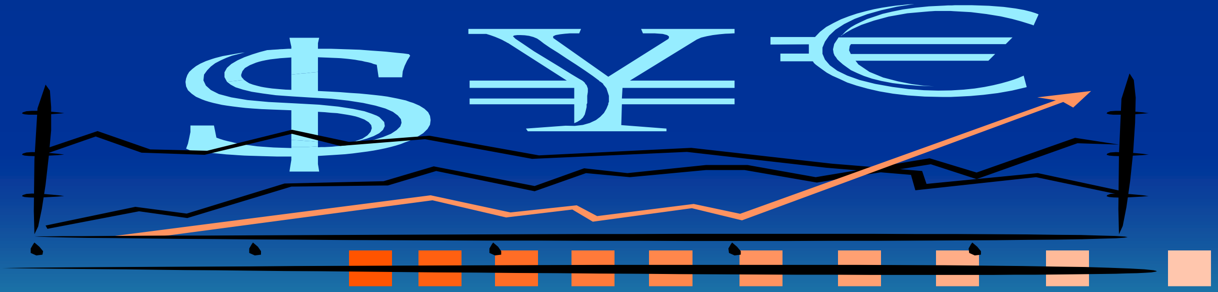
Relational Databases

The other “flat file”

- EMS data tends to be available via proprietary interfaces (ICCP) or flat files, Market data tends to live in databases (Oracle, SQL Server, etc.)
- RDBMS interface works well – is more complicated to configure than BFI
- Cooperation from database administrators is essential for success

RDBMS at PJM

- LMP data
  - Most sought after piece of data
  - “Lives” in an Oracle database
  - RDBMS interface connects to a dedicated view in the database and uses a dedicated database user ID
- Day Ahead Forecast (which a catch … stay tuned)

