Using COMTRADE Files with PI

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OSIsoft PI T&D Users Group Meeting

September 17, 2003

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Topics Covered

- What is COMTRADE
- The Business Proposition to archive COMTRADE.
- SISCO COMTRADE Utility

Power Disturbances = Lost $$$

Substation

Monitoring Devices:

Protective Relays

Power Quality Meters

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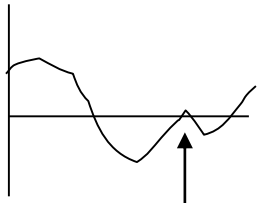
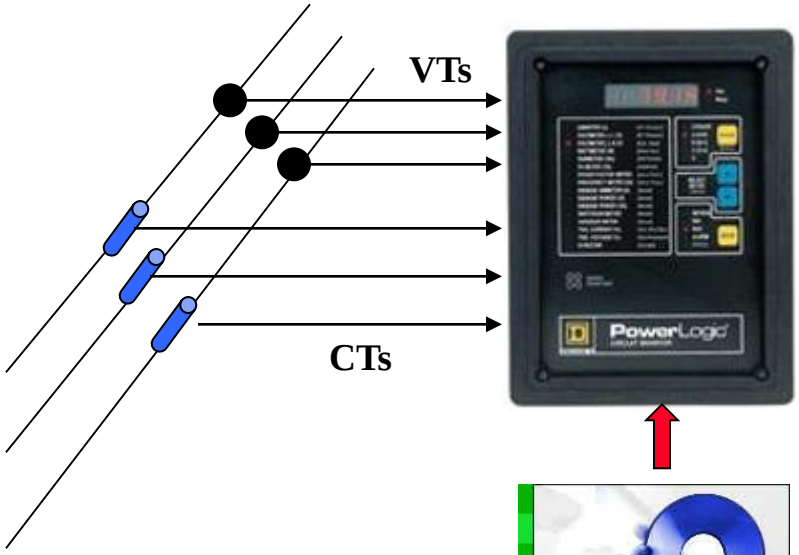
Generation of Transient Data



Captures

Event

Event Data



Monitoring of:

- Frequency
- Harmonics
- Voltages
- Currents

User Configuration for Event Triggers

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The Need for a Standard

- Vendors stored event/disturbance data in different incompatible formats.
- Difficult to retrieve, analyze, and exchange disturbance data.

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The Standard: COMTRADE

- In 1997 IEEE C37.111-1997 IEEE standard for Common Format for Transient Data Exchange (COMTRADE) was published.

- A new revision was released in 1999.

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Anatomy of a COMTRADE File

Four (4) files and extension with content and format definitions for all files.

Filename Extension	Contents Used for	Mandatory/ Optional
*.inf	Comments and additional information	Optional
*.hdr	Header Information	Optional
*.cfg	Configuration information for event data	**Mandatory**
*.dat	Event Data records per *.cfg file.	**Mandatory**

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Configuration file Content

- Station name and identification of the recording device
- Format definition of data file
  - Date and time of Event
  - Number and type of channels (analog and/or digital)
  - Sample rate
  - Line frequency
  - Channel definitions (scale and offset factors)
  - Data File Format (ASCII or BINARY)

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Data file content

- Actual data samples of events
- Digital time tagged samples
- Number of entries depend on sampling rate and length of time of data captured

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Business Reasons to use

- Legal
  - Audit Trail for customers and regulatory purposes
    - Fault Time, Fault Retrieval Time are key
  - Storage of original data (e.g. the files)
  - Allows determination of whose at fault (utility, consumer, or other).

- True Picture of Process
  - COMTRADE is a high sample rate for a small period of time enabling reproduction of waveforms.
  - Allows augmentation of slow sampled information.
  - Allows determination of power quality problems.

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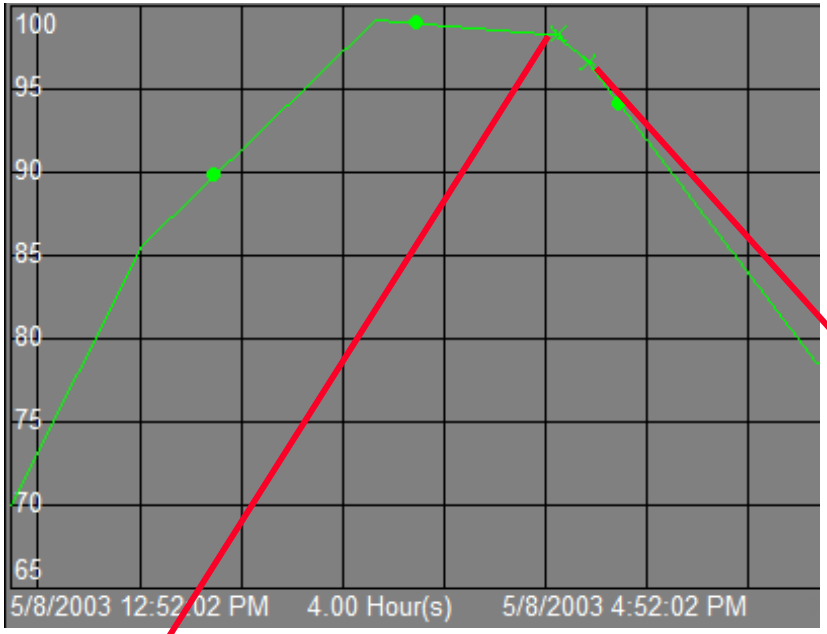
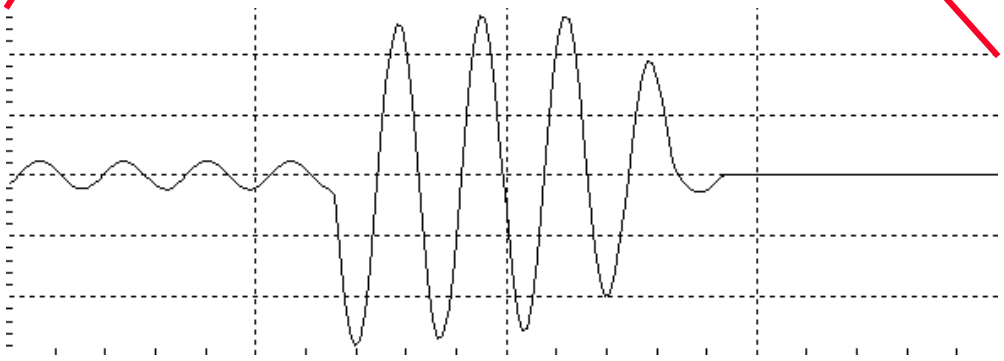
Getting the True Picture



But, what really happened?



