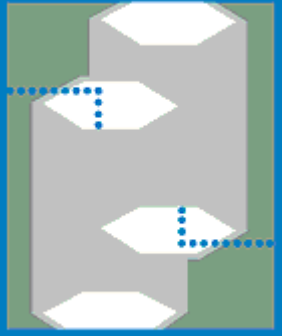


C A P E



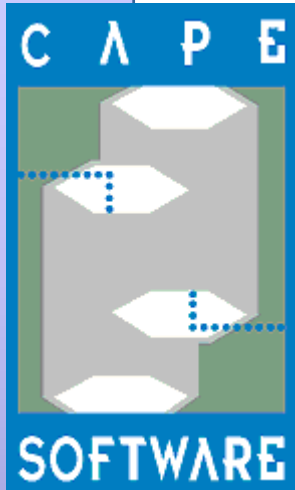
SOFTWARE

A collage of images in the background, including green pipes, industrial structures, a person at a control panel, and a 3D model of a refinery.

# *The Virtual Process Overview and Applications*

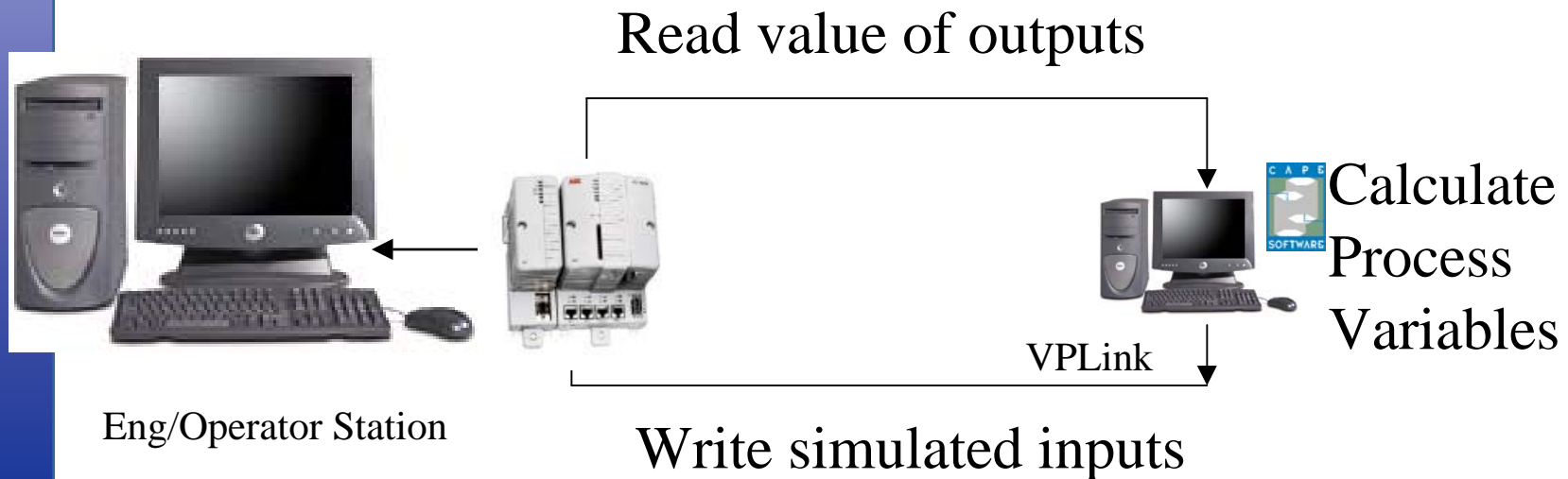
Cape Software Inc.