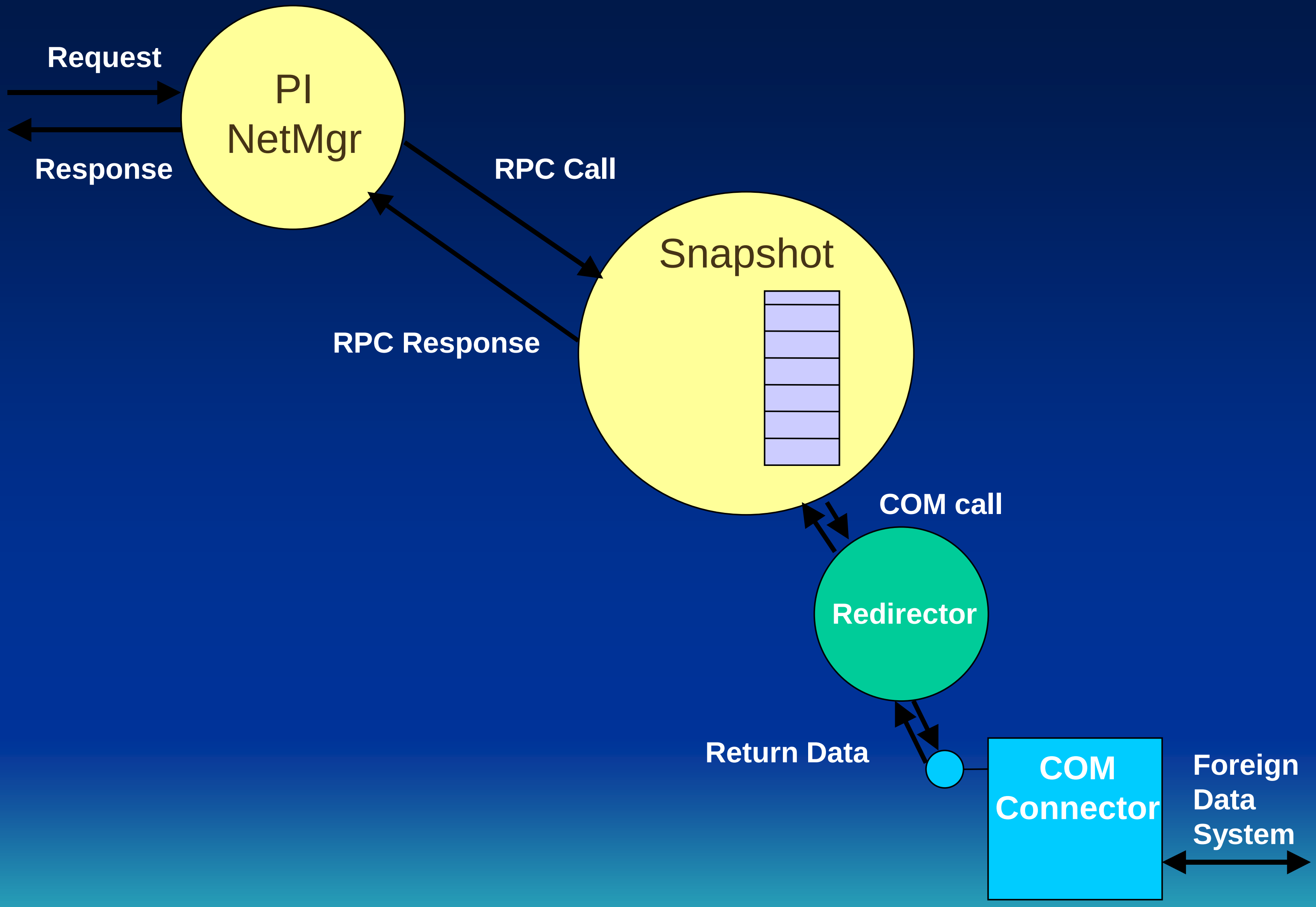


Now it gets *really* interesting…

- The Day Ahead load forecast
  - PI doesn’t want it, well the archive anyway.
  - Dispatchers need it
  - Data is readily available in an Oracle database

Enter the COM connector!

- Allows data that isn’t actually in the PI archive to look like it is.
- Points are configured similarly to “real” PI points
- You write the code that handles data requests


Request
Response
PI NetMgr
RPC Call
RPC Response
Snapshot
COM call
Redirector
Return Data
COM Connector
Foreign Data System

Day Ahead Forecast Logic

1. User requests data for PI tag – Forecast_Load
2. Request is redirected to a PJM written COM connector
3. COM connector decides if request is for past or future values for Forecast_Load
4. If the request is for past values, the COM connector goes to the PI archive and pulls the data out of a parallel tag: Forecast_Load_Hidden
5. If the request is for future values, then the COM connector goes directly to the Oracle database and retrieves the values
6. RDBMS interface pulls data from Oracle into Forecast_Load_Hidden as real time catches up with the values in the database

Pros and Cons of the COM connector

- PROs
  - Cheap
  - It works
  - Dirt simple for the users
  - Once you master this, it’s a practical way to interface to some strange stuff
- CONs
  - Complicated (relatively)
  - Not as easily supported as the alternatives
  - People will ask you 3,276,352 times if this could be done in ACE

Getting even farther outside the box

- The PI SDK has brought the ability to read/write data to PI from VBScript.
- If you can write a script to read the data, you can write it to PI.

AccuWeather.com®

- “Web scraping” is a fancy name for parsing a text file (HTML formatted, but text none the less)
- Internet Explorer is easily scriptable
- Snooze alert – here comes the code:

```
Set oIE = CreateObject("InternetExplorer.Application")
oIE.Navigate2("http://wwwa.accuweather.com/adcbin/public/curcon_local.asp?partner=accuweather&zipcode=94203&metric=0")
While oIE.Busy
    WScript.Sleep(100)
Wend
strHTML = oIE.Document.body.innerText
```

- Parse strHTML like any other text. Then use the SDK to write it to PI

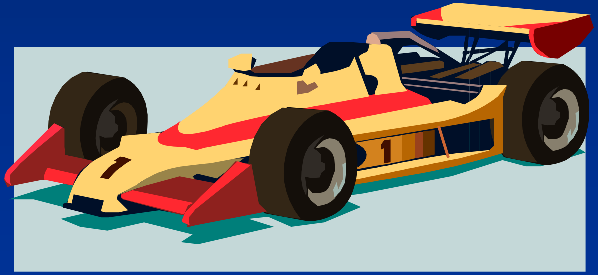
Why do I think that I just opened Pandora's box?