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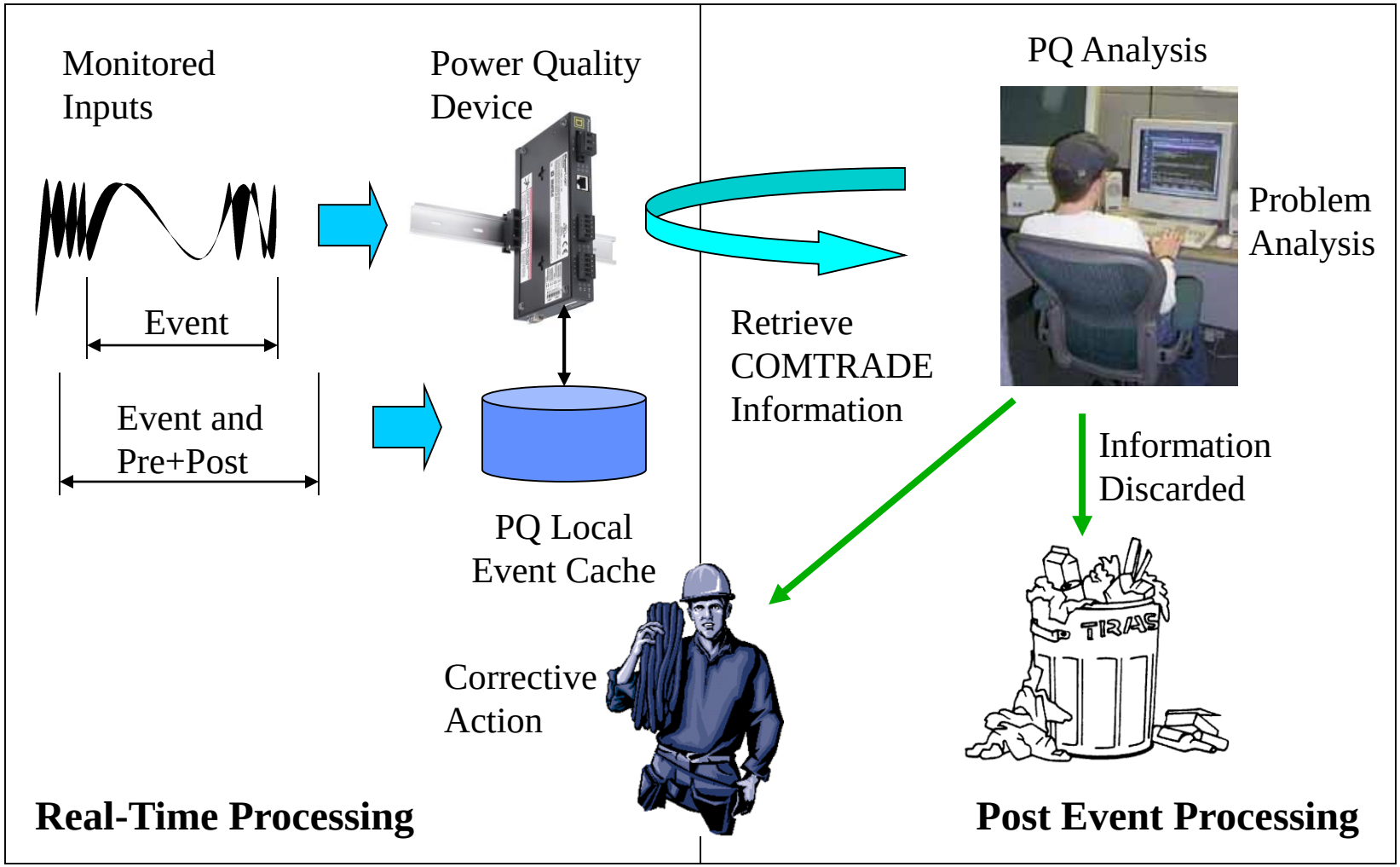
Legacy COMTRADE Handling



A Better Way

Monitored Inputs

Power Quality Device

Event

Event and Pre+Post

PQ Local Event Cache

Automatic Retrieval

COMTRADE Utility for OSIsoft

Retrieval in minutes not hours.