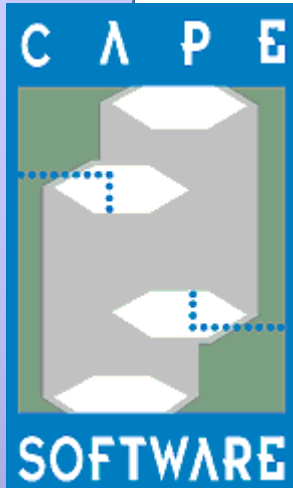
Houston TX



## *Virtual Process Overview*

- Windows based interface: intuitive
- No Changes to Logic programs: 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

**ConocoPhillips** –San Francisco,CA

**ChevronTexaco** – Several Sites Licenses

**Phillips Refining** – Several Sites Licenses

**Iron Ore Company** – Labrador City ,CA



**BP** – several licenses at several sites

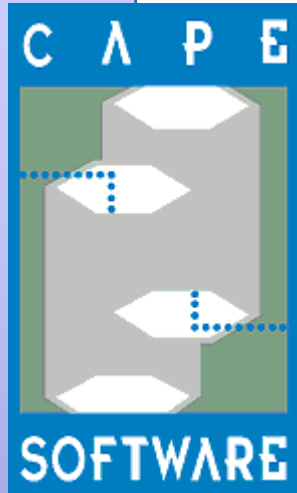
**Shell Deepwater / Shell Chemicals,UK**

**Eli Lilly** – Corporate licensing

**Genentech** – several licenses at different sites

**General Mills** – W/W licensing

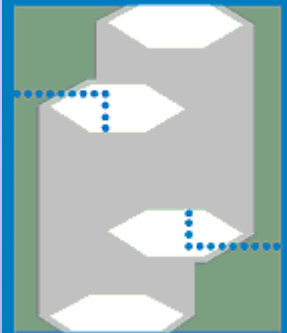
**Murphy Oil** - Mereaux, LA



## *Supported Systems*

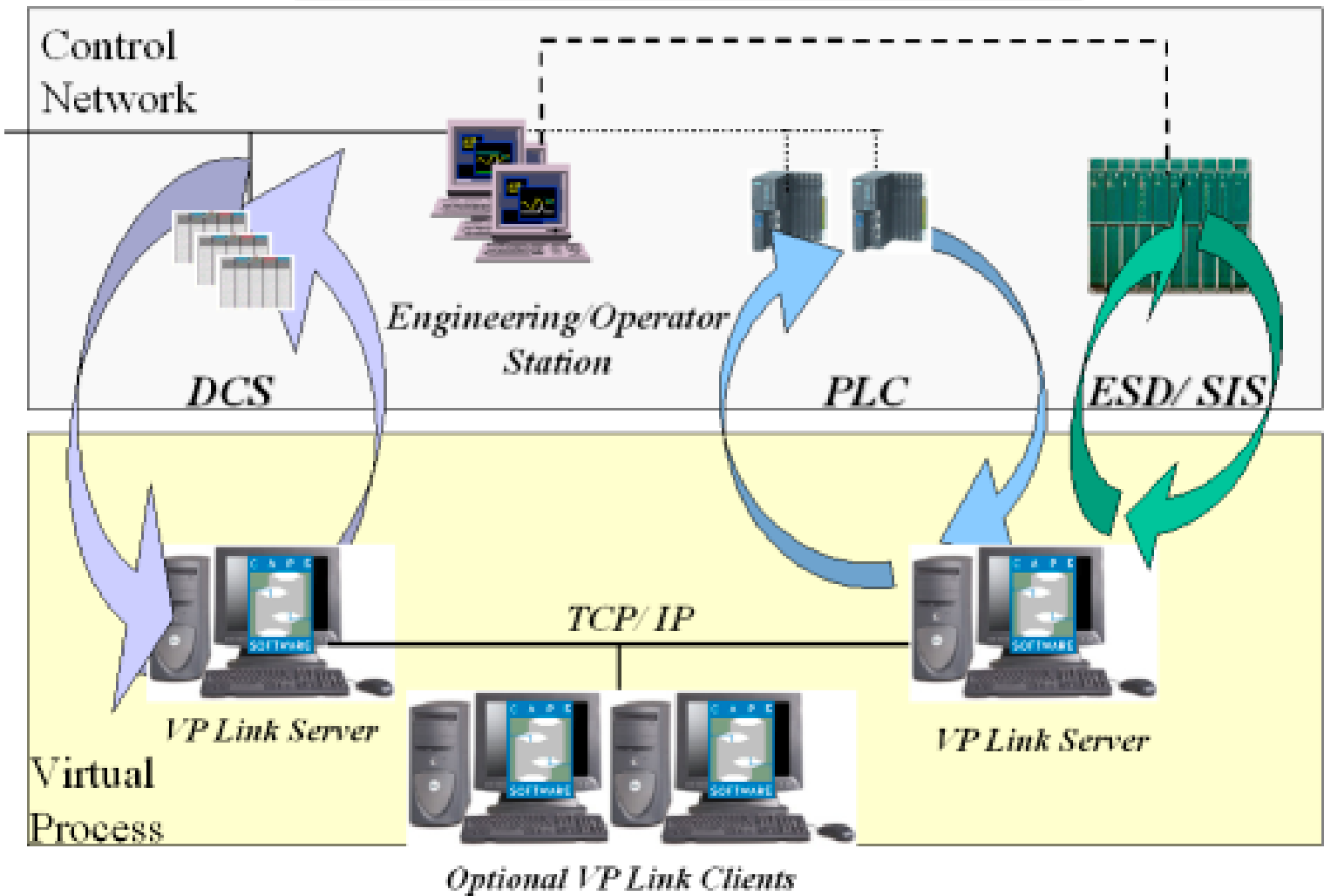
- ABB 800 xA, Industrial IT
- ABB Mod300, Advant
- Honeywell Experion PKS TDC, TPS , FSC
- Honeywell Plantscape / Rockwell ProcessLogix
- Triconex: Tricon/Trident
- GE Fanuc series 90
- A-B PLC5/SLC500, CLX, Modicon, Siemens-Ti 505
- Foxboro I/A, Archestra
- Siemens APACS, PCS7, S7
- Yokogawa CS3000/R3/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

