Integrating Network Status Data (PI) with GIS Asset Graphics

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Overview

- What you've been asking for
- The obstacles
- The architecture of a solution --
  - components
  - how they fit together
- SCADA/Mimic Board project
- Demo
- The next phase of applications

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What customers have asked for?

- Data access
  - real-time
  - historical
- Accurate data
- Optimal performance of Operations Support Systems
- CAD/GIS integrated with asset status

All of the above - NOW

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What are the obstacles?

- Direct GIS data access
- Direct SCADA data access
- Inaccurate and incomplete data
- Incompatible data models
- Traditionally separate operating, mapping, and planning environments
- Traditionally separate distribution and transmission/substation responsibilities

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Here's a Solution

The Integration of **PI** with ***FastGate***

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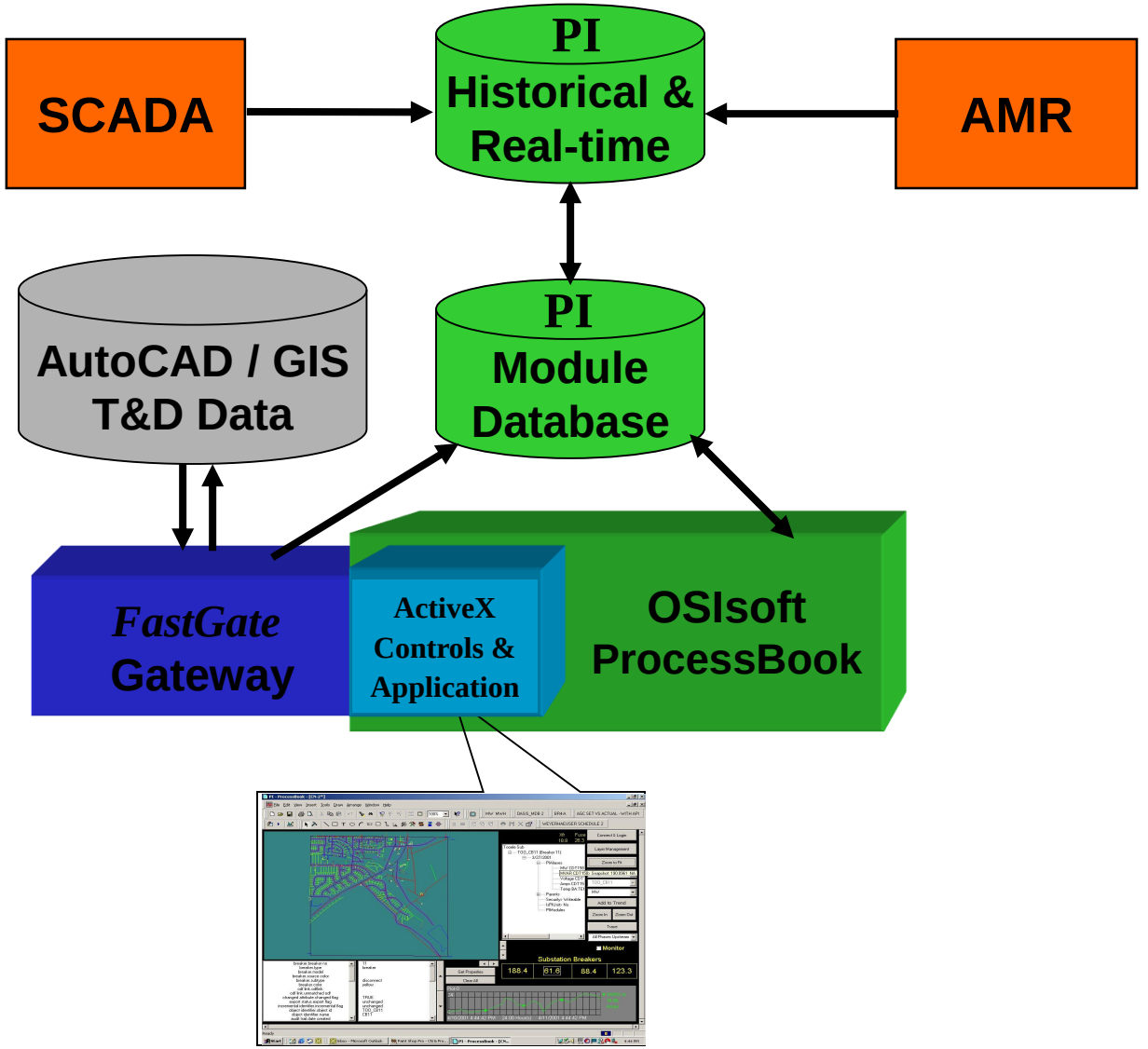
Solution Components

