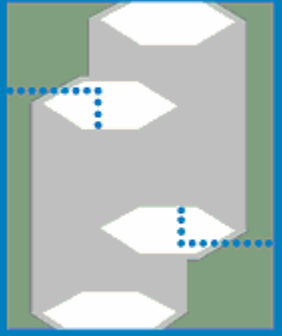


C A P E



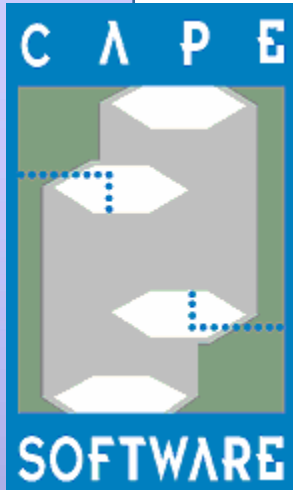
SOFTWARE

The background of the slide is a collage of various images related to industry and technology. It includes a green circuit board with white circles, a glowing industrial structure, a person in a control room, a person in a lab coat working with equipment, and a 3D wireframe model of a complex industrial plant.

The Virtual Process Overview and Applications

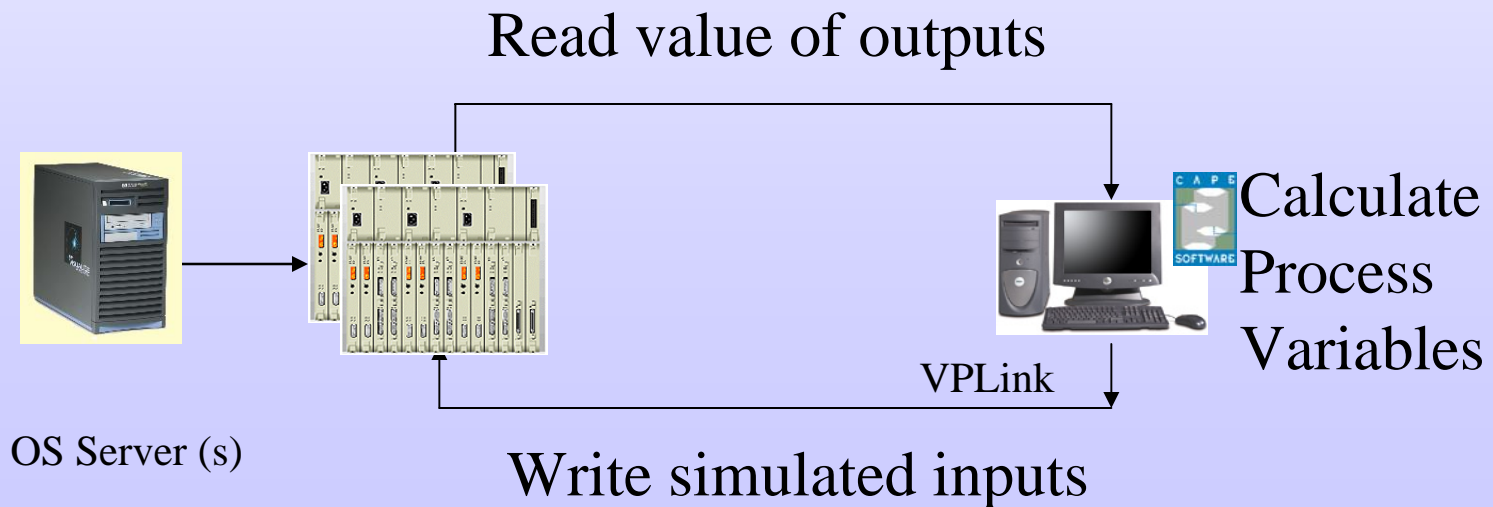
Cape Software Inc.

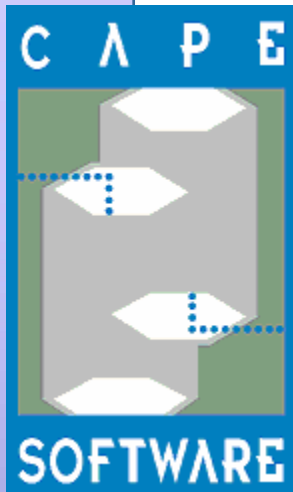
Houston TX



Virtual Process Overview

- Windows based interface: intuitive
- No Changes to Logic : non-invasive
- I/O board Hardware not required (cost advantage)