C A P E

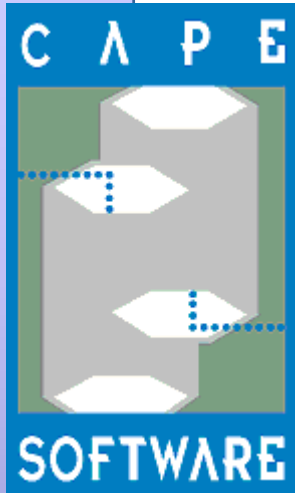


SOFTWARE

## VP LINK 3.0 Sample Network



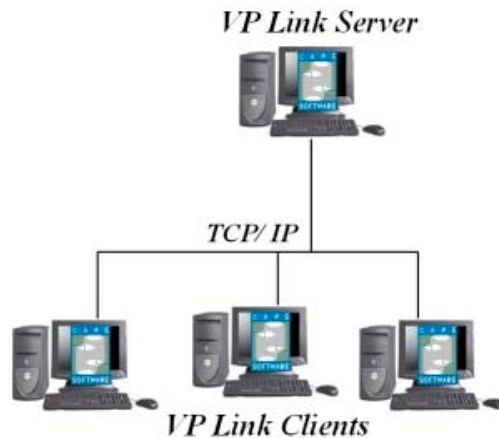
Control Network Systems are solving the logic, responding to simulated VP Link inputs