Retrieve COMTRADE Information

Problem Analysis

Post Event Processing

Corrective Action

Faster Response To the Problem

Real-Time Processing

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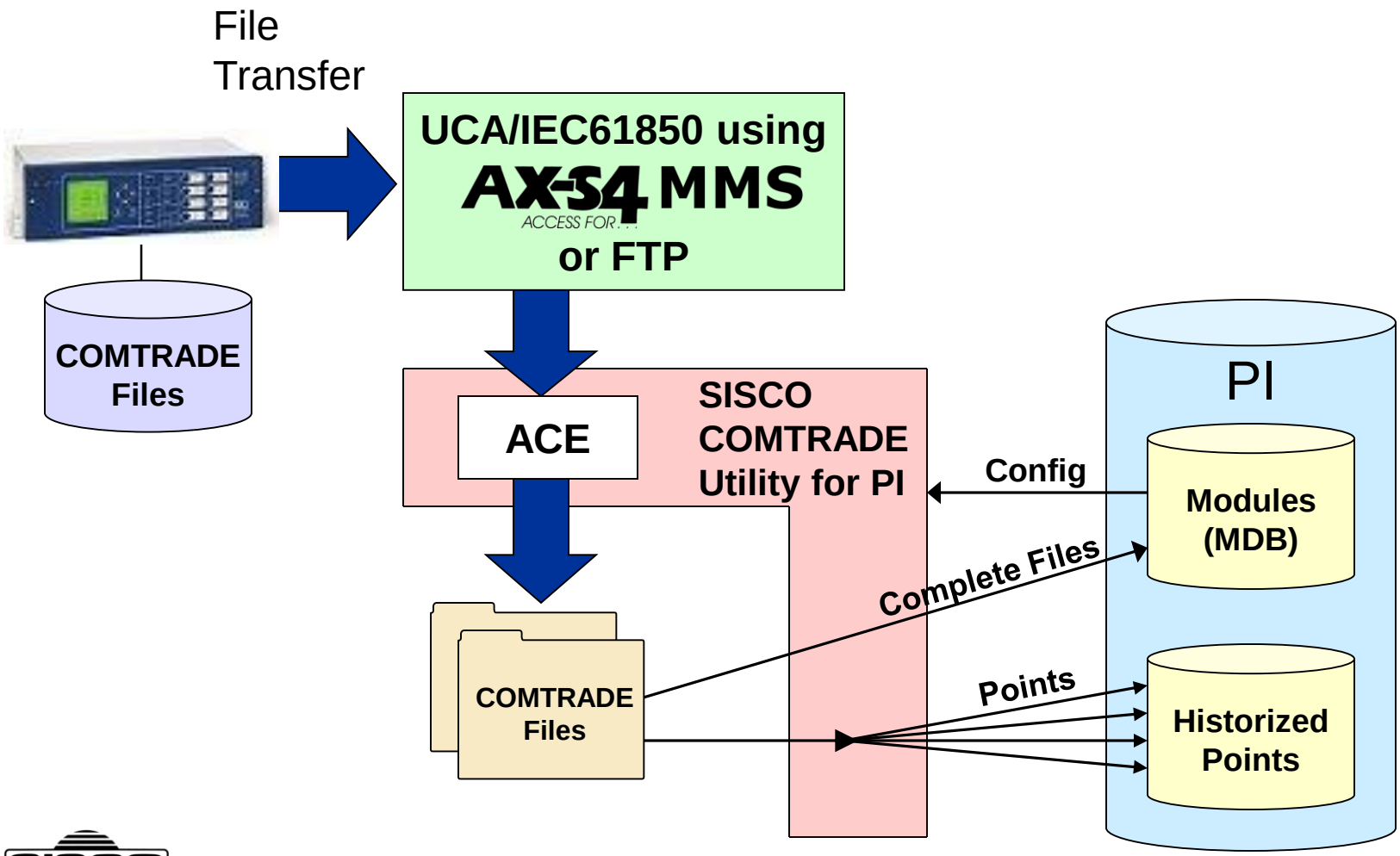
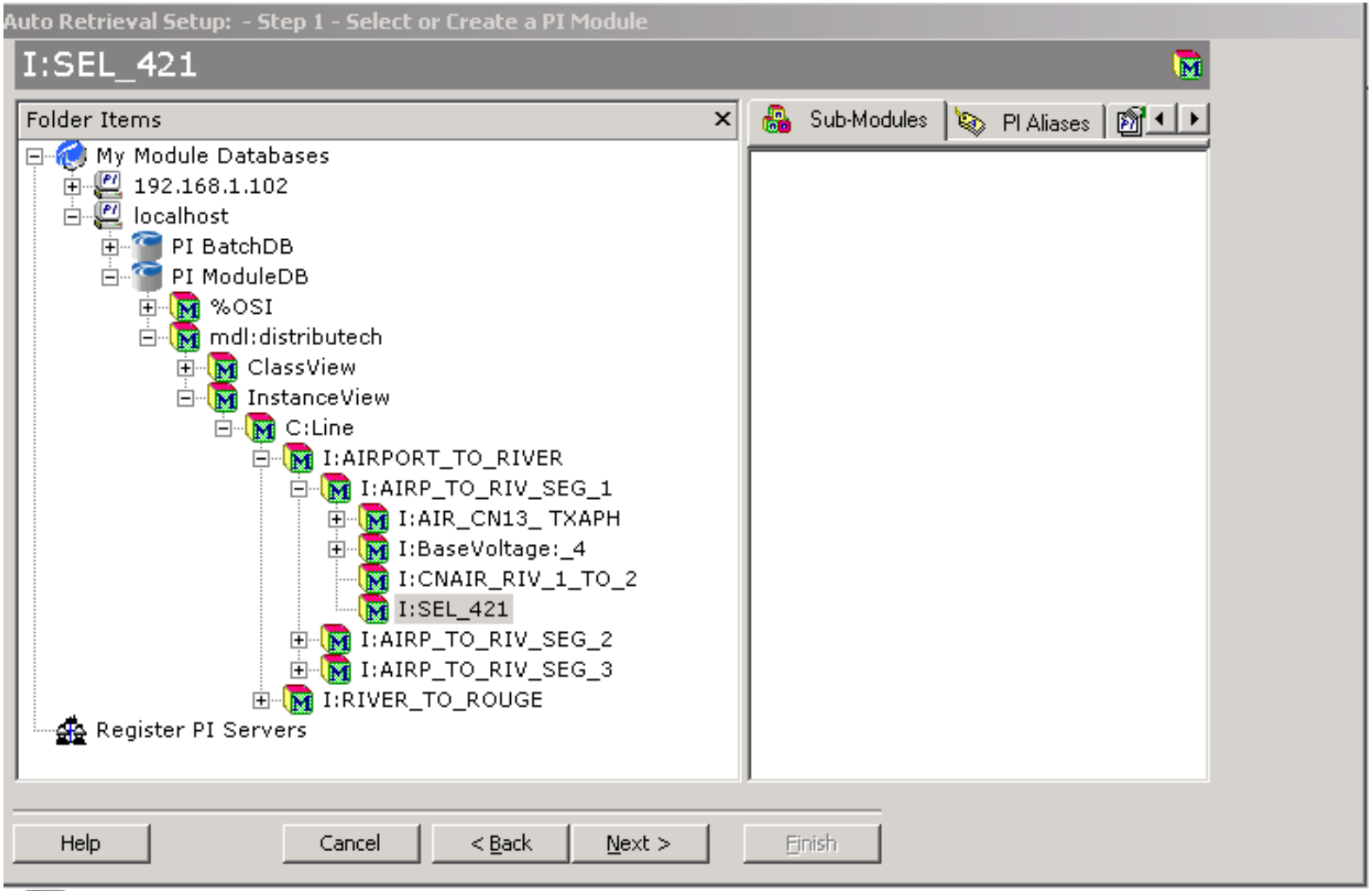
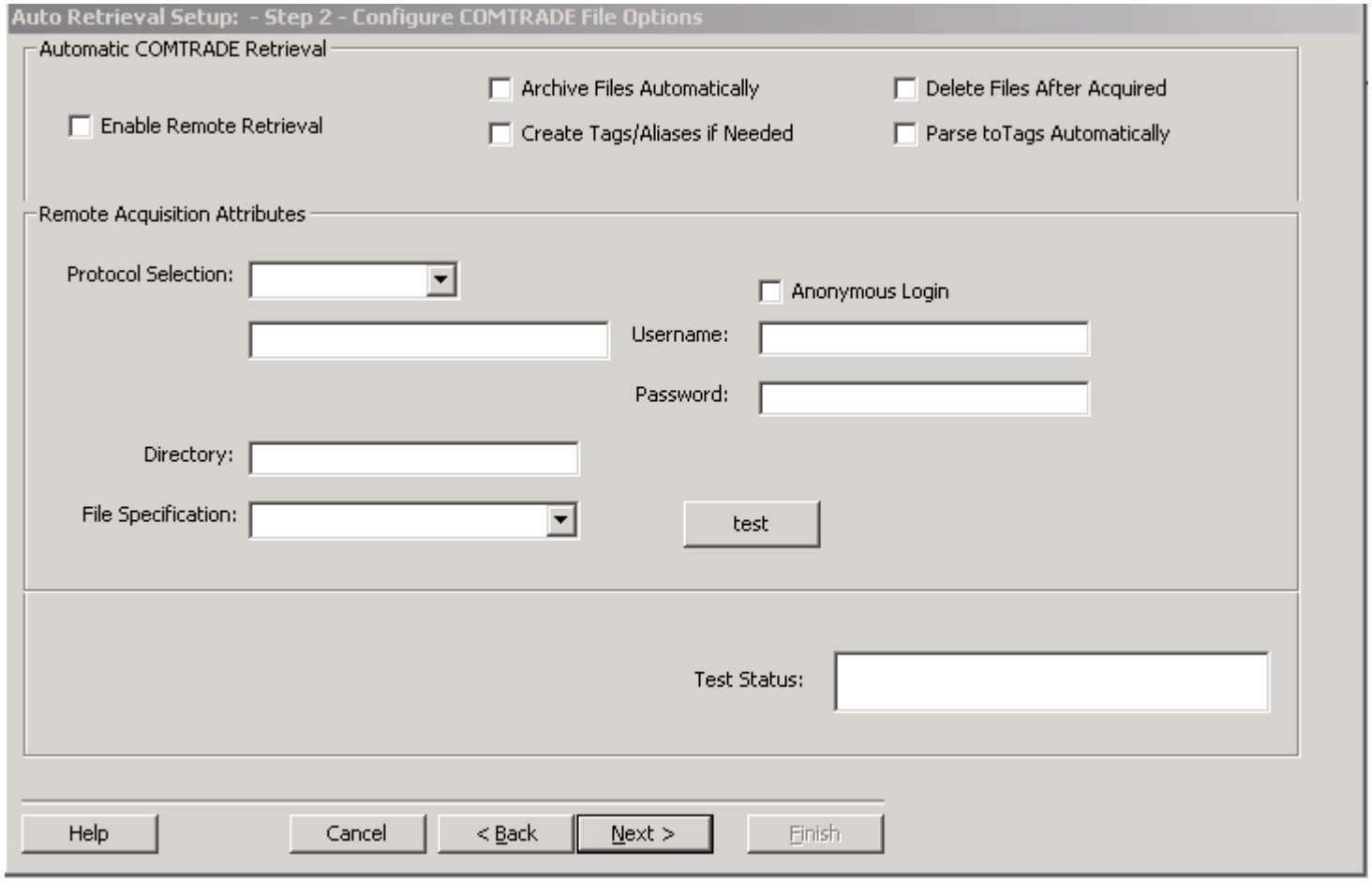
A Closer Inspection