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

Conoco Phillips –San Francisco,CA

Chevron Texaco – Several Sites Licenses

Phillips Refining – Several Sites Licenses

Triconex, Foxboro – US



BP –several site licenses

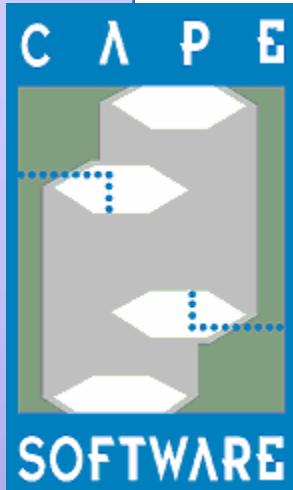
Shell Deepwater / Shell Chemicals,UK

Eli Lilly – Corporate licensing

Genentech – several licenses at different sites

Dow Chemicals – several site licenses

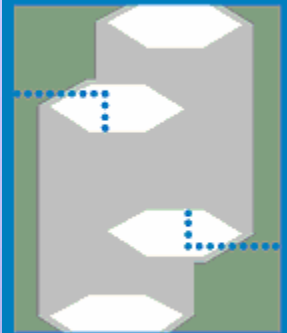
Murphy Oil – Mereaux,LA



Supported Systems

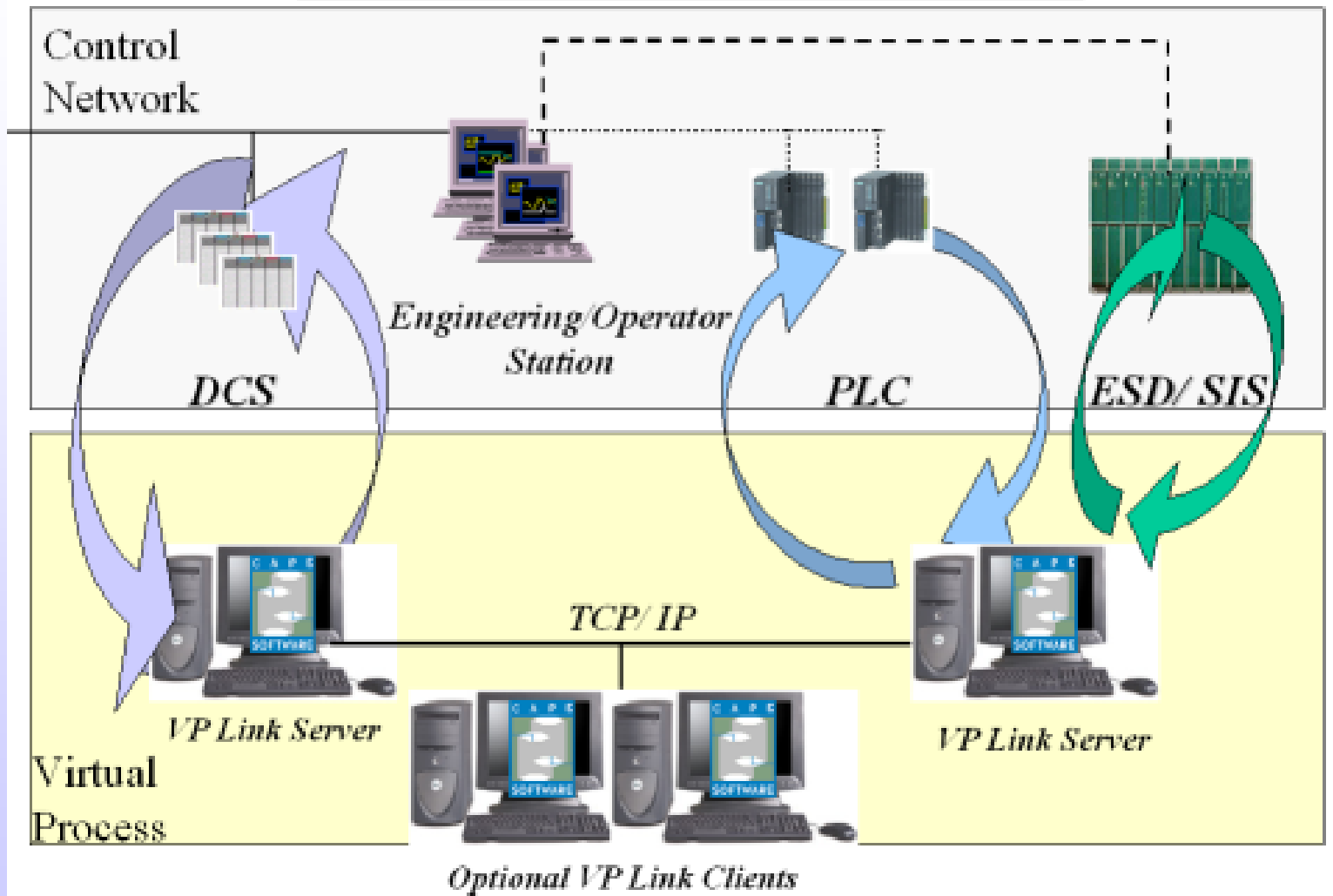
- ABB 800 xA, Industrial IT
- ABB Mod300, Advant
- Honeywell Plantscape / Rockwell ProcessLogix
- Honeywell Experion PKS TDC, TPS , FSC
- Triconex:Tricon/Trident
- GE Fanuc series 90
- A-B PLC5/SLC500,CLX, Modicon,Siemens-Ti 505
- Foxboro I/A,Archestra
- Siemens APACS, PCS7, S7
- Yokogawa CS3000/R3/ ProSafe
- Etc...