# *Different Architectures for different Applications*

## **Integrated Training Setup**

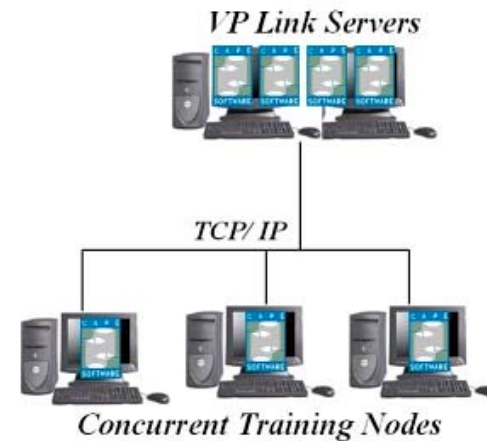
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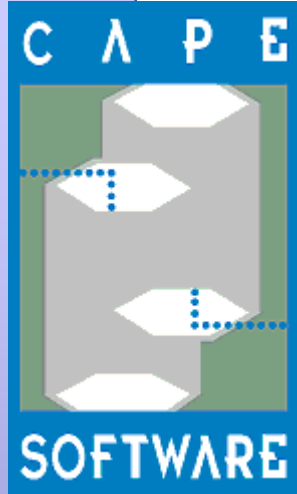
Trainees operate different units, interacting with each other

## **Parallel Training Setup**

---



Trainees operate identical units, in parallel



# The *Virtual Process* for ABB 800xA Systems

VP Link 3.0



Trainer Station

VP Link/ABB Interface  
over Ethernet



ABB Connectivity Server  
with VP3 driver

Optional  
VP Link/SIS  
Interface



SIS Station

Ethernet

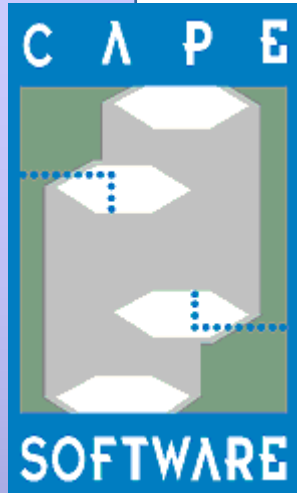


AC800 M  
Controllers



Operate IT  
Station

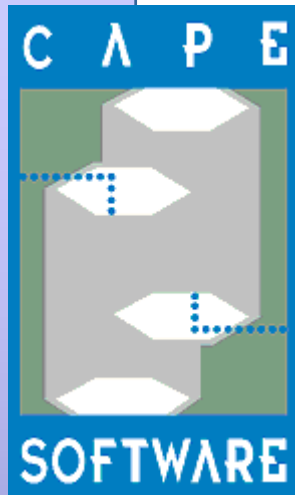
VP Link



## *VP Link Specifics for Industrial IT*

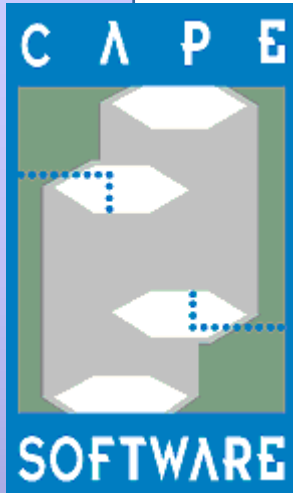
- Fast TCP-IP based interface
- Robust OPC based connectivity
- Optimized ABB API connectivity available
- Interface work in parallel with other simultaneous connections (such as ABB Portal,etc) for vertical integration





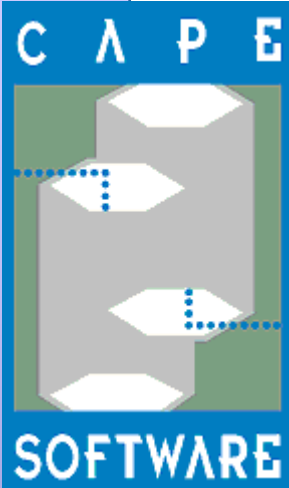
## *5 steps to simulation with ABB Platforms*