Configuration Starts with a Module:



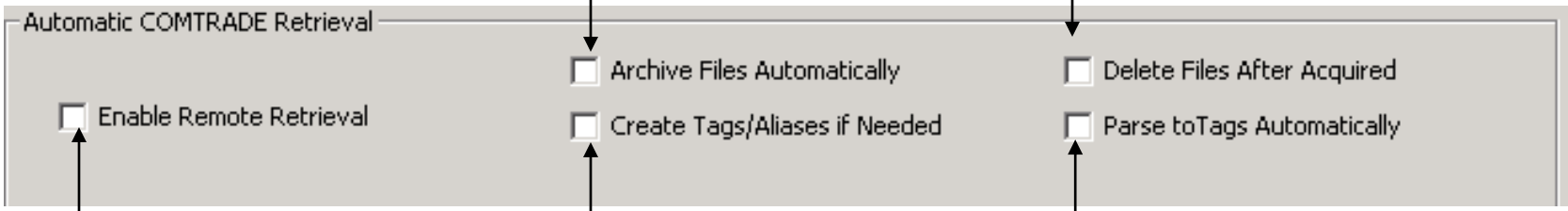
Select Options



Select Retrieval Options

Places Retrieved Files into PI-MDB

Delete retrieved files From disk once processed



Instructs ACE Calculation to Retrieve Files

Will create new Tags if file contains Data not previously configured

Decompose COMTRADE Files and place data into The configured PI Tags.