C A P E

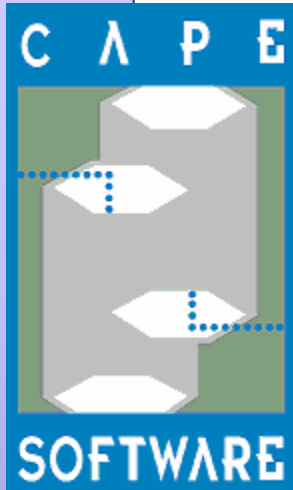


SOFTWARE

VP LINK 3.0 Sample Network

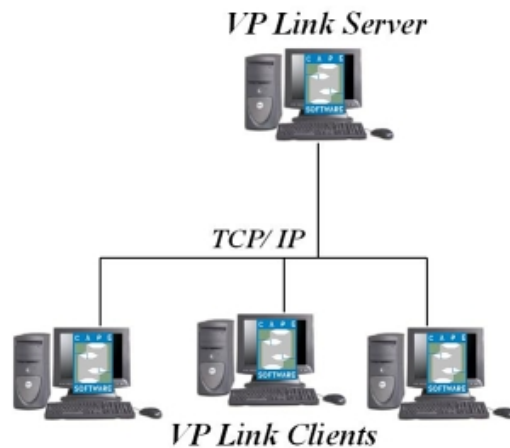


Control Network Systems are solving the logic, responding to simulated VP Link inputs



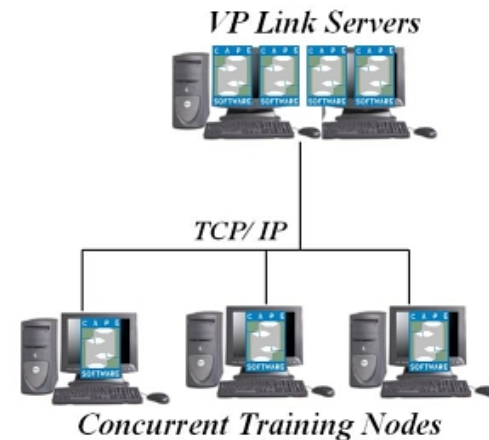
Different Architectures for different Applications