- 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

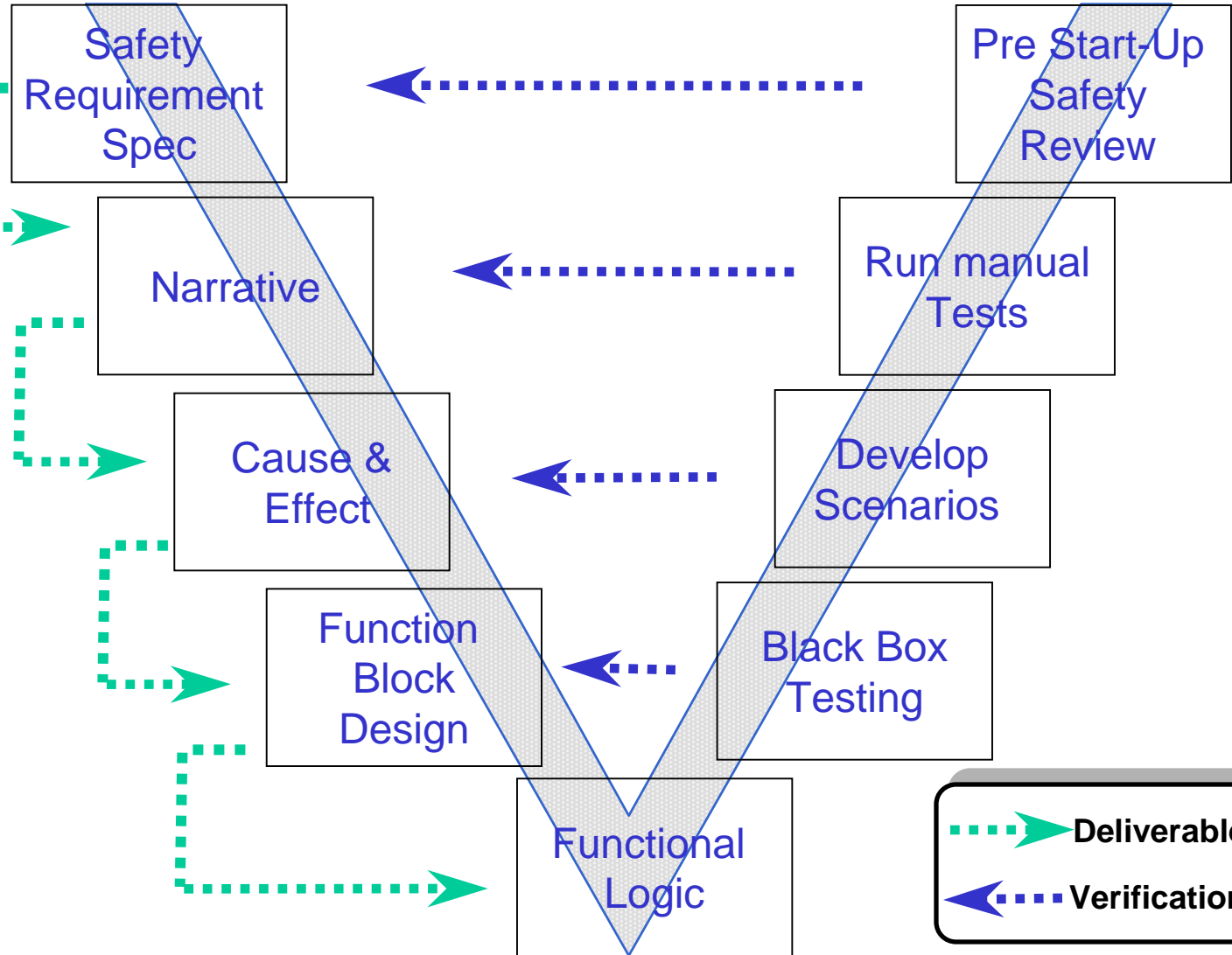


## *I - Logic Validation*

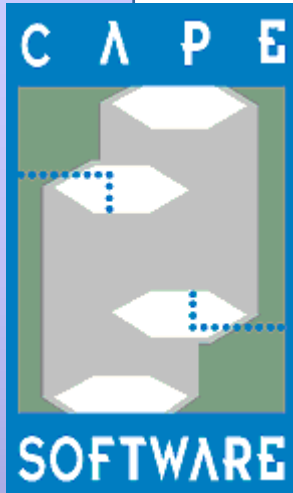
- **Graphics** verification
- **Logic** checkout
- **Automate** repetitive testing task (ie resets etc...)
- Facilitate Testing with practical graphics
- **Interlock** schedule approval
- **Mapping** to DCS and interaction between DCS/PLC logic ( gateway points tests)
- Thoroughly debug prior to online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



