The Virtual Process Overview and Applications

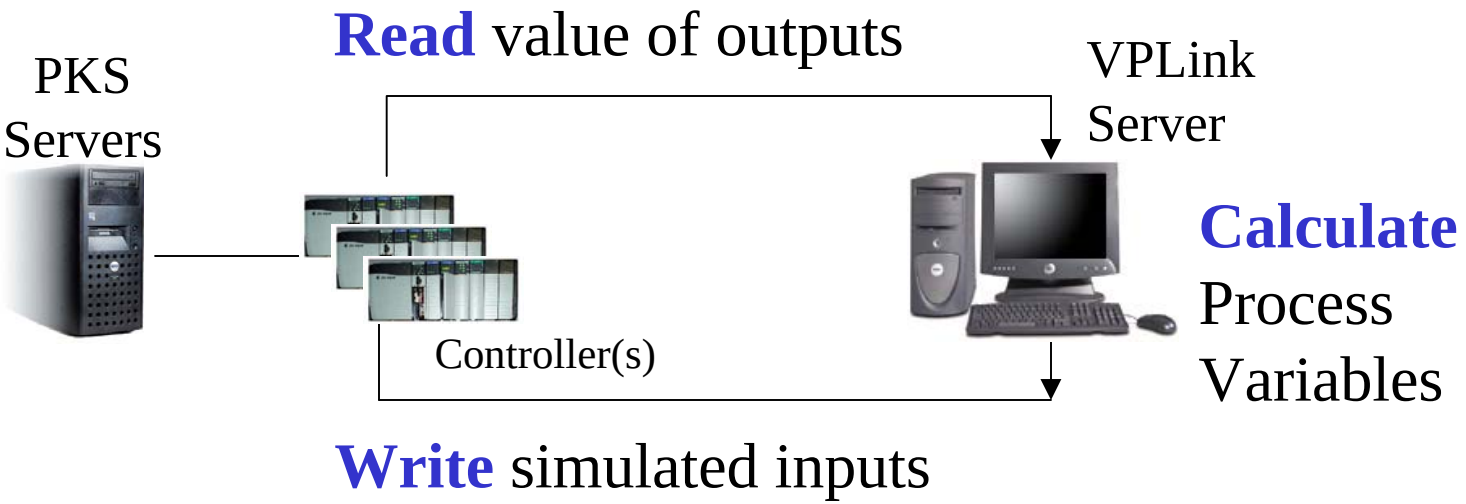
Cape Software Inc.

Houston TX

VP Link

The Virtual Process Loop

- Object Oriented and Tag-based.
- Direct Connect bypasses hardware I/O boards
- Interfaces with real/emulated controllers



Some of our customers...

BASF – several plants across several sites W/W

TOTAL–Netherlands

Eastman – several systems within Kingsport, TN

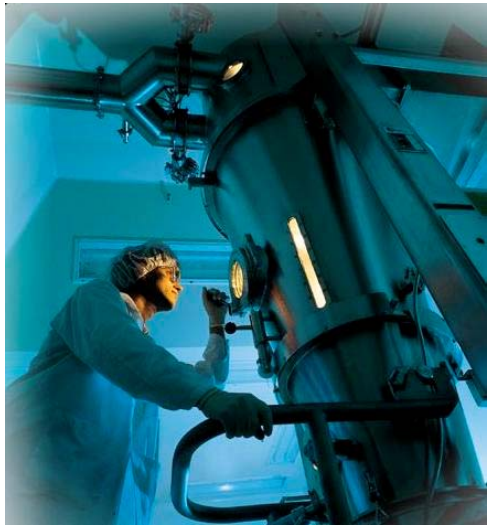
Air Products & Chemicals – several systems W/W