Integrated Training Setup

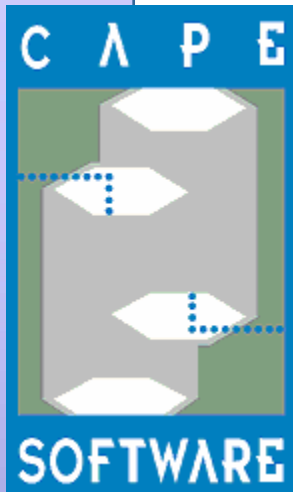


Trainees operate different units, interacting with each other

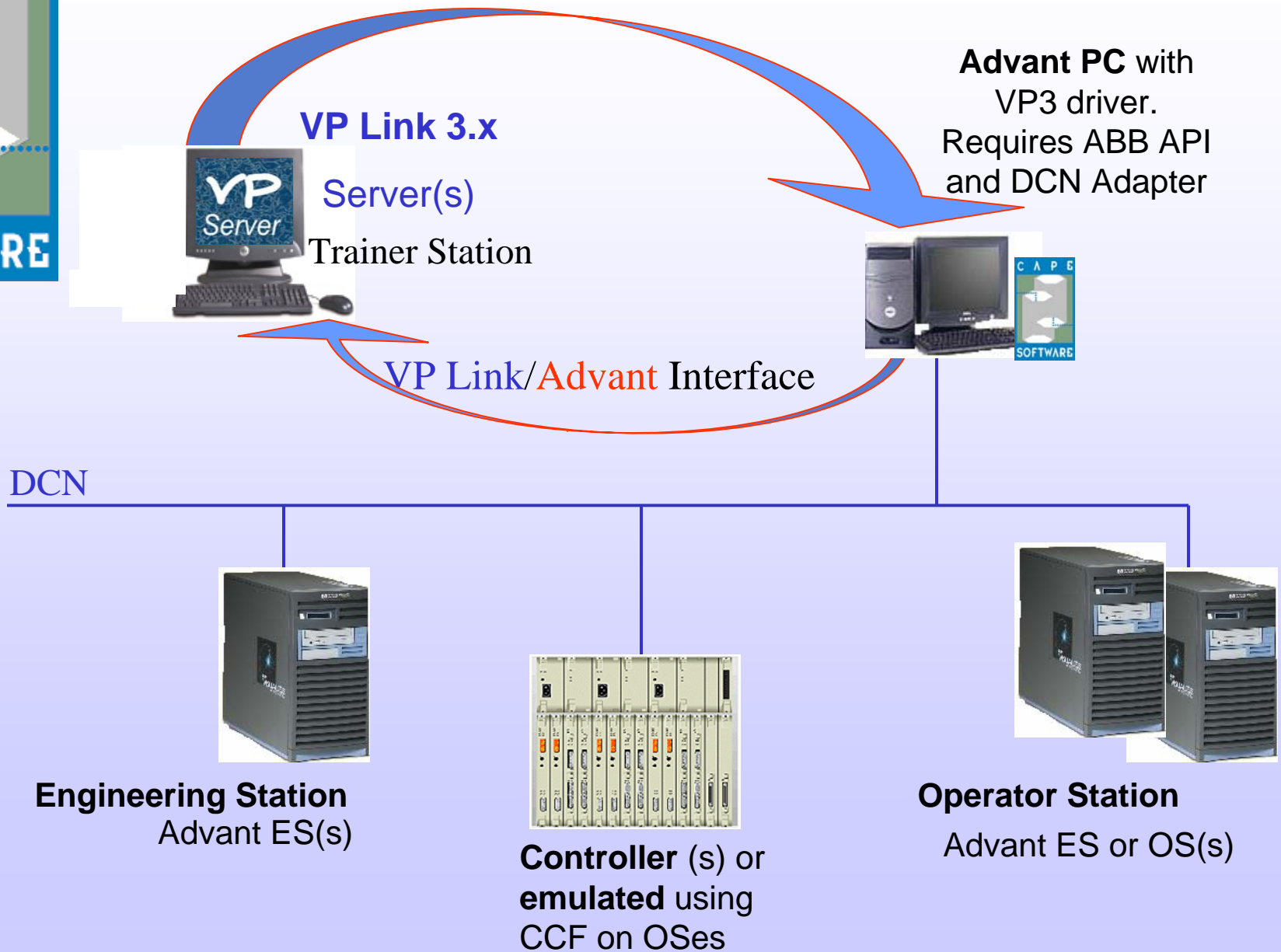
Parallel Training Setup



Trainees operate identical units, in parallel



Virtual Process for ABB Advant



Advant PC with VP3 driver.
Requires ABB API and DCN Adapter

VP Link 3.x

Server(s)
Trainer Station

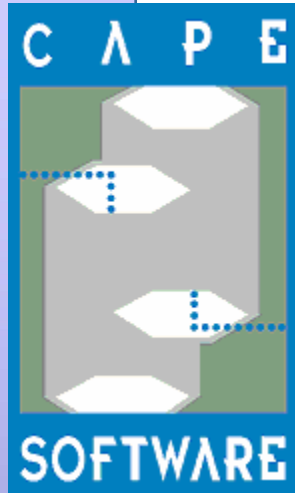
VP Link/Advant Interface

DCN

Engineering Station
Advant ES(s)

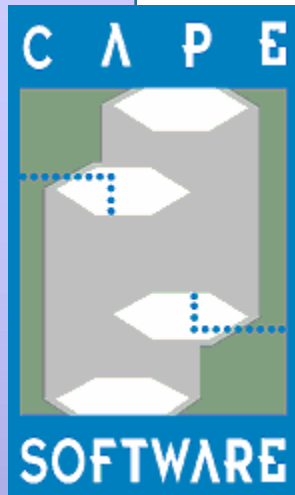
Controller (s) or emulated using CCF on OSe

Operator Station
Advant ES or OS(s)