# *V-Approach methodology: application to validation*

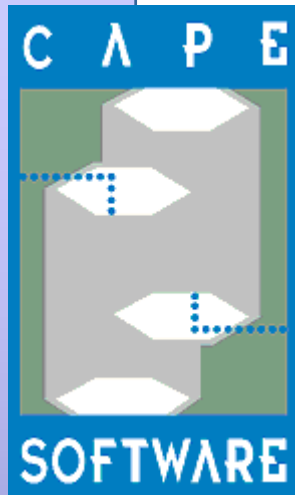


VP Link



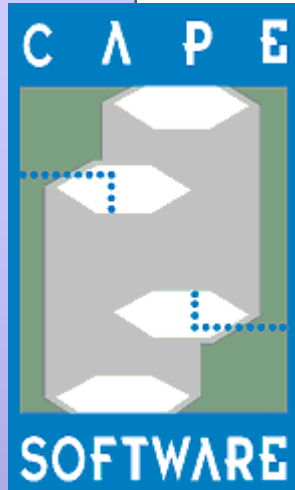
## *II-Operator Training*

- **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



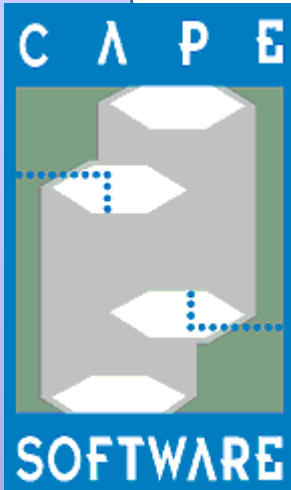
## *Operator Training System (OTS) using VP Link*

- *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 *ore refining industry*



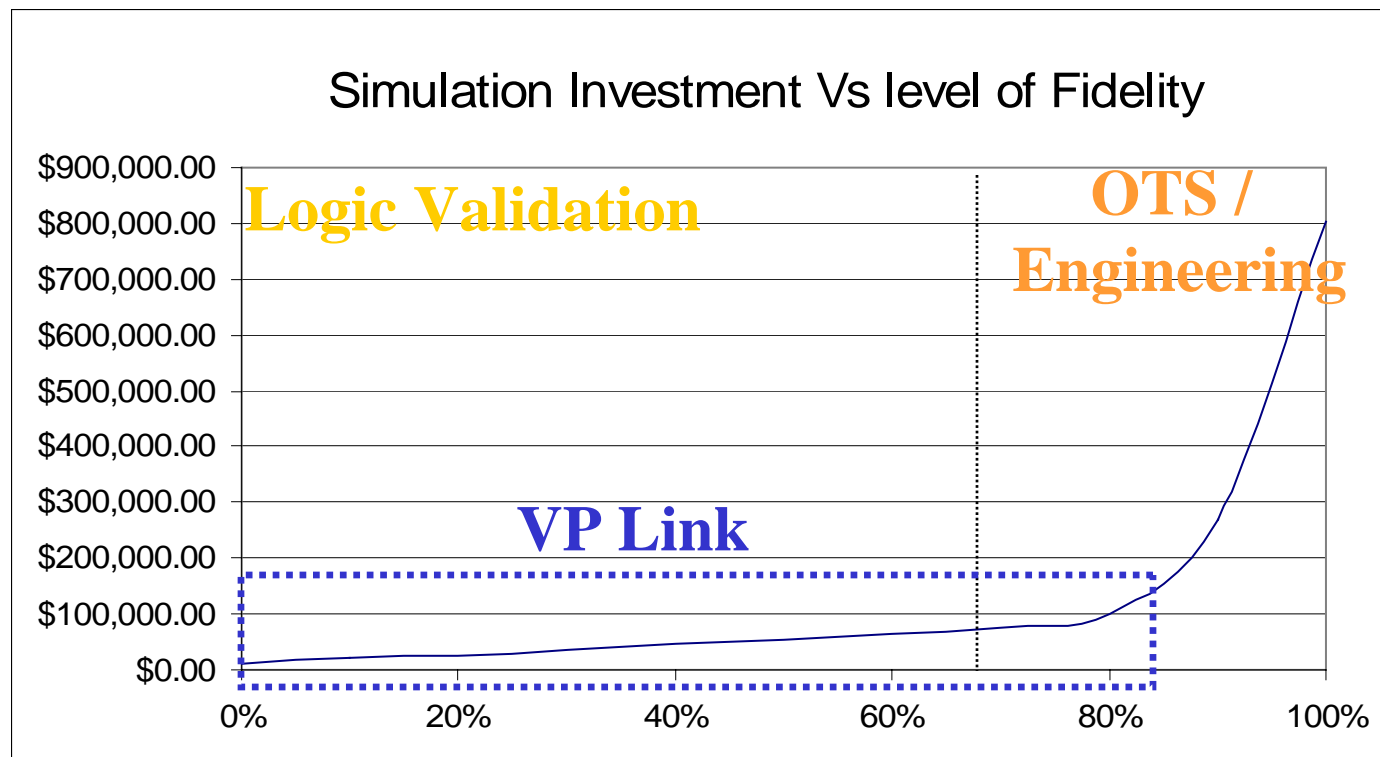
## *What kind of process simulation do I need ?*