ConocoPhillips –San Francisco,CA

ChevronTexaco – Several Sites Licenses

Phillips Refining – Several Sites Licenses

TrunkLine LNG – Baton rouge,LA



Lubrizol – multiple licenses Deer Park, TX

BP – several licenses at several sites

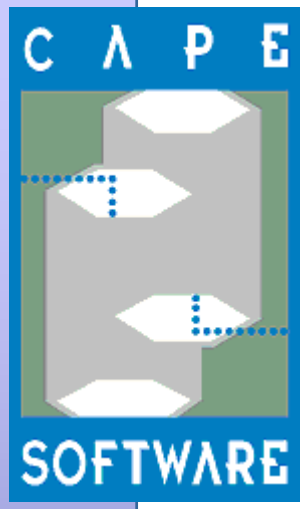
Shell Deepwater / Shell Chemicals,UK

Eli Lilly – Corporate licensing

Genentech – several licenses at different sites

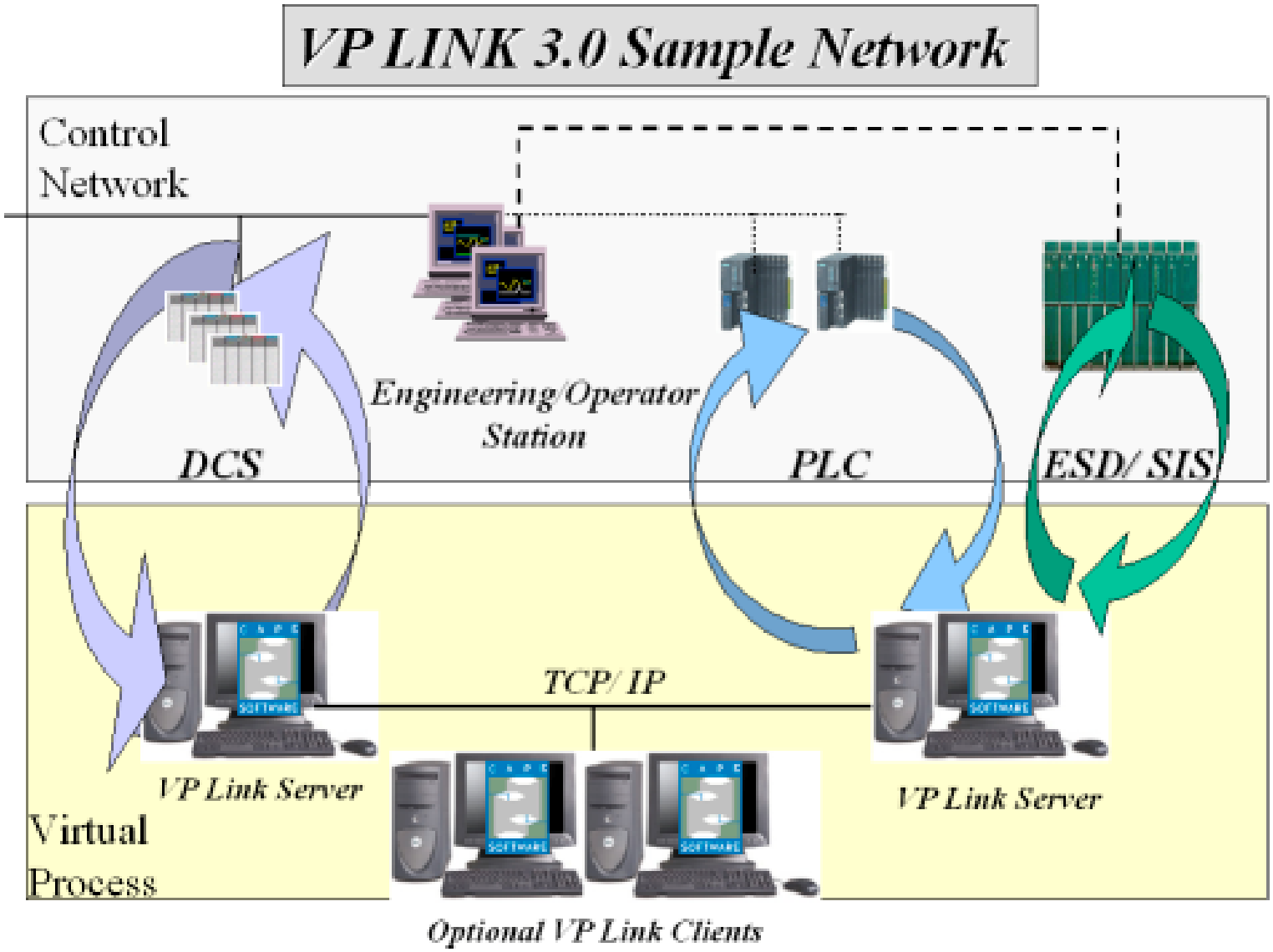
General Mills – W/W licensing

Murphy Oil - Mereaux, LA



Supported Systems

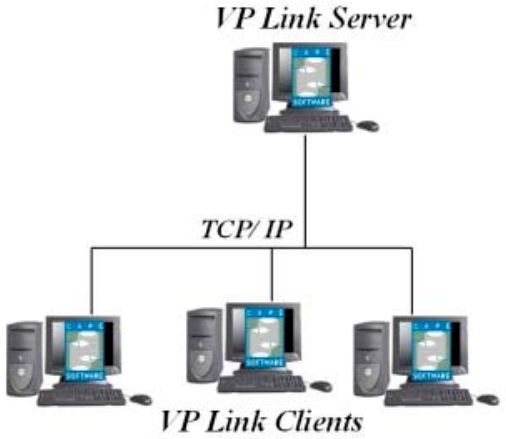
- **Honeywell Experion PKS TDC,TPS , FSC**
- **Honeywell Plantscape / Rockwell ProcessLogix**
- Triconex:Tricon/Trident
- GE Fanuc series 90
- A-B PLC5/SLC500,CLX, Modicon,Siemens-Ti 505
- Foxboro I/A,Archestra
- Siemens APACS, PCS7, S7
- ABB Mod300, Advant
- Yokogawa CS3000/R3/ ProSafe
- Etc...



Control Network Systems are solving the logic, responding to simulated VP Link inputs

Different Architectures for different Applications

Integrated Training Setup



Trainees operate different units, interacting with each other

Parallel Training Setup

Trainees operate identical units, in parallel

Virtual Process for PKS

VP Link 3.0

Server(s)

Trainer Station

VP Link/PKS Interface

Experion Servers (ESVT) with VP3 driver, for **Experion interface**

VP Link/FSC Interface

Redundant Ethernet

FSC, Safety Manager or other **ESD**

C200 Controllers (or emulated)

Experion Trainee Station (ES-T)