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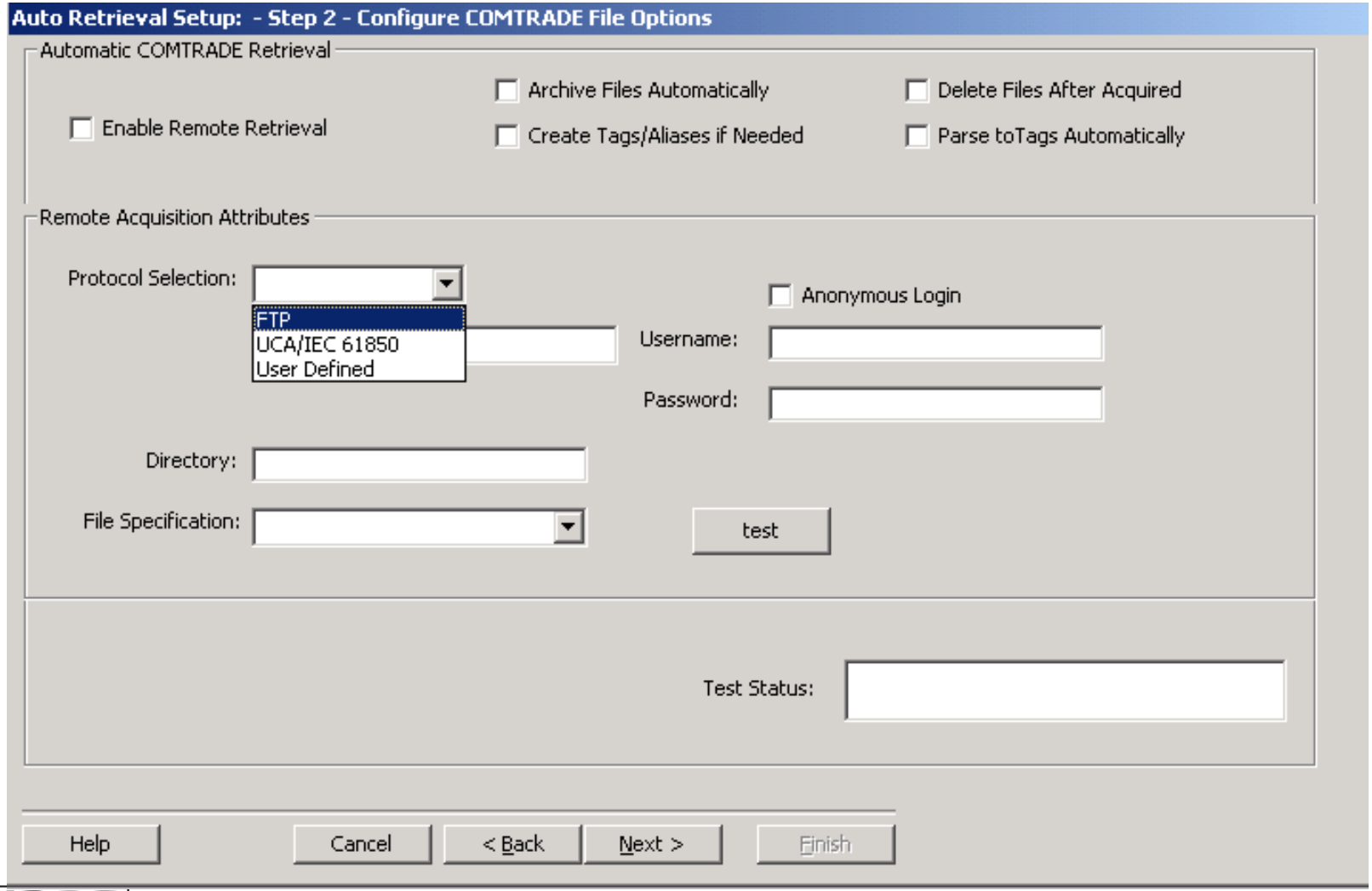
Select Protocol