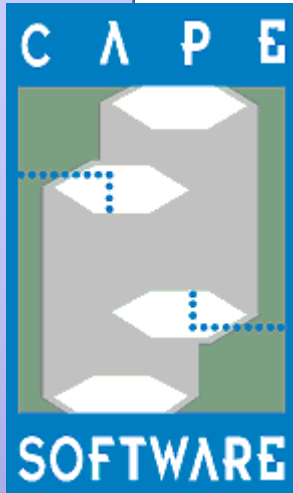
- Process simulation Fidelity
- Applications of process simulation



# *Cost Analysis of process model fidelity*

- ~ 2,000 I/O
- Oil Refining units





# *Medium Vs High Fidelity Process model*

- **Medium Fidelity**

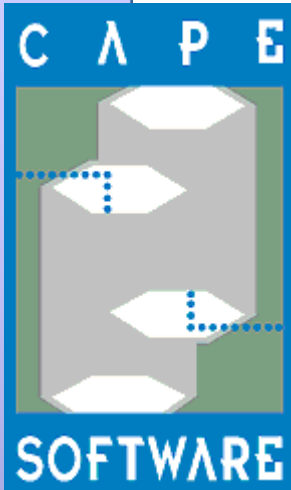
- validation & OTS
- Heuristic / Hybrid
- dynamic
- Connects to DCS
- Console graphics
- DCS upgraded during maintenance
- \$50k-\$150k