VP Link

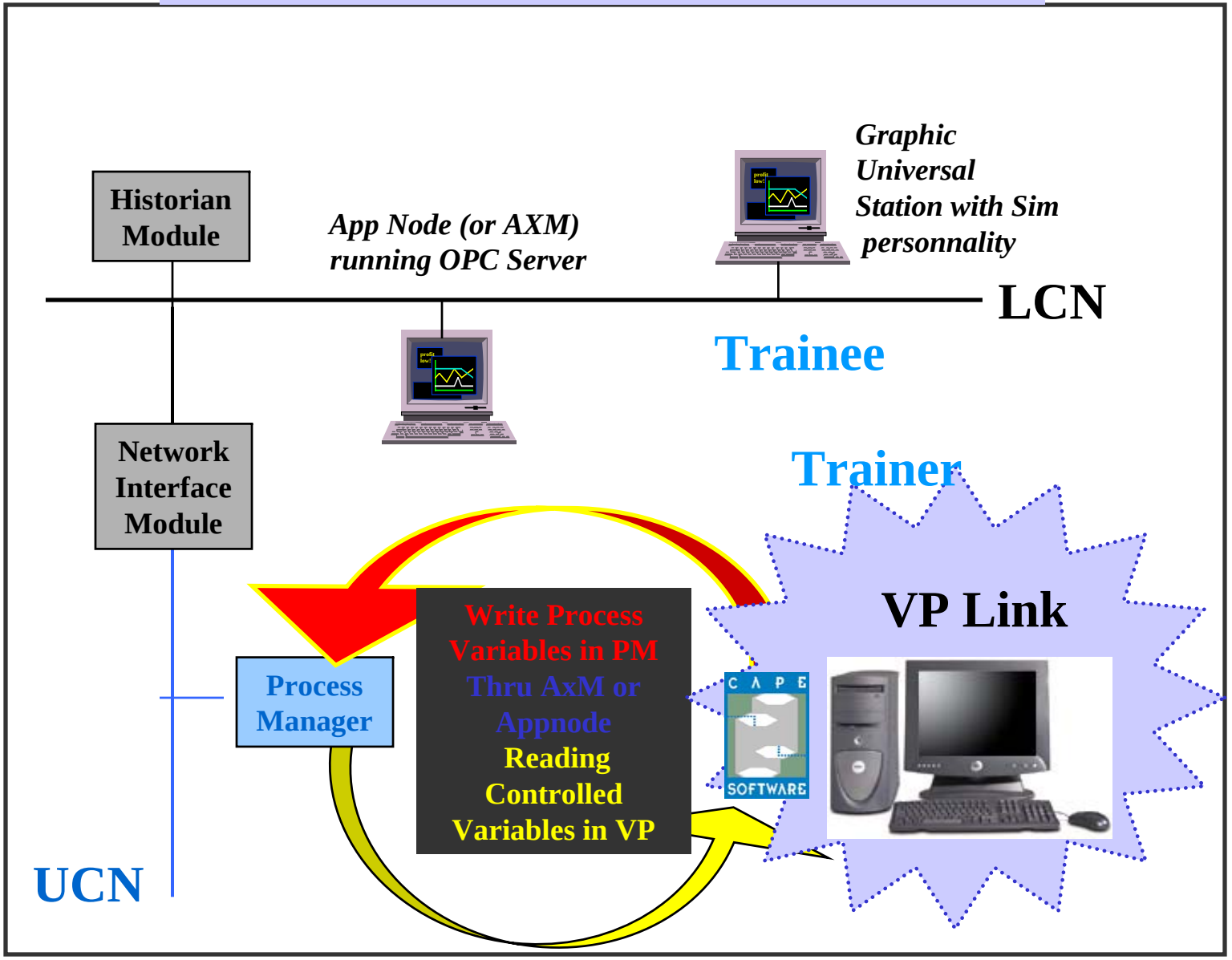
VP Link for Honeywell PKS Specifics

- Automated Extraction utility for *easy model maintenance*
- PKS Graphics Import in Toolbook for realistic trainer interface
- Fast *PKS API* Interface
- Both *Quick* AND *Control Builder* points available
- PKS *AutoSim* for seamless simulation,thru OPC interface

VP Link for Honeywell FSC Specifics

- No Change to the application
- Automated Extraction utility for *easy model maintenance*