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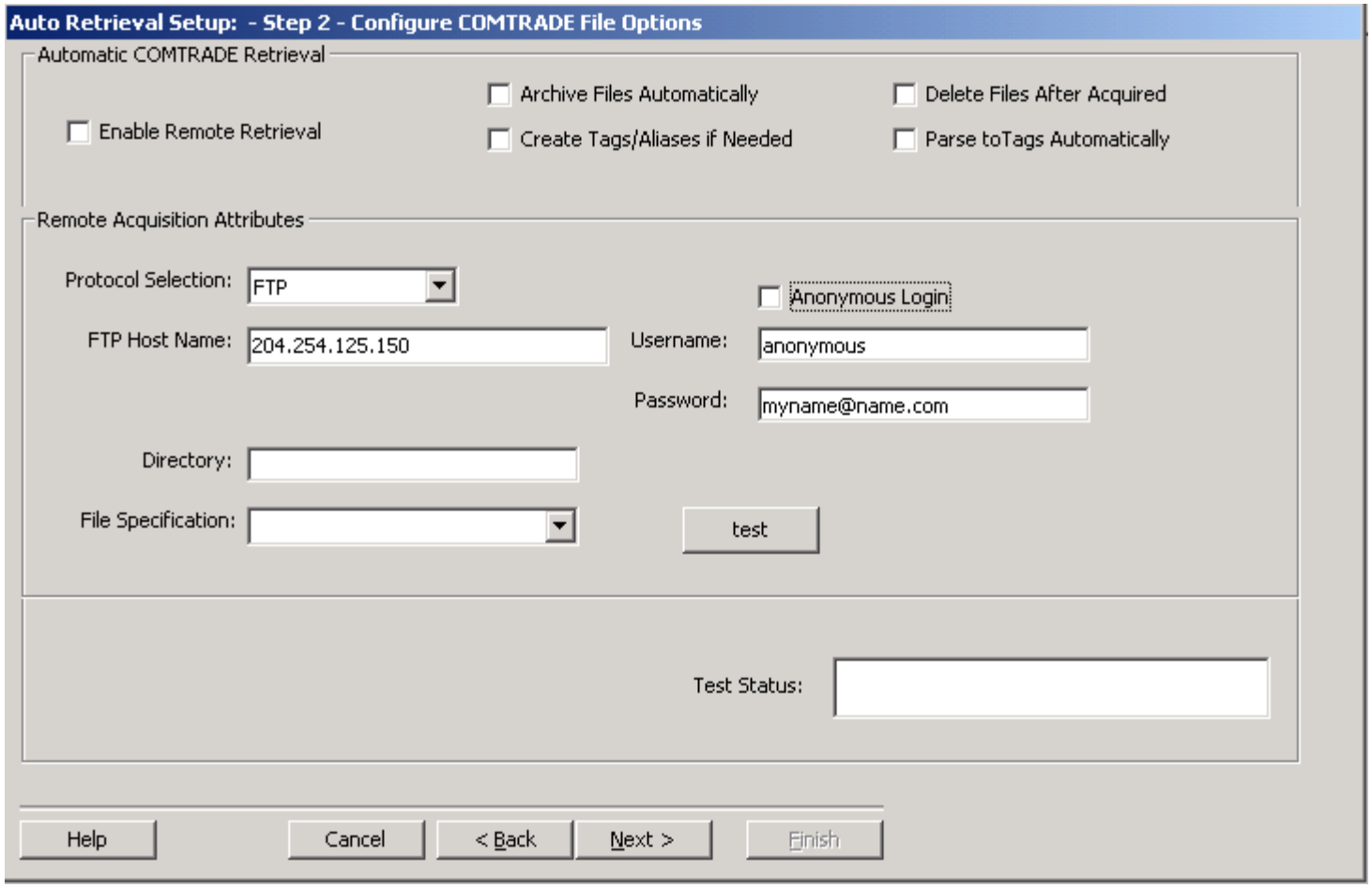
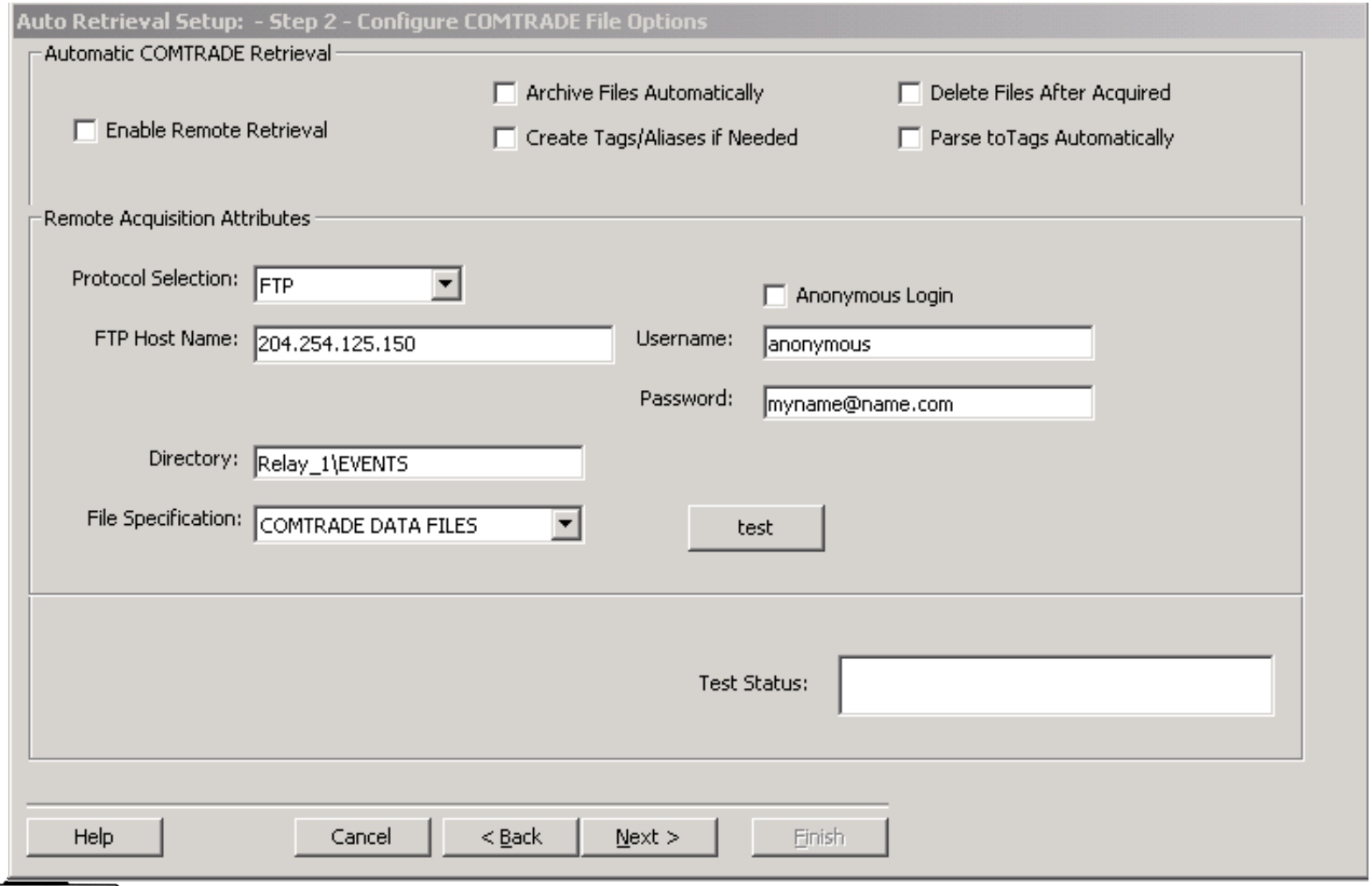
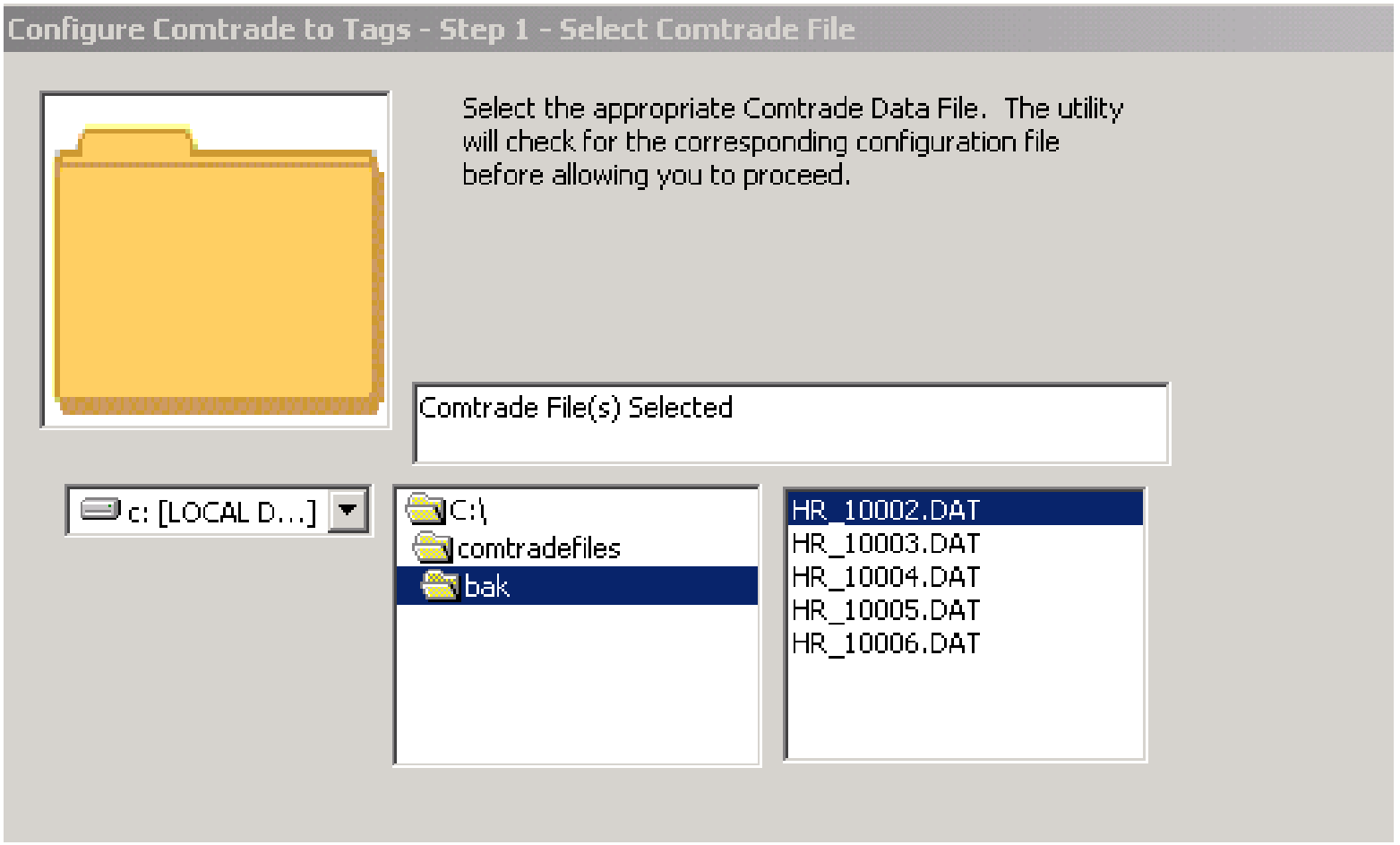
Configure Login Information for FTP