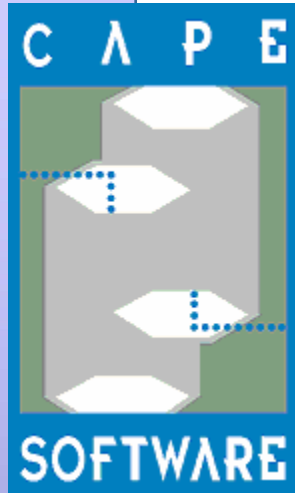
5 steps to simulation with ABB Advant Platform

- 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



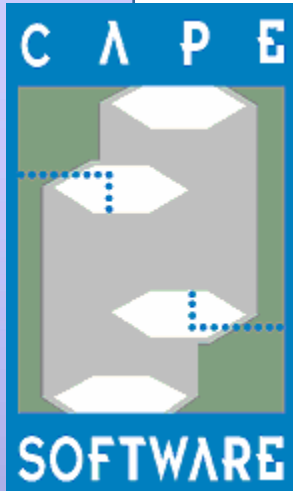
VP Link for Advant : Specifics

- I/O blocks “initoutmod” parameter *temporarily* changed during simulation
- Automated Extraction utility for *easy model maintenance*
- *OS Graphics Import* in Toolbook for realistic trainer interface (trainees operate from the real OS)
- Fast, Robust *ABB API* Interface for real time simulated process feedbacks
- Seamless interface to *Emulated* or *Hardware* Controllers



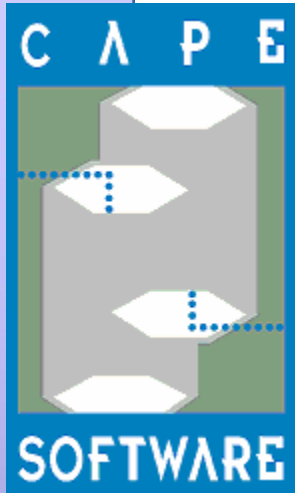
Does the type of process matter ?

- VP Link is a proven solution for :
 - Batch (recipe / state control based strategy)
 - Semi-continuous
 - Continuous
- How ?
 - VP Link model is I/O based
 - Hence isolated from control strategy