- RS 232 / 485 Interface
- Use of the proprietary development protocol

Virtual Process for TDC



VP Link for TDC 3000 Specifics

- Automated Extraction utility for *easy model maintenance*
- TDC Graphics Import in Toolbook for realistic trainer interface
- Fast *TCP/IP OPC* Interface with AppNode
- Or Native *TCP/IP* Interface with AxM
- Interfaces with Real Hardware or emulated PMs if available

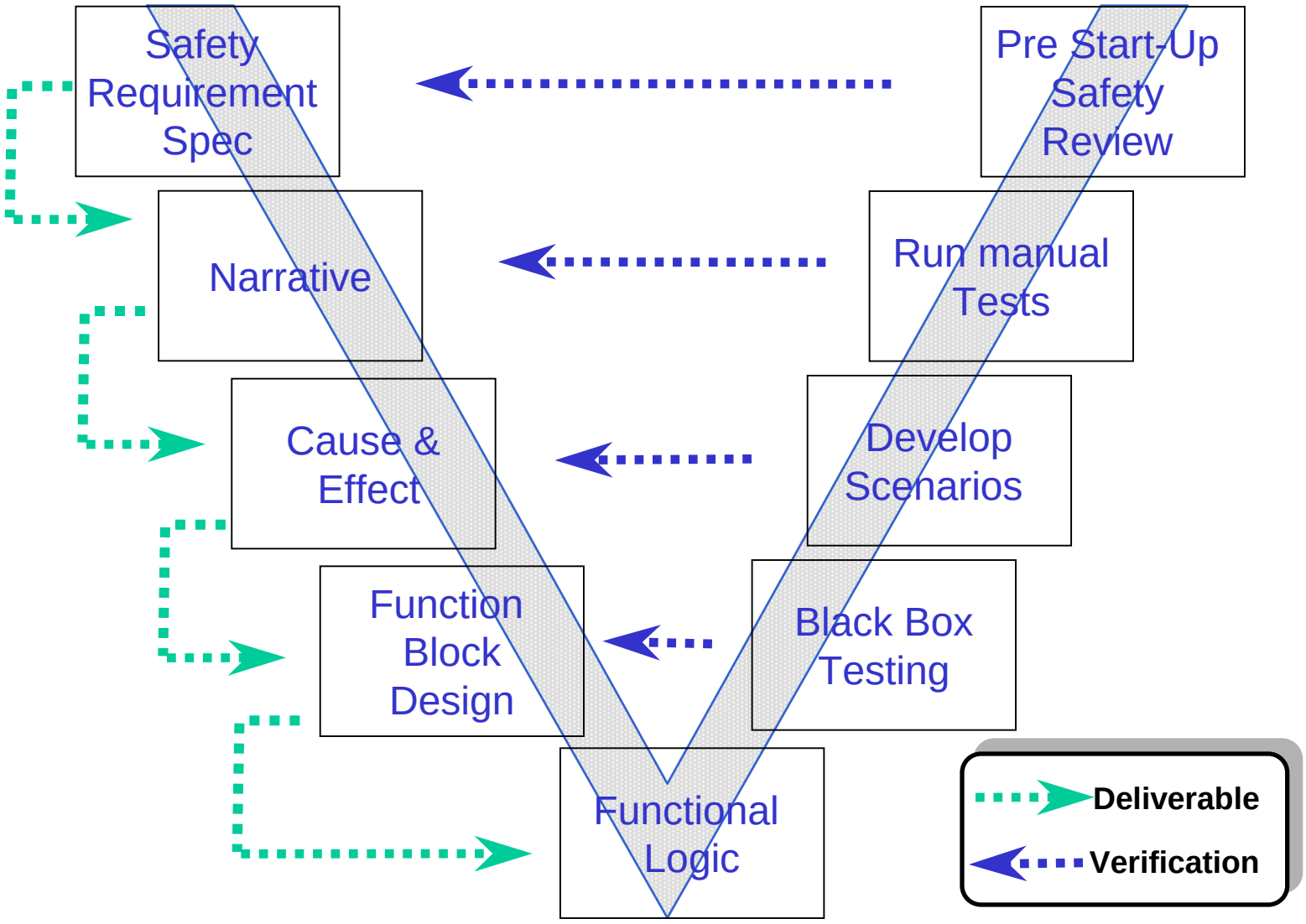
5 steps to simulation with Honeywell Platforms