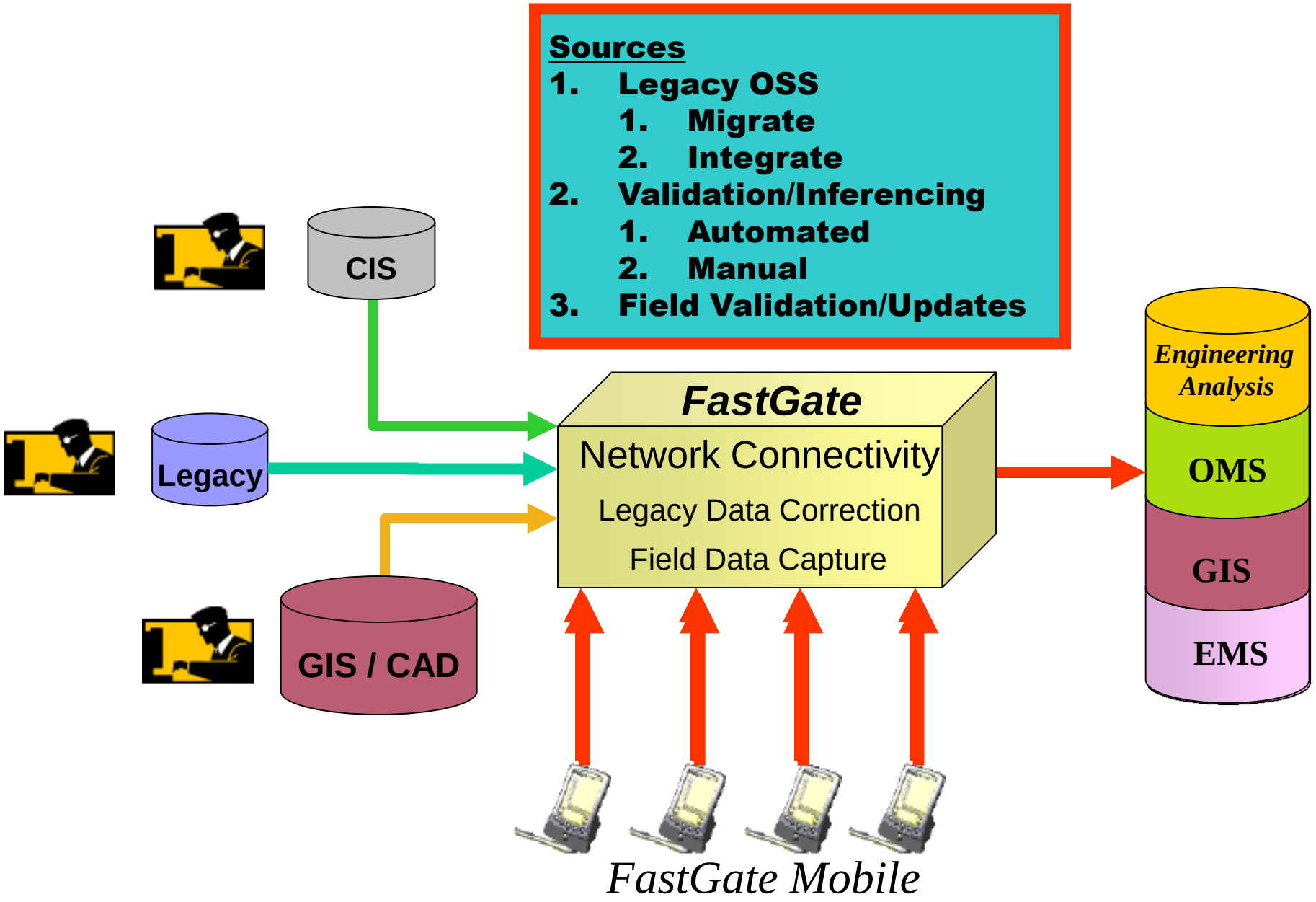
- **PI**
- **ProcessBook**
- **PI Module Database**
- ***FastGate*** ActiveX Controls (PBAXC) & Application
- ***FastGate*** **Gateway**

Any data transport mechanism

Merging Real-time and Historical Status with Network Asset Data



FastGate Gateway Overview



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What does the ***FastGate Gateway*** provide?