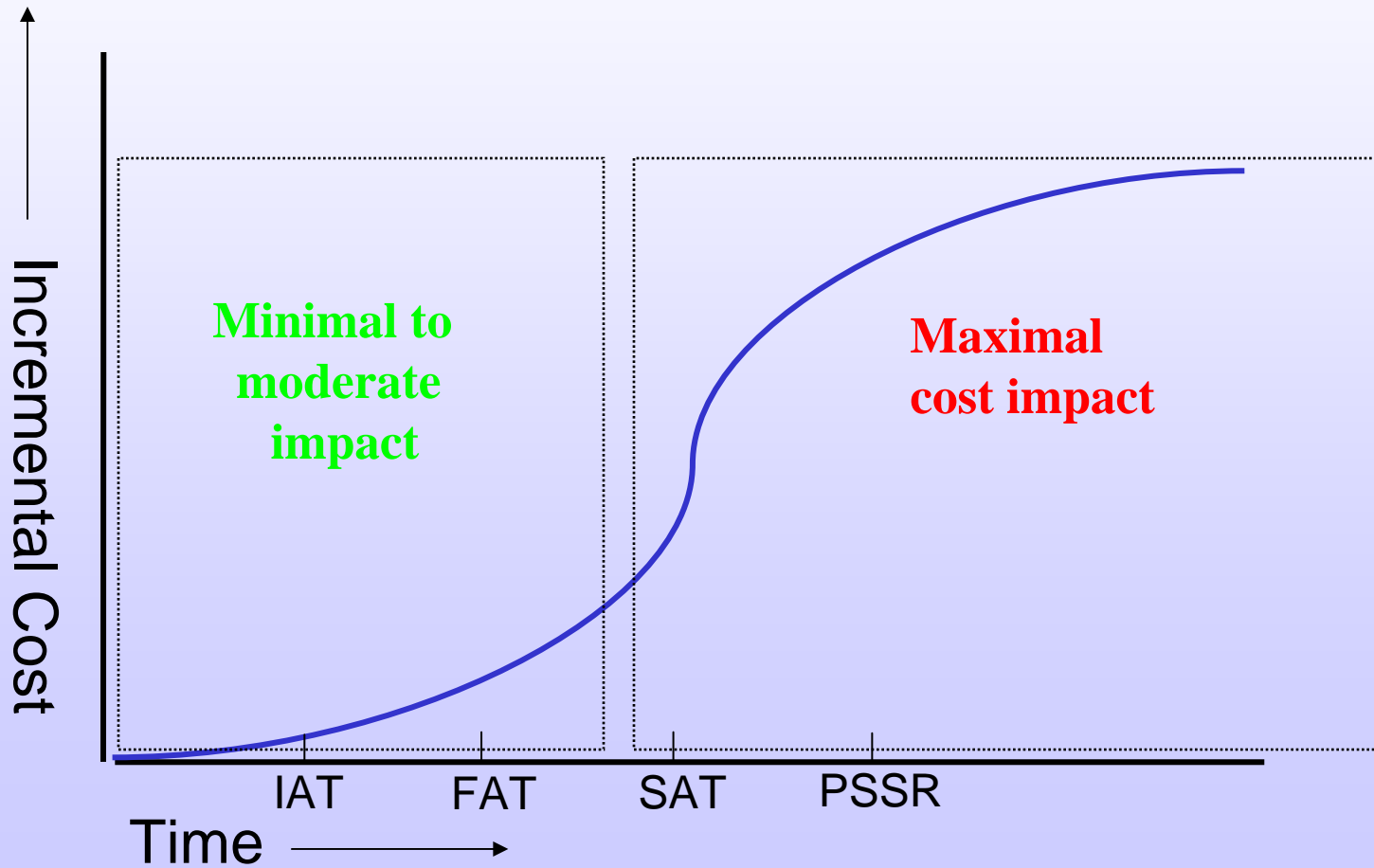


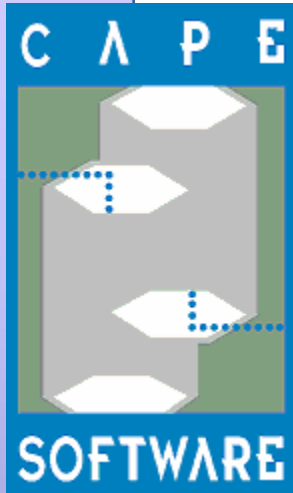
VP Link Applications

I - Logic Validation



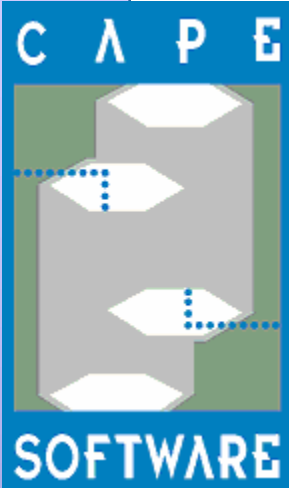
Impact of change during a project development cycle