- Extract the I/O image,using built-in platform specific tools
- Import the image(and HMI) in VP Link
- Model the process, using loop templates, algorithms and CalcBlock
- Write training/failure scenarios
- Connect to Control System

I - Logic Validation

- **Graphics** verification
- **Logic** checkout
- **Automate** repetitive testing task (ie resets etc…)
- Facilitate Testing with practical graphics
- **Interlock** schedule approval
- **Mapping** to DCS and interaction between DCS/PLC logic (gateway points tests)
- Thoroughly debug prior to online download, ie, **Management of Change** and periodical testing
- **Test Compiler complies with IEC61508/61511**

V-Approach methodology: application to validation

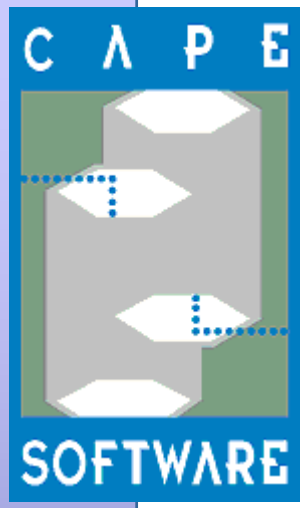


II-Operator Training

- **Familiarize** staff with HMI, Overlays, Navigation, Alarm Pages, Trend Displays
- **Exercise Startup** / **Shutdown** Procedures
- **Test Emergency** Responses to Faults / **Malfunctions** / **Upsets** (Real or Instrumentation)
- Refresher Training or Re-certification
- **Track** trainee's **proficiency** (**Scoring Engine**)
- **Knowledge Transfer** Tool

Operator Training System (OTS) using VP Link

- *Real control program* is used, in same field controllers for realistic control response
- Trainees operate the virtual plant using the real *field consoles, graphics and keyboards*
- *ESD* (Emergency Shutdown Device) is easily integrated in the process model and OTS
- *HMI graphics are imported* in VP Link to offer a intuitive trainer interface
- *High Quality* process modeling tools, simulating the most complex chemical processes
- *Experienced* simulation staff in *many industries*