- There is no practical limit to the type of data that can be collected this way
- Think twice before revealing this ability to your users (and please don’t tell mine!)

- Every line of useful VBScript requires 30 lines of error control.
- High overhead – you’ll not be collecting 1000’s of tags like this.
- Consider building a text tag to write script errors to. Monitor this text tag with Processbook (or another script – egad!)

The one who dies with the most interfaces wins, right?

- What about all those computers?
- How do you know
  - They’re alive
  - They’re keeping up
  - You’re not about to be paged



- The answer is Perfmon, Ping, SNMP, and TCP Response – a.k.a. ITMonitor

IT monitoring is important!

- **If your systems are overload, hung or otherwise dead, you don’t collect any data!**
- Perfmon – performance counters from your Windows systems
- SNMP – performance counters from your UNIX systems and network devices
- PING – is there anybody out there?

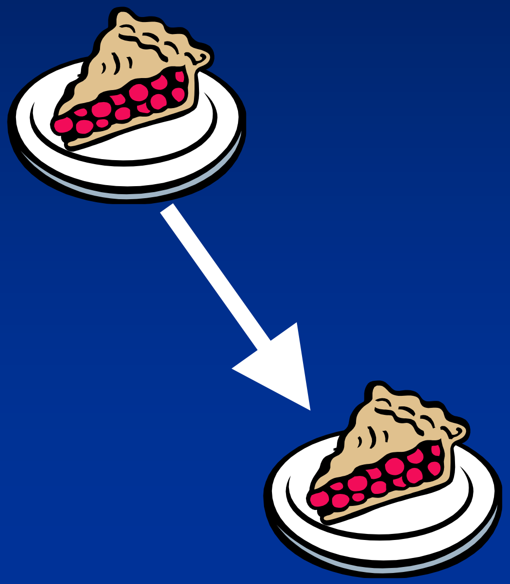
Caveats…

- Your IT people may or may not want to give you access to performance data.
- Check with your OSISoft account rep about purchasing these interfaces stand alone.

Whew! Where are we now…

- Siemens Spectrum
- ICCP
- Batch File
- RDBMS
- SDK Scripting
- COM Connector
- Perfmon
- SNMP
- Ping

But there’s always room for 1 more:



PItoPI

- Used to replicate data between PI systems
  - Geographic dispersion
  - OLAP processing
  - Fault Tolerance
  - Additional compression

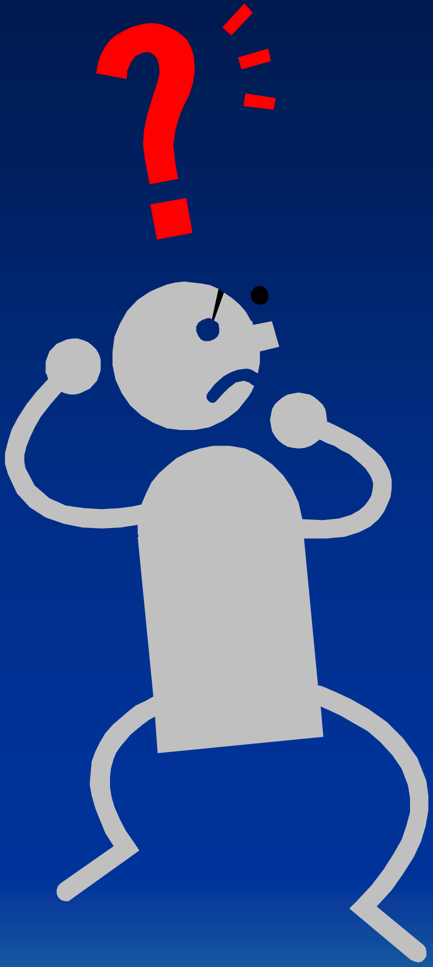
Conclusions

Life Today

- PJM is using 10 different interface technologies to collect data.
- This number won’t be going down anytime soon

Life Tomorrow

- More market data
  - More use of RDBMS
  - More use of COM connectors
- Attempts to leverage the SDK to reduce the number of file based interfaces



Questions?