- Access to any geospatial data source
- Linkage of asset data to status data
- Auto-population of PI Module Data Base
  - Linkage between Network Model and PI Tags
- Validation and verification of network data against model requirements

  --- Target Application & CIM
- Identification and correction of data issues --- discrepancies

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Geospatially enables ProcessBook

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What's PI & ProcessBook

- **PI** is a real-time database that also contains all of the historical SCADA point data - alarms, status, values
- **ProcessBook** is an ActiveX container where the data is displayed in real-time - single-lines, graphs, trends, etc.
- **PI Module Data Base** provides the relationship between multiple tags and the specific asset, which then provides the link to any network asset model from *FastGate* for historical rendering.

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PI -- Data Access

- Published API with formal Software Development Tool Kit (SDK)
- Microsoft compliant Desktop Clients – works out of the box
  - Interoperable with Office Applications
  - PB- environment for rapid VBA development
  - **Leverage available ActiveX Controls**
  - Adhoc trending & analysis
  - Automate Reports
- **Module Data Base**
  - **Hierarchical Data Storage - feature relationships**
  - **History of Configuration**

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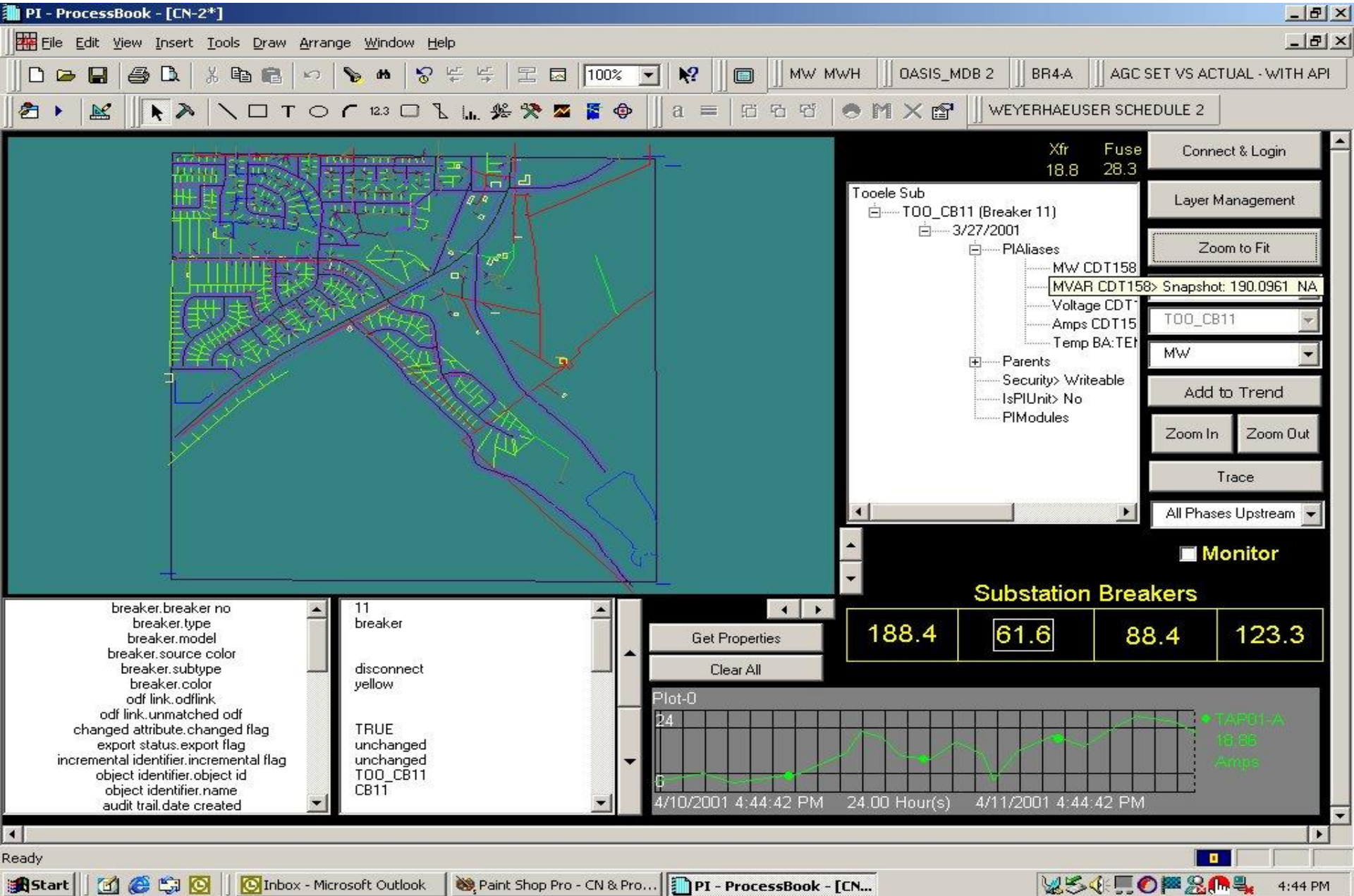
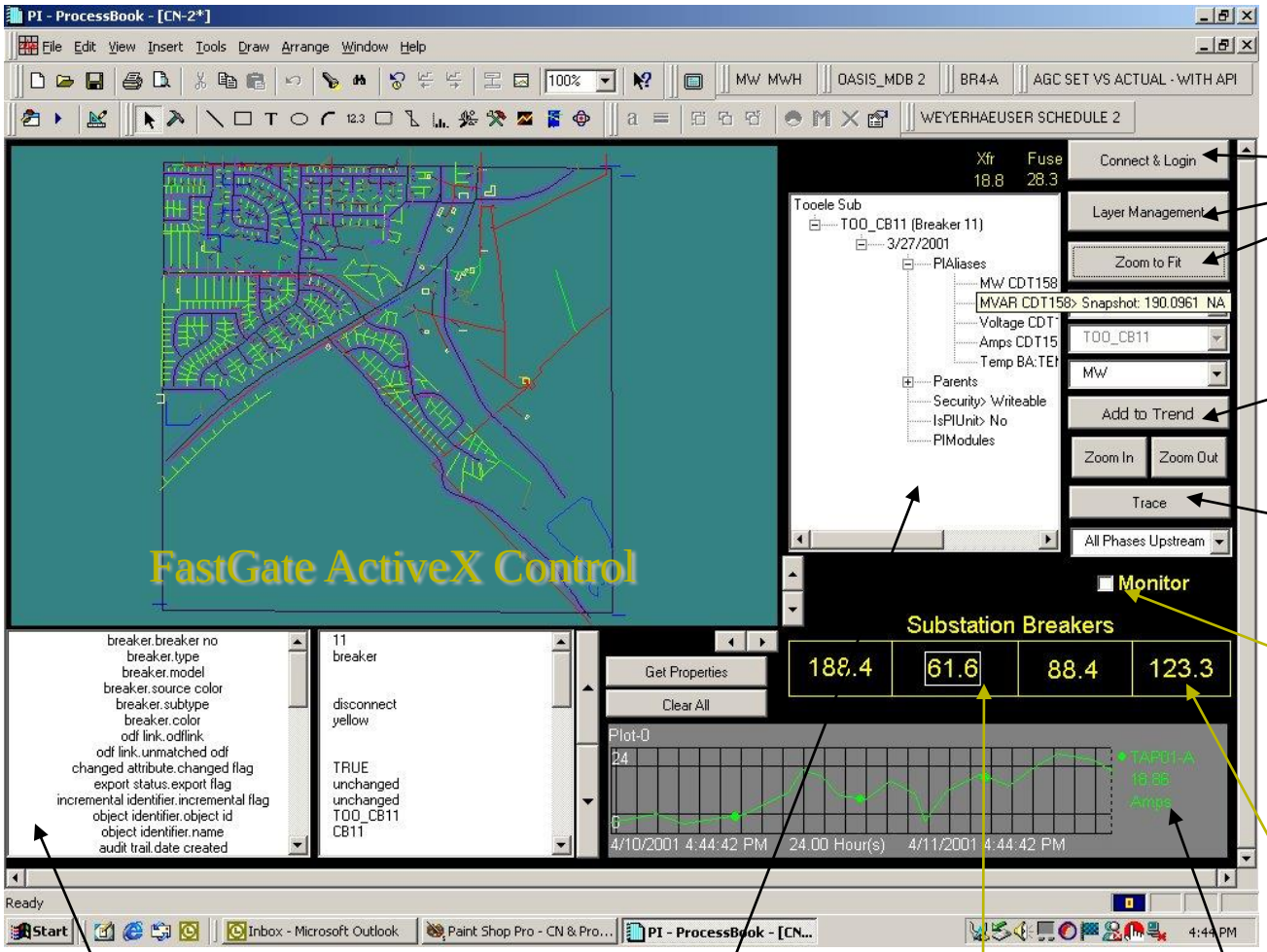
The Integration of PI with *FastGate*



ProcessBook ActiveX Event Container with VBA



VB Links to FG Draw Functions

MDB Integrated With PB

FG Network Trace

Send real-time data to FG Control

VB Links to FG Server Selected feature

Module DataBase For selected feature

Real-time Trends & Values

Select CB will center view w/in FG

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The bottom line --

- ***FastGate*** technology geospatially enables your **ProcessBook**.
- In other words – you can **integrate** your **real-time and historical** SCADA **data with** your AM/FM/GIS and CAD **network facilities data**.