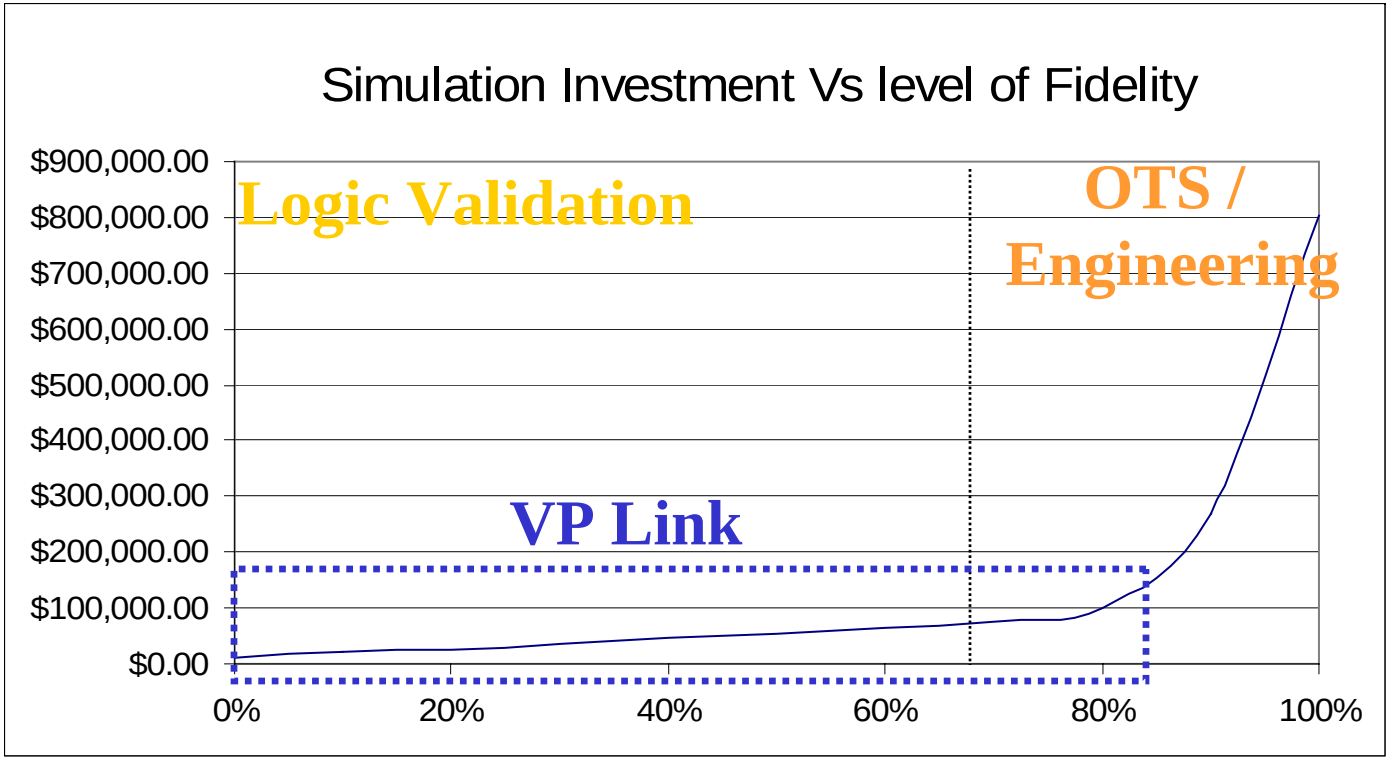


What kind of process simulation do I need ?