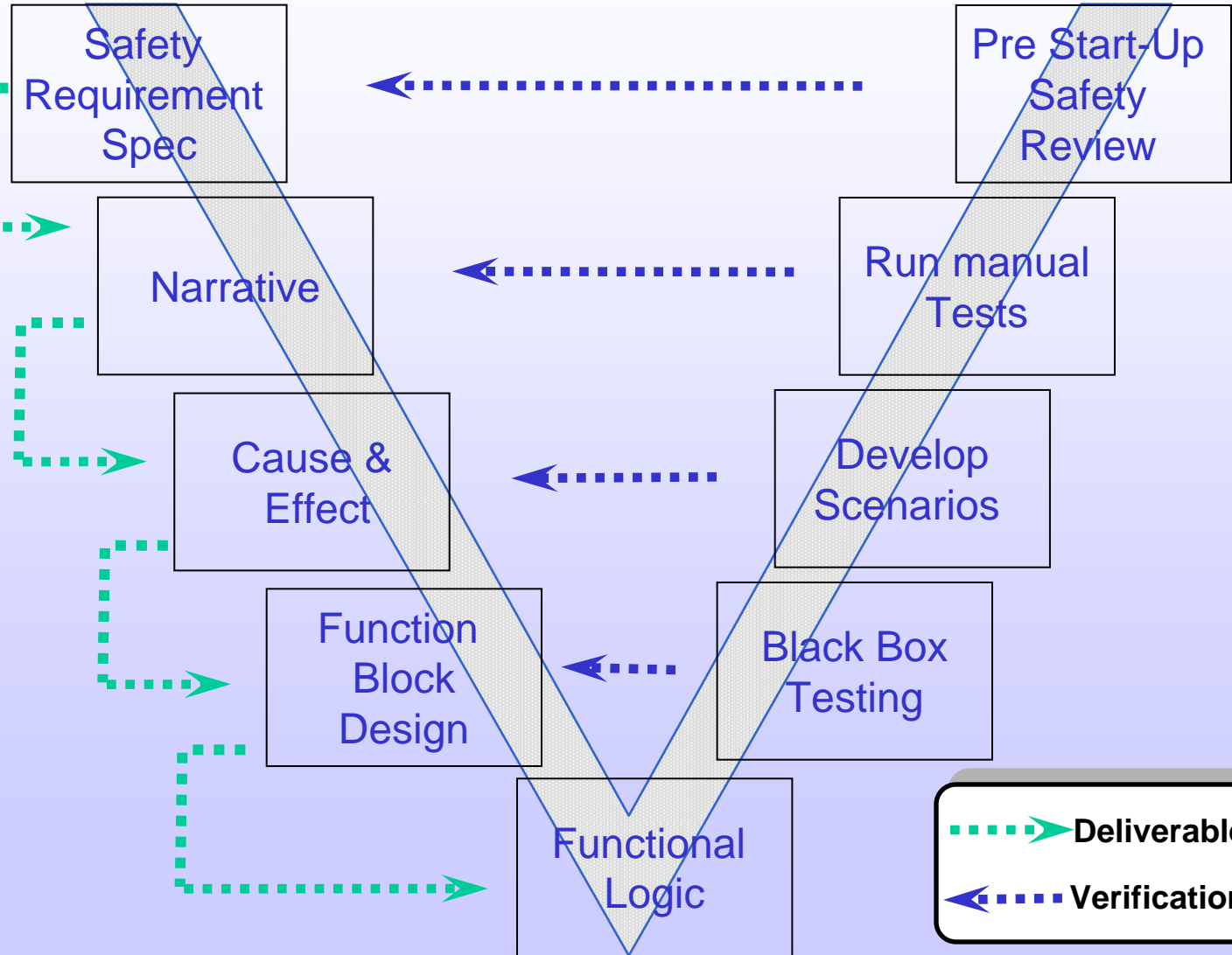


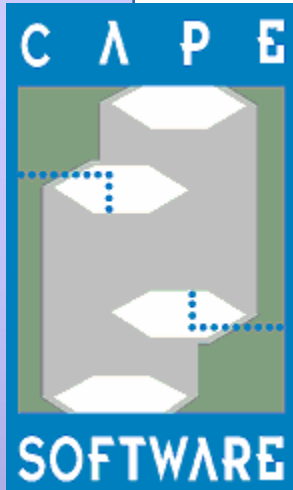
I - Logic Validation

- VP Link Allows:
 - Graphics verification
 - Logic checkout at I/O / block / module / system level
 - Interlock schedule approval
 - Integrated Testing :**Mapping** to DCS and interaction between DCS/PLC logic (gateway points tests)
- How ?
 - Automates repetitive testing task (ie resets etc...)
 - Facilitates FAT with customized graphics
 - Collaborative testing framework thru distributed architecture
- Thoroughly debug prior to online download, ie, **Management of Change** and periodical testing
- **Test Compiler complies with IEC61508/61511**



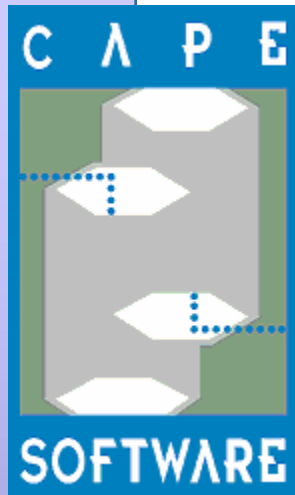
V-Approach methodology: application to validation





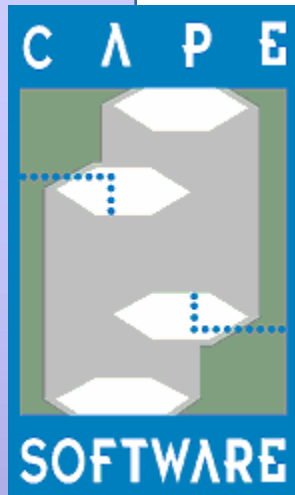
VP Link Applications

II- Operator Training Simulator
(OTS)



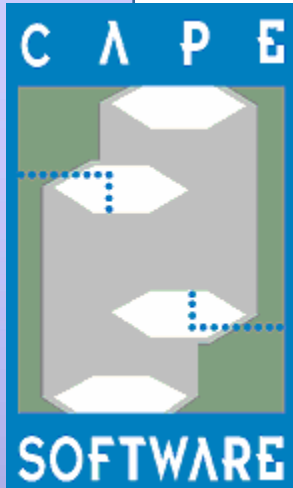
II-Operator Training

- **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



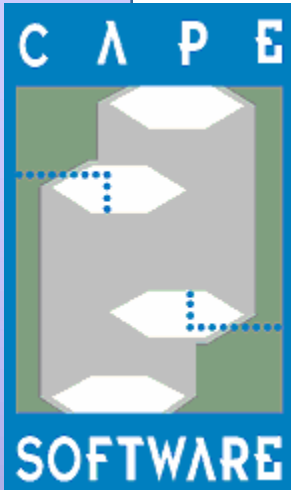
Operator Training System (OTS) using VP Link

- *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 the *Refining & Chemicals industry*



What kind of process simulation do I need ?