Select Source of Files



Select Comtrade File



Define Translation

Configure Comtrade to Tags - Step 3 - Selection of PI Tags

This is an optional step. If you wish to assign the translation of COMTRADE tags to PI Tags, you may do so here or later. You will need the appropriate COMTRADE file(s) to perform the setup.

Index	PI Tag	Needs Creation	Import
1	I:SEL_421_comA__sta_StationA_id_IAW_phase_A	Yes	No
2	I:SEL_421_comA__sta_StationA_id_IBW_phase_B	Yes	No
3	I:SEL_421_comA__sta_StationA_id_ICW_phase_C	Yes	No
4	I:SEL_421_comA__sta_StationA_id_IAX_phase_A	Yes	No
5	I:SEL_421_comA__sta_StationA_id_IBX_phase_B	Yes	No
6	I:SEL_421_comA__sta_StationA_id_ICX_phase_C	Yes	No
7	SISCO.AXS4MMS.5:sel421:Relay_1/MMXU.MX.V.PhsAf	Yes	Yes
8	SISCO.AXS4MMS.5:sel421:Relay_1/MMXU.MX.V.PhsBf	Yes	Yes
9	SISCO.AXS4MMS.5:sel421:Relay_1/MMXU.MX.V.PhsCf	Yes	Yes
10	I:SEL_421_comA__sta_StationA_id_VAZ_phase_A	Yes	No
11	I:SEL_421_comA__sta_StationA_id_VBZ_phase_B	Yes	No
12	I:SEL_421_comA__sta_StationA_id_VCZ_phase_C	Yes	No
13	I:SEL_421_comA__sta_StationA_id_VDC1	Yes	No
14	I:SEL_421_comA__sta_StationA_id_VDC2	Yes	No