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SCADA / Mimic Board Replication Project

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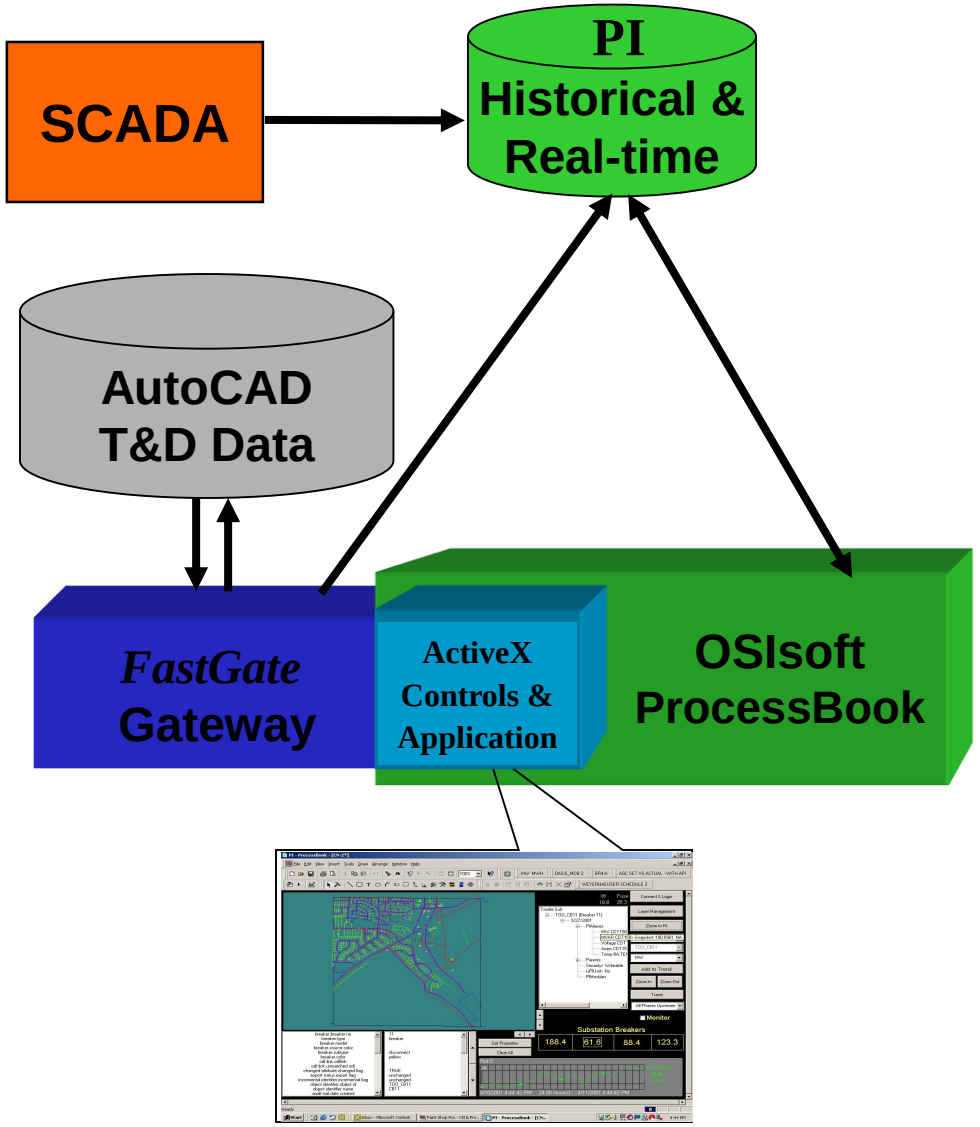
Merging Real-time and Historical Status with Network Asset Data



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Project Challenges

- Keeping the display in sync with SCADA
- Display of historical event information
- Display update response time with thousands of PI tags (pan / zoom)
  - Real-time refresh < 5 seconds
  - Historical Snap-shot refresh < 20 seconds
- Flexibility to display the graphics consistent with current SCADA display
- Changing graphics at different zoom levels
- Limiting graphics at different zoom levels
- Individual client acknowledgment of alarms -- not managed by the server

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SCADA / Mimic Board Project -- definition

- Import of CAD High Voltage Network diagram
- Graphical behavior definition
- FastGate PI Gateway configuration
- ProcessBook Application configuration
- Real-time and Historical display
- Update capability

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SCADA / Mimic Board Project -- display

- Substation details
- Generation status
- Cable loading status
- Devise (e.g. breaker, switch) status
- Display of PI Tag values
  - alarms
  - analog values
  - quality
- Pan/zoom & many Windows features

