



Power Services Customer Training

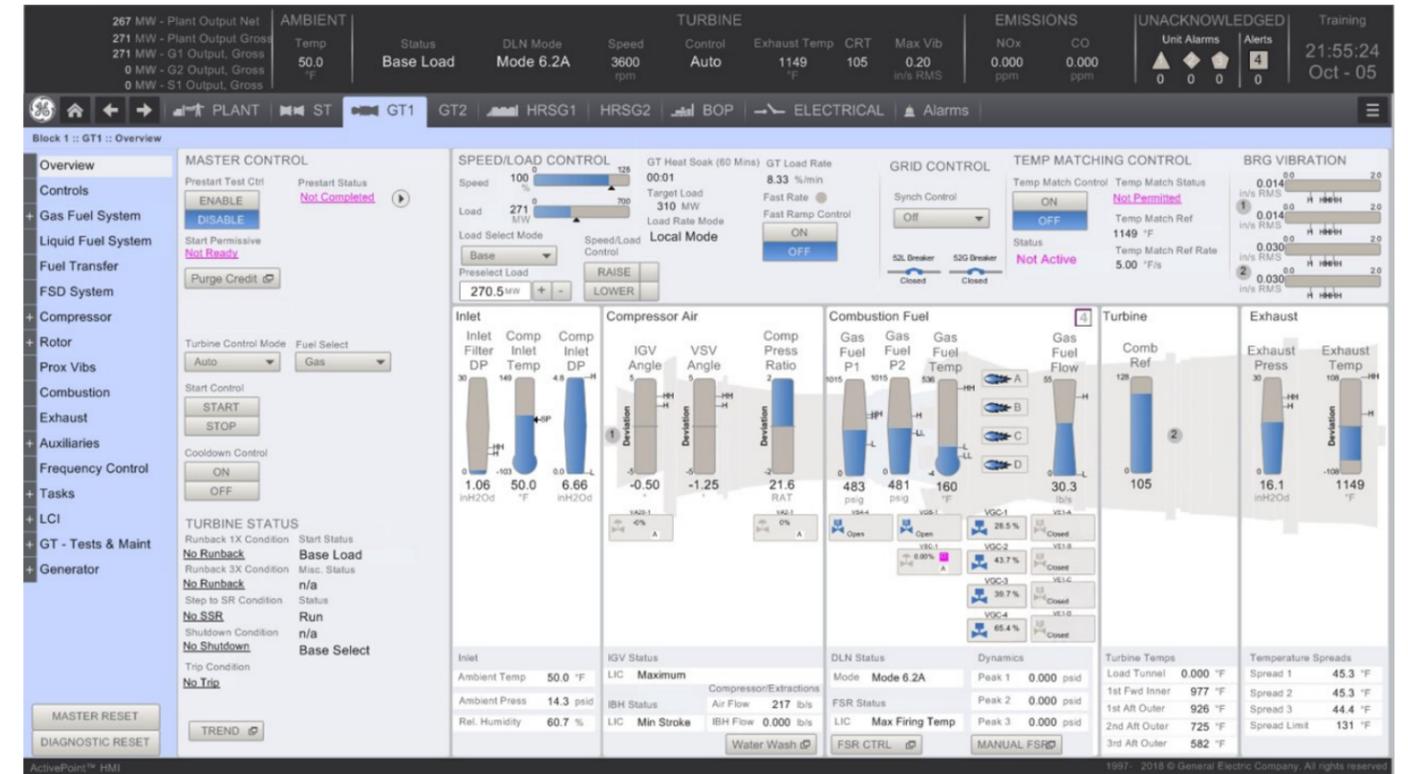
Virtual Integrated Plant Simulator (VIPS)

A Site-Specific Solution Customized for Individual Plant Needs



Knowledge is Power

Hands-on learning using the latest advanced technology simulation tools from GE.



Above: ActivePoint* Gas Turbine Operator Display from a Combined Cycle VIPS Simulation. The above is a representative image only. VIPS operator displays will use site-specific screen configurations.

High-fidelity simulation for risk-free one-to-one job skill transferability

GE's newest simulator technology, the Virtual Integrated Plant Simulator (VIPS), offers an extremely robust simulation environment for effective, convenient, real-life scenario training that is tailored to your specific plant configuration—all without operational risk. Custom-created by the same GE engineering team that develops gas turbine and engineered equipment packages, VIPS provides a comprehensive, high-fidelity replica of your plant's turbine control room environment. Your VIPS system can accurately simulate any or all of the following GE components at your plant: gas turbines, steam turbines, generators, HRSG systems, specific control systems, and balance of plant equipment.

Available as a server hardware-based package anywhere in the world, VIPS offers your employees unlimited, 24/7 simulator access from the convenience of your plant. Multiple employees will have simultaneous access to the simulator, so they can safely practice control room skills at their own pace. They can collaborate while supervisors monitor their progress and offer "over-the-shoulder" support.

GE's engineering teams custom develop a plant-specific VIPS process model based on your:

- System piping and instrumentation diagram (P&ID)
- Instrumentation – using your units' conversion data and slew time
- Physical dimensions of process equipment
- Heat mass material balance
- Equipment-specific parameters (e.g. pump and valve curves)
- Control parameters and initial condition information – base load and part load data
- Human-Machine Interface (HMI) graphics

Simulator support throughout your plant's life cycle

When you invest in a VIPS system, GE offers support to keep your simulator in tune with your plant's ever-changing needs.