**VP Link**

- **High Fidelity**

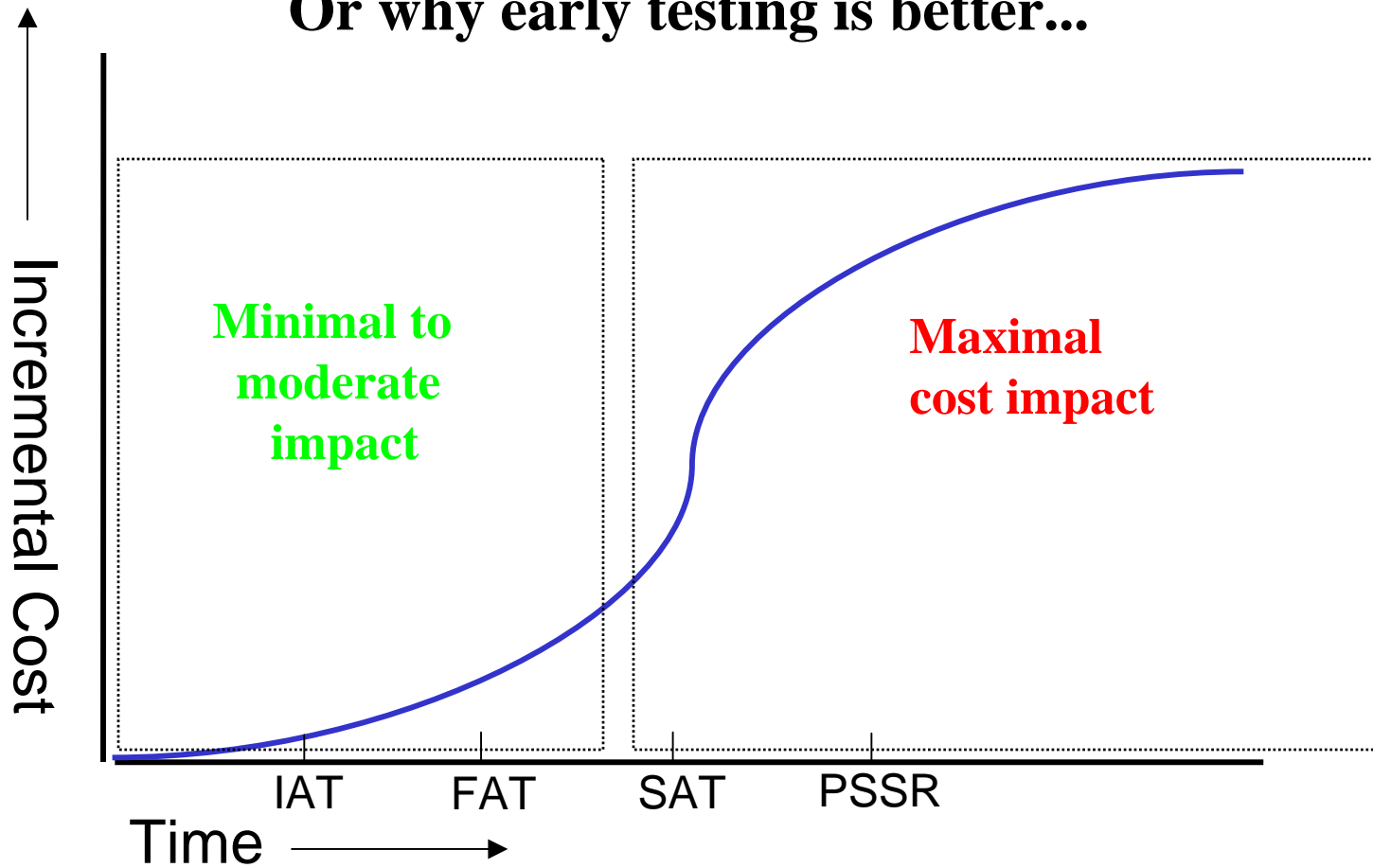
- Plant study ( sizing)
- Predictive
- steady or approx.
- Invasive
- replicate HMI
- Heavy maintenance
- \$500k-\$1M

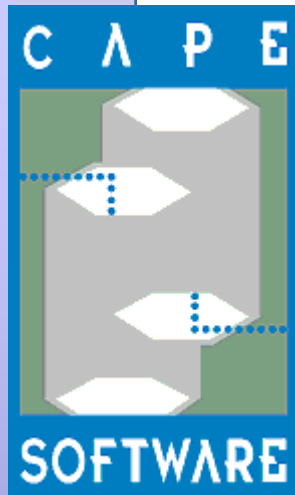




# *Impact of change during a project development cycle*

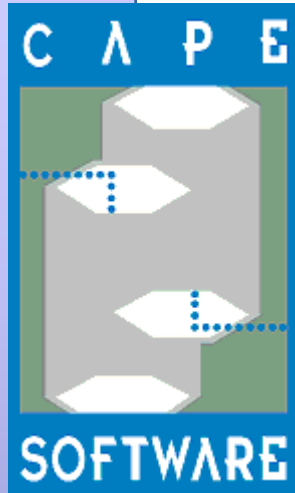
Or why early testing is better...





## *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 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*