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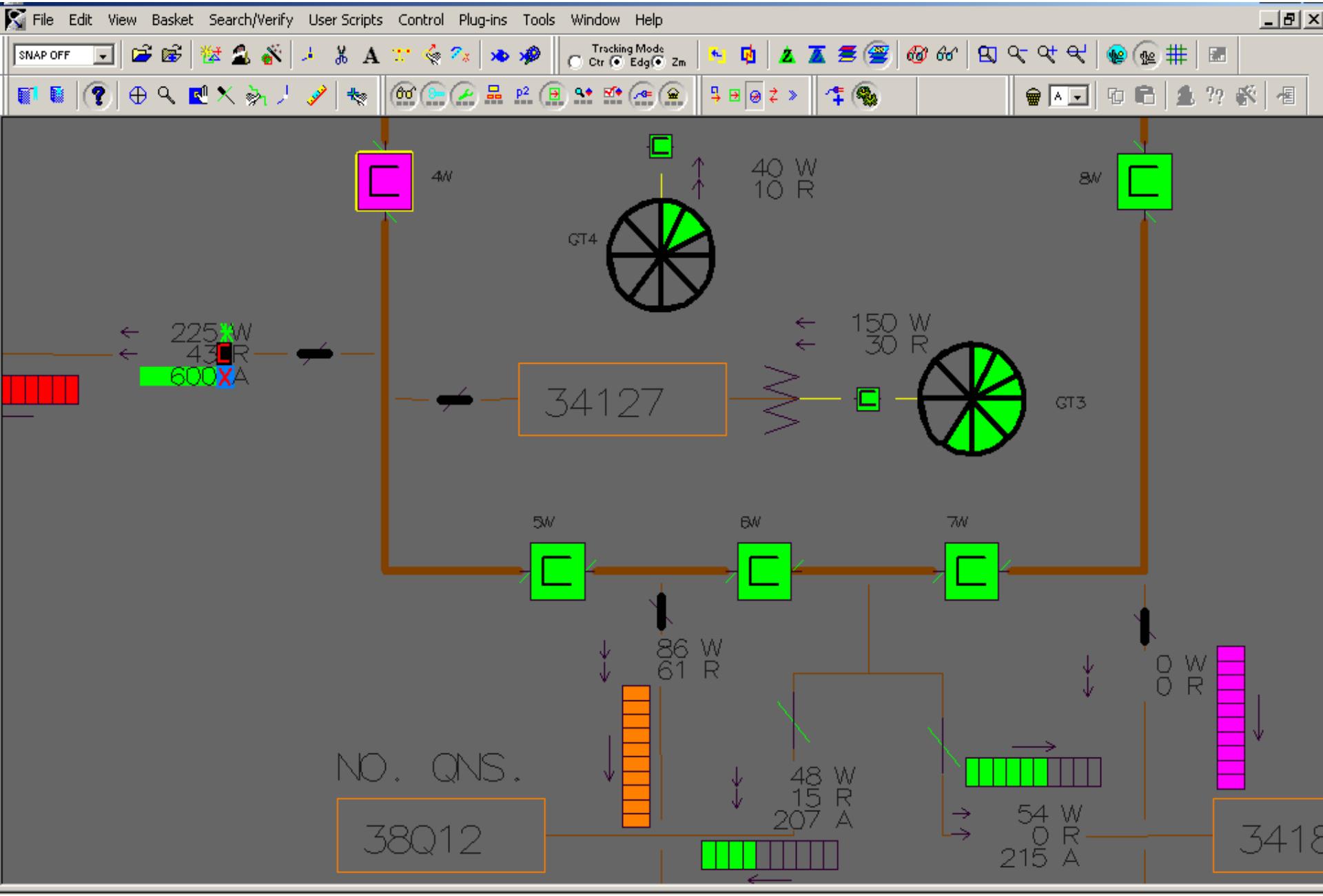
File Edit View Basket Search/Verify User Scripts Control Plug-ins Tools Window Help
SNAP OFF
Tracking Mode Ctr Edg Zm
4W
40 W
10 R
GT4
8W
225 W
43 R
600 A
34127
150 W
30 R
GT3
5W
6W
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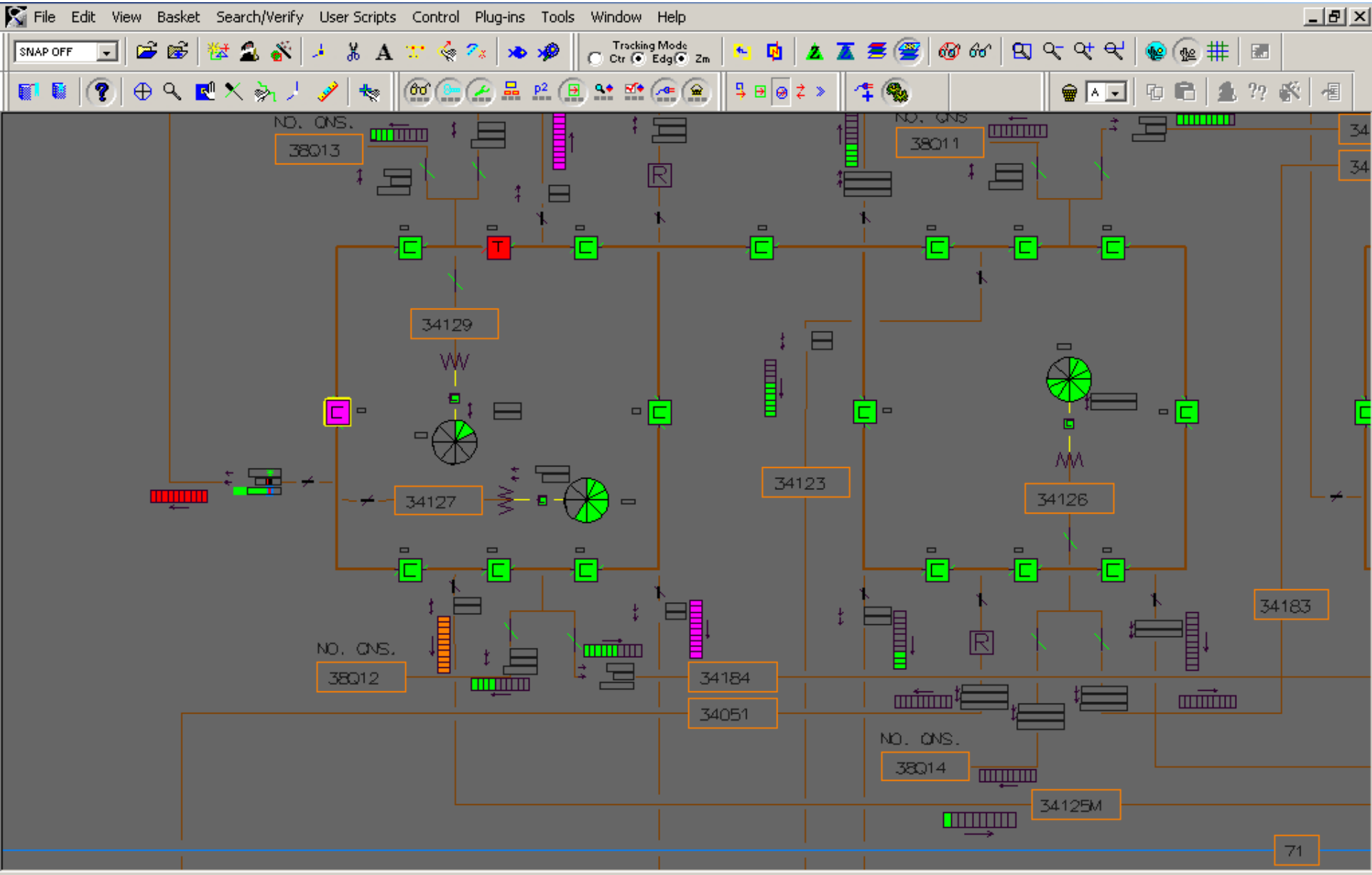
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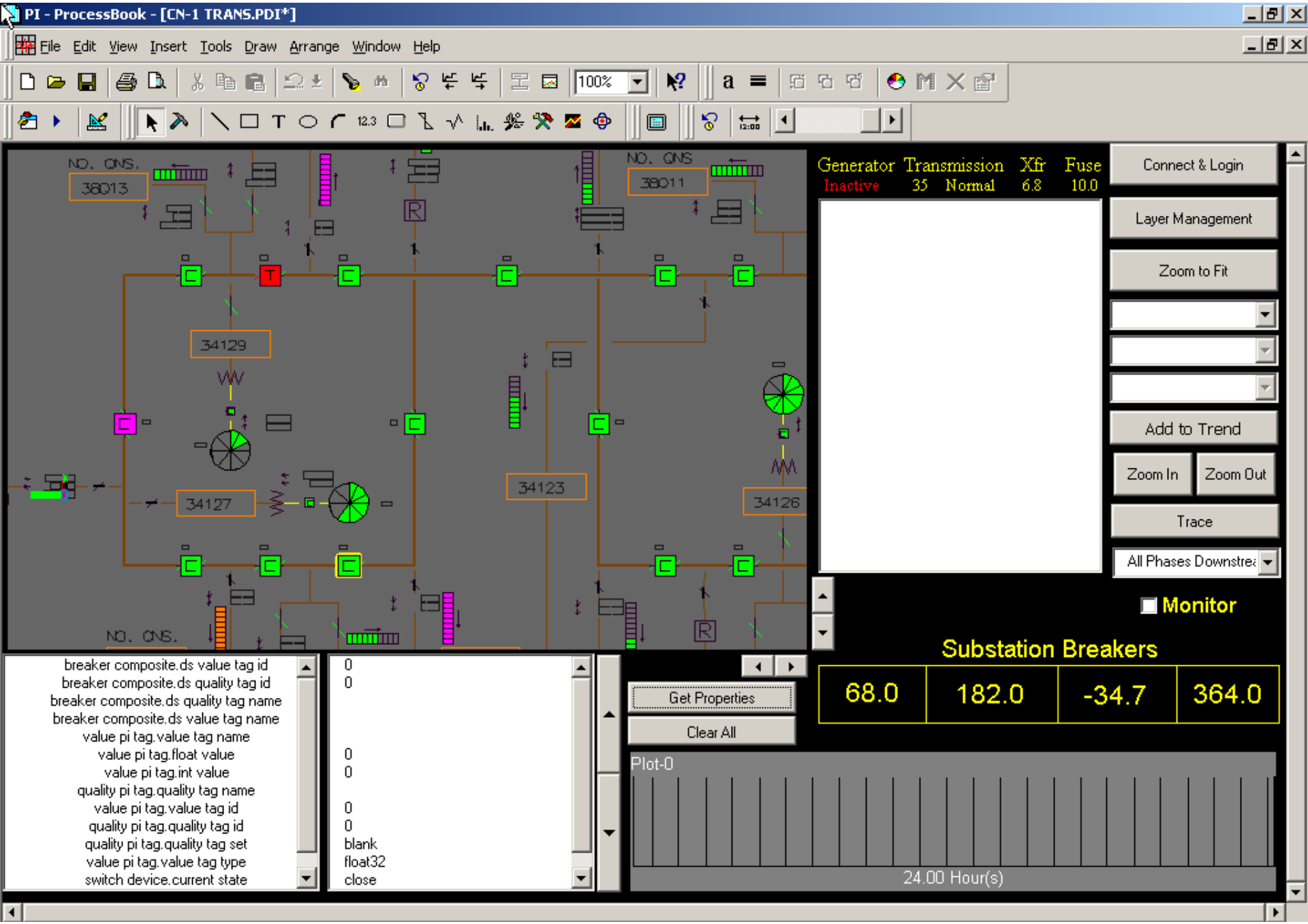
PI - ProcessBook - [CN-1 TRANS.PDI*]
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100%
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NO. QNS
38011
34129
34127
34123
34126
NO. QNS.
Generator Transmission Xfr Fuse
Inactive 35 Normal 6.8 10.0
Connect & Login
Layer Management
Zoom to Fit
Add to Trend
Zoom In
Zoom Out
Trace
All Phases Downstrea
Monitor