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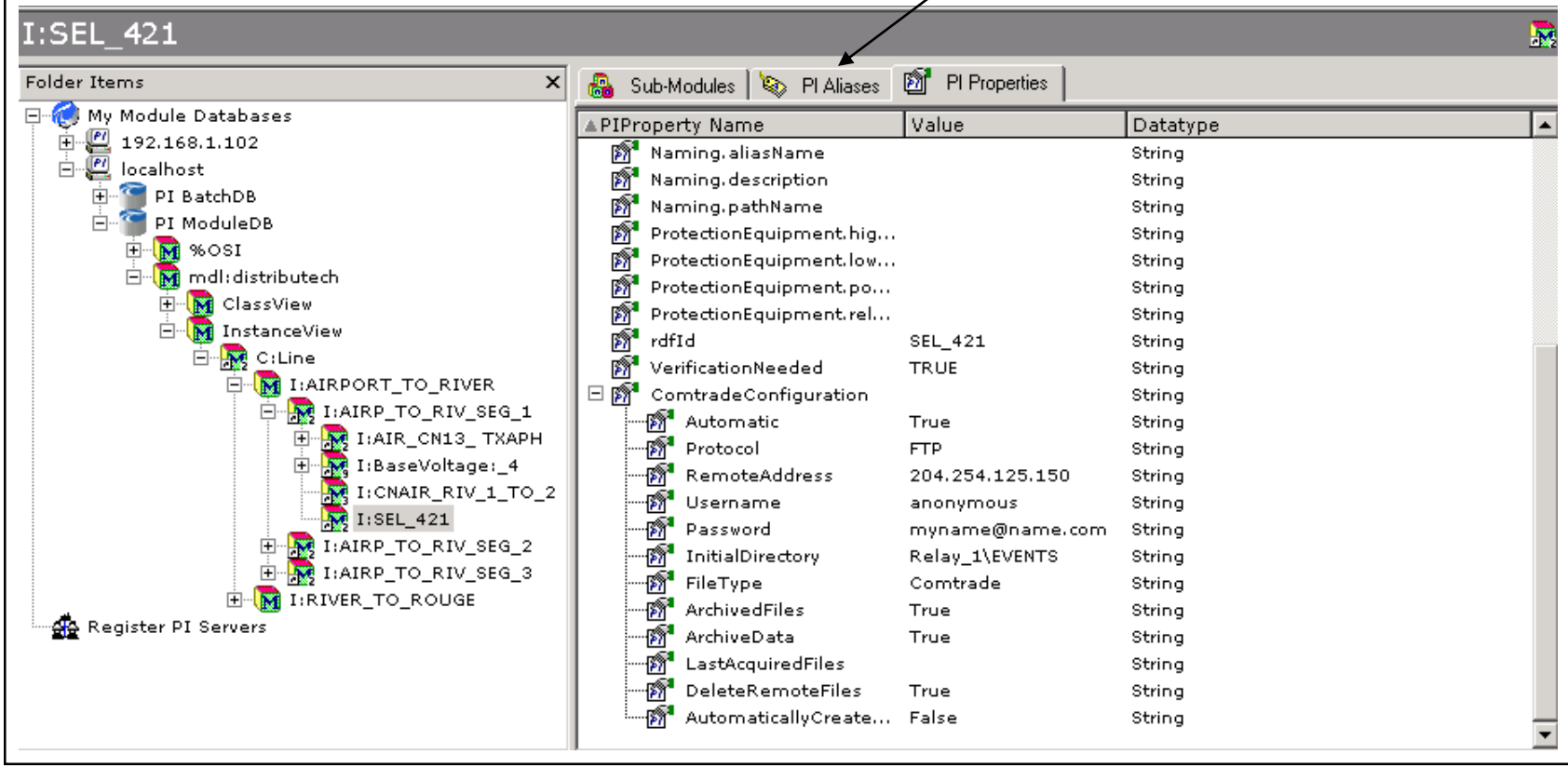
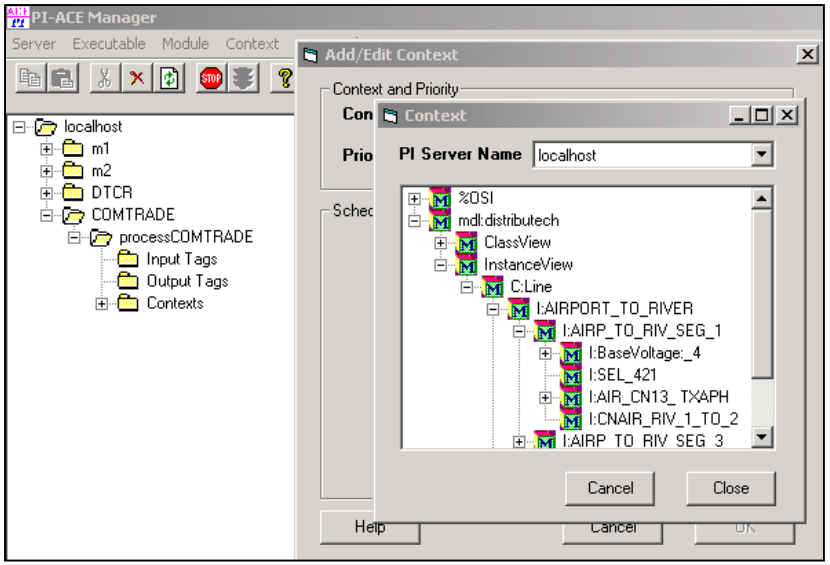
Configuration stored in Module

PIAlias Name	Tag Name
comA__sta_StationA_id_VAY_phase_A	SISCO.AXS4MMS.5:sel421:Relay_1/MMXU.MX.V.PhsAf
comA__sta_StationA_id_VBY_phase_B	SISCO.AXS4MMS.5:sel421:Relay_1/MMXU.MX.V.PhsBf
comA__sta_StationA_id_VCY_phase_C	SISCO.AXS4MMS.5:sel421:Relay_1/MMXU.MX.V.PhsCf



Enable ACE for Module

```
Dim myModule As PIModule

    Set myModule = GetPIModuleFromPath(mstrACEContext)
    If Not myModule Is Nothing Then
      myRetrievalObject.getComtrade myModule
    End If

End Sub

Private Sub UserDefinedInitialization()
    '
    ' User defined initialization
    '
   Set myRetrievalObject = New SISCOAutoFetch

End Sub

Private Sub UserDefinedTermination()
    '
    ' User defined termination
    '
   Set myRetrievalObject = Nothing
End Sub
```



The ACE Calculation

Select Configured Module

Benefits of Using PI for COMTRADE Processing

- PI ACE/Alarms/Expert Systems can be used to determine severity of issue.
- Earlier notification and response to problems.
- Could be used to update other applications such as Outage Management Systems.
- Ability to use PI tools to allow multiple individuals to work collaboratively on a problem.

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SISCO COMTRADE Utility for PI Licensing Options

- Individual License
  - Per CPU
- Corporate License
  - Unlimited Internal Usage

Historical Integration Allows:

- Comparison of events throughout a system lifecycle.
- A better view of the system before and after the event.
- Using PI allows easy correlation to other factors (e.g. temperature, weather, etc.)

Summary

The combination of the SISCO COMTRADE Utility and allows for quicker analysis of and response to disturbances, the ability to compare information from past disturbances, and correlation to other factors.

This combination makes sure that important information is used effectively and not discarded.

Thank You

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