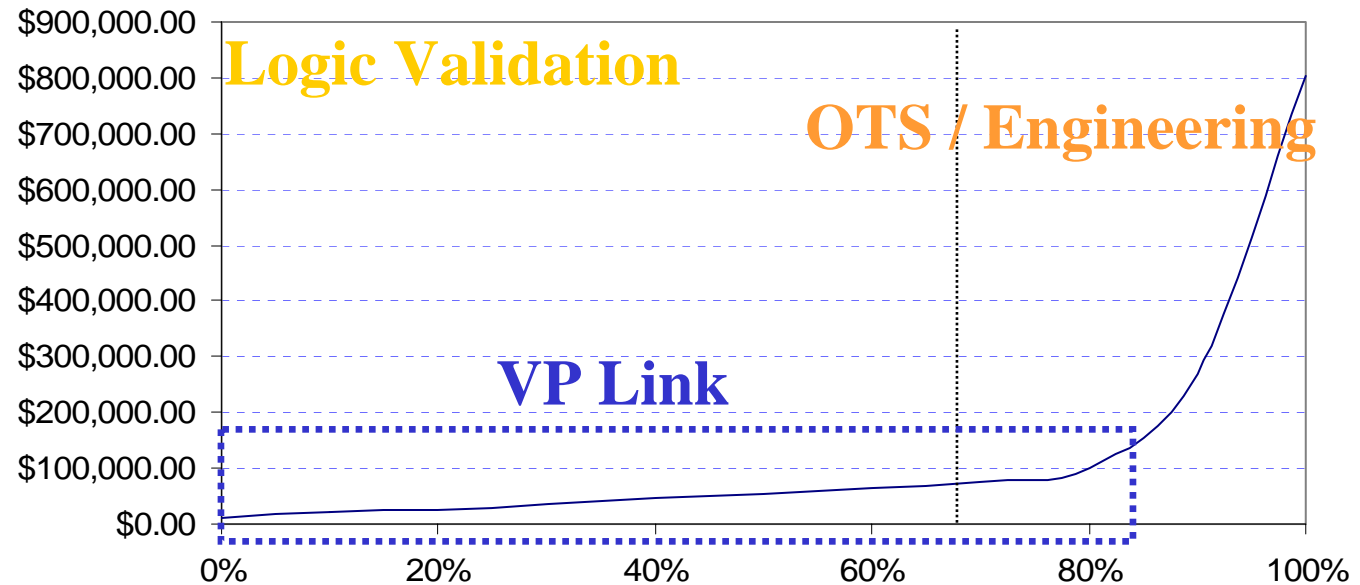
- Process simulation Fidelity
- Applications of process simulation



Cost Analysis of process model fidelity

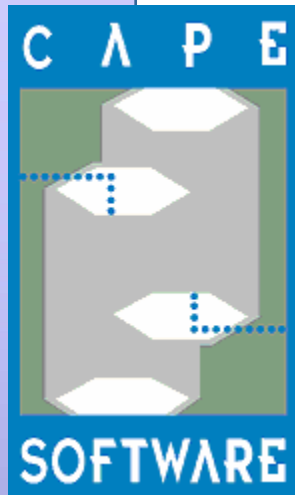
- ~ 2,000 I/O
- Oil Refining

Simulation Investment Vs level of Fidelity



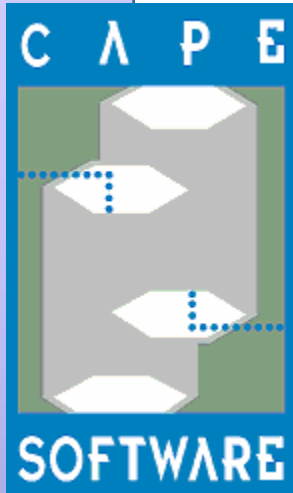
"Large increases in cost with questionable increases in performance can be tolerated only in race horses and fancy women."

--Lord Kelvin



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

- VP Link solves simulation needs from *simple to sophisticated*, rigorous modeling.
- OTS node can be 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* functionalities makes VP Link an *evolutionary investment*