- **Process simulation Fidelity**
- **Applications of process simulation**

Cost Analysis of process model fidelity

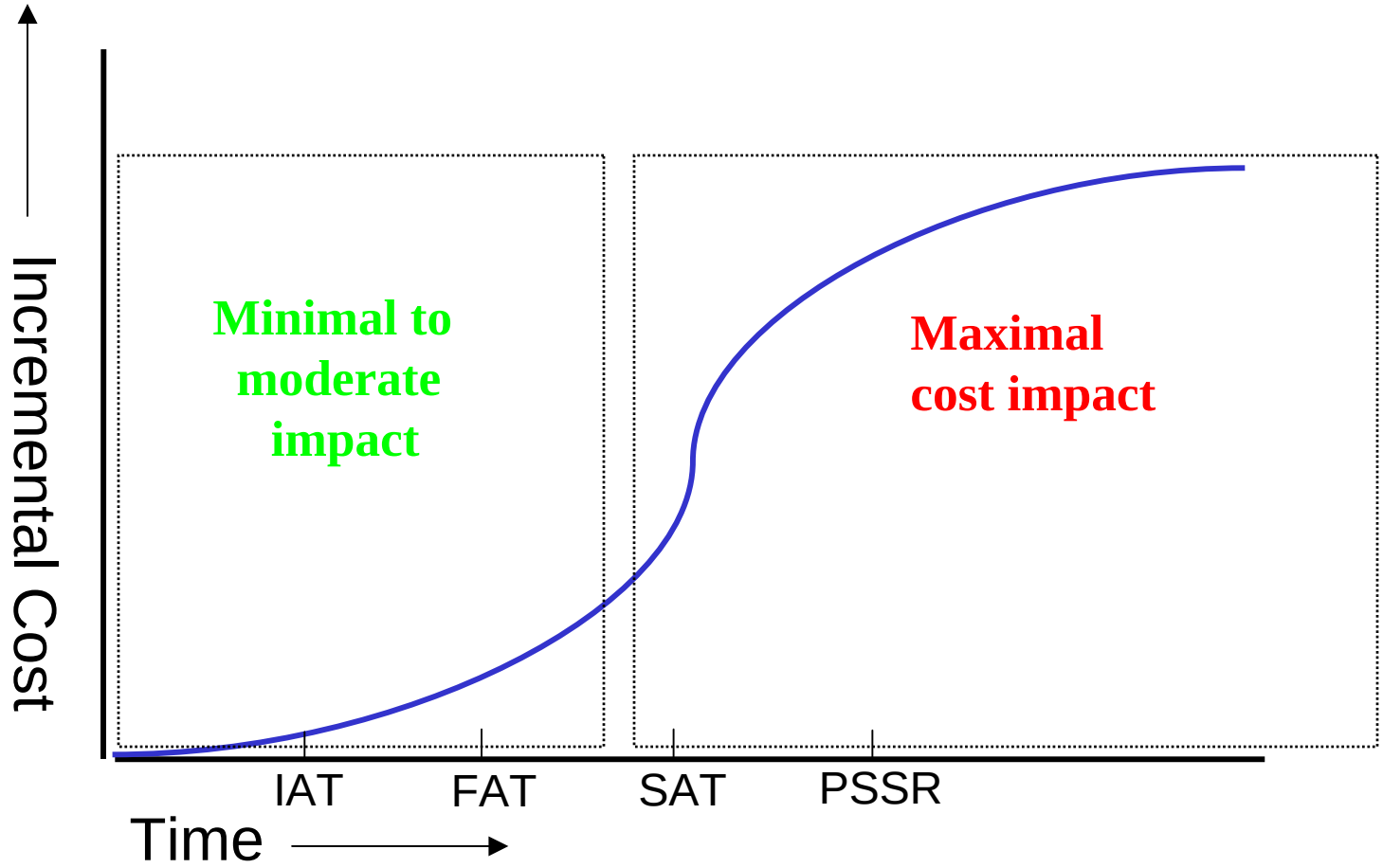
- ~ 2,000 I/O
- Refining units (treater/separation)



Medium Vs High Fidelity Process model

- Medium Fidelity
  - validation & OTS
  - Heuristic / Hybrid
  - dynamic
  - Connects to DCS
  - Console graphics
  - DCS upgraded during maintenance
  - $50k-$150k
- High Fidelity
  - Plant study (sizing)
  - Predictive
  - steady or approx.
  - Invasive
  - replicate HMI
  - Heavy maintenance
  - $500k-$1M

Impact of change during a project development cycle



VP Link

Maximize your ROI with VP Link

- ROI = (Gains - Investment) / Investment

- Minimize your operating costs & investment:
  - Fixed investment for simulation based on **I/O count**
  - **Low maintenance** cost (non-invasive,I/O based)
- Maximize your gain:
  - **Gains** calculated over **process lifecycle**
  - Highly **variable gains** depending on flexible implementation **timing** (if used for **validation** AND **OTS**) in terms of schedule AND software quality

Conclusion

- VPLink solves simulation needs from *simple to sophisticated*, rigorous modeling.
- OTS node can used as an engineering Test Bed system, for *preventive / periodical logic validation*
- *Unattended Real Time* trainee performance logs
- Modeling environment is *flexible,easy to learn and maintain*
- Available *New Version Service* keeps VP Link components up to date,with *free* technical support
- *Cost Effective* simulation package for *OTS*,using Off the Shelf components for process model and control or emulated control
- *Cross platform* functionalites makes VP Link an *evolutive investment*