Substation Breakers
68.0
182.0
-34.7
364.0
Get Properties
Clear All
Plot-0
24.00 Hour(s)
breaker composite.ds value tag id 0
breaker composite.ds quality tag id 0
breaker composite.ds quality tag name
breaker composite.ds value tag name
value pi tag.value tag name
value pi tag.float value 0
value pi tag.int value 0
quality pi tag.quality tag name
value pi tag.value tag id 0
quality pi tag.quality tag id 0
quality pi tag.quality tag set blank
value pi tag.value tag type float32
switch device.current state close

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Demo

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Planned Applications

- Low-cost detailed view for system operators with only a high-level view
- Control room “mimic only” application
- Low voltage network Grid Mimic board on the desktop
- Historical event network response replay
- Real-time valve status for oil systems
- View only remote site SCADA back-up
- Real-time & historical gas and steam network status
- Web view via PI thin (ICE) or thick (PB) clients

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General – Expected Results

- Eliminate redundant graphics & data and associated data maintenance entry
- Leverage existing data assets for development of ProcessBook displays
- Facilitate solutions to:
  - prevent certain types of customer outages
  - lower line losses
  - extend the life of existing facilities
  - allow real-time verification of load reduction actions to lower operating costs
- Eliminate field dispatch for:
  - placement of load verification recording devices
  - checking status of various devices

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