First, your employees receive comprehensive one-day training that explains how to access, initialize, and use the plant simulation system and related tools.

Additionally, GE offers service agreements that provide biannual system maintenance to help your VIPS system remains properly aligned with your plant's controls platform.

Simulator upgrades also are available when you make impactful plant changes such as adding new equipment and/or upgrading equipment.

Value differentiation: technology-specific simulator versus VIPS

Like GE's technology-specific remote operations simulator, the VIPS environment lets your employees safely practice a variety of skills, including: plant operation, alarm troubleshooting, software tracing, trending data, working with Cimplicity* screens, building and downloading software, and reviewing hardware configurations.

VIPS offers a customized solution that provides advanced training support ideal for new plants, significant technology updates, and evolving personnel changes. It uses advanced thermodynamic and fluid flow models to accurately replicate your specific turbine and related equipment processes for realistic learning experiences. Moreover, VIPS mirrors GE's detailed physical equipment layout and process flows based on highly accurate details from our performance, accessories, and operability teams, delivering superior accuracy for both steady state and transient dynamics.



POWER SERVICES SIMULATOR COMPARISONS

	Technology-Specific Simulator	Site-Specific VIPS
Features		
Available to GE's transactional customers		✓
Available to GE's multi-year agreement customers	✓	✓
Can address full plant operations	Turbine Operations Only	✓
Continuous, unlimited access	✓ Cloud-Based	✓ Hardware-Based
Customized to your specific equipment and processes	Select from Turbine & Controls System Technologies	✓
Multiple simultaneous secure connections to your private, risk-free learning environment	✓	✓
Acceptance testing		✓
Management		
Provides a consolidated user interface for controlling simulation features	✓	✓
Ability to create, manage, and activate training scenarios such as failed devices and active alarms	✓ Defined Set of Scenarios	✓
Ability to pause and restart the simulation for easier analysis and troubleshooting	✓	✓
Ability to save operating conditions and restore the system to the same conditions at a later date	✓	✓
Ability to adjust the execution timing of the simulation for easier analysis, or to quickly achieve a specific operating state	✓	✓
Software		
Software Licenses from GE: ControlST*, ToolboxST*, WorkstationST*, Mark* Vle Virtual Controller, Cimplicity*	✓	✓
Third-Party Software Licenses: Non-GE process modeling tools and simulation management software	✓	✓
Hosted Platform		
Hardware-Based: A high-powered server allows for flexibility, scalability, and central management of all virtual machine HMI operator stations on-site		✓
Cloud-Based: HMI operator stations are hosted off-site and accessible from anywhere via the internet using a standard laptop or desktop computer	✓	
Scalability: You can add additional operator stations or incorporate new simulation functions without the addition of new hardware		✓
HMI: Makes use of common GE tools and processes for an enhanced user experience	✓	✓
Aftermarket Services		
Introduction to simulator training	✓	✓
Remote help desk simulator support	✓	✓
Multi-year service agreement for simulator	Not Applicable	✓ Available Upon Request
Upgrades for simulator	Not Applicable	✓ Available Upon Request

VIPS Advantages



Tailored to Your Site

This comprehensive, high-fidelity replica of your plant's turbine control room environment addresses your specific equipment technology types, plant configuration, and process needs.



Convenient, Flexible, Scalable

Employees can simulate realistic turbine operating conditions from a comfortable, convenient location whenever their busy schedules allow. You can easily add operator stations and new simulator functions as needed.



Risk-Free, Controlled Learning

Your on-site server-based simulator helps employees hone real-world skills, establish unified procedures, and build teamwork proficiency in a risk-free, controlled learning environment.



Knowledge Building

Plant personnel quickly and effectively build their knowledge base as a result of simulator learning, enabling them to more confidently respond to real-life challenges.



Hands-On Training

With VIPS, you have access to 24/7 hands-on training. In addition, note that GE's Power Services Customer Training site-specific classroom courses make use of your VIPS system, as applicable to the course curriculum.

VIPS BENEFITS

OPERATIONS

- Site specific operations training
- Improve operator reaction time
- Train / mentor new operators in a safe environment
- Develop skills to navigate and read operator displays
- Develop fault scenarios to evaluate operator actions
- Test / improve plant procedures by simulating events

TROUBLESHOOTING AND MAINTENANCE

- Better handling of alarms and abnormal operating situations
- Help to avoid potential shut down through expert intervention
- Create and review trip logs to determine potential causes ... reduce down time
- Develop trends and watch windows for site HMI's ... helps to identify issues early
- Expert review of operator display functions (Cimplicity*) ... insights to help plant competitiveness

WHAT'S INCLUDED?

Component	Category	Description
VIPS Simulation Platform	Licenses	Process Models Third-Party License GE Proficiency* Perpetual License Microsoft* OS License
	Documentation	Simulator System User Manual, Specification And Architecture VIPS Maintenance Manuals
	Software	VIPS Unity Simulation Executive Initial Conditions Predefined Malfunctions
Process Modeling Package	Software	Process Models—Detailed High-Fidelity Representation Of Combined Cycle Power Block
The Virtual HMI	Software	Unit Level Virtual Controller WorkstationST*—Engineering Workstation (EWS) And Operator Workstation (OWS) Graphical User Interface
VIPS HMI Package	HMI Hardware Package	Thin Client Adapters 24-Inch Display Monitors Control Room Configuration
Control Server Hardware	Hosting Server Hardware	GE Control Server Laser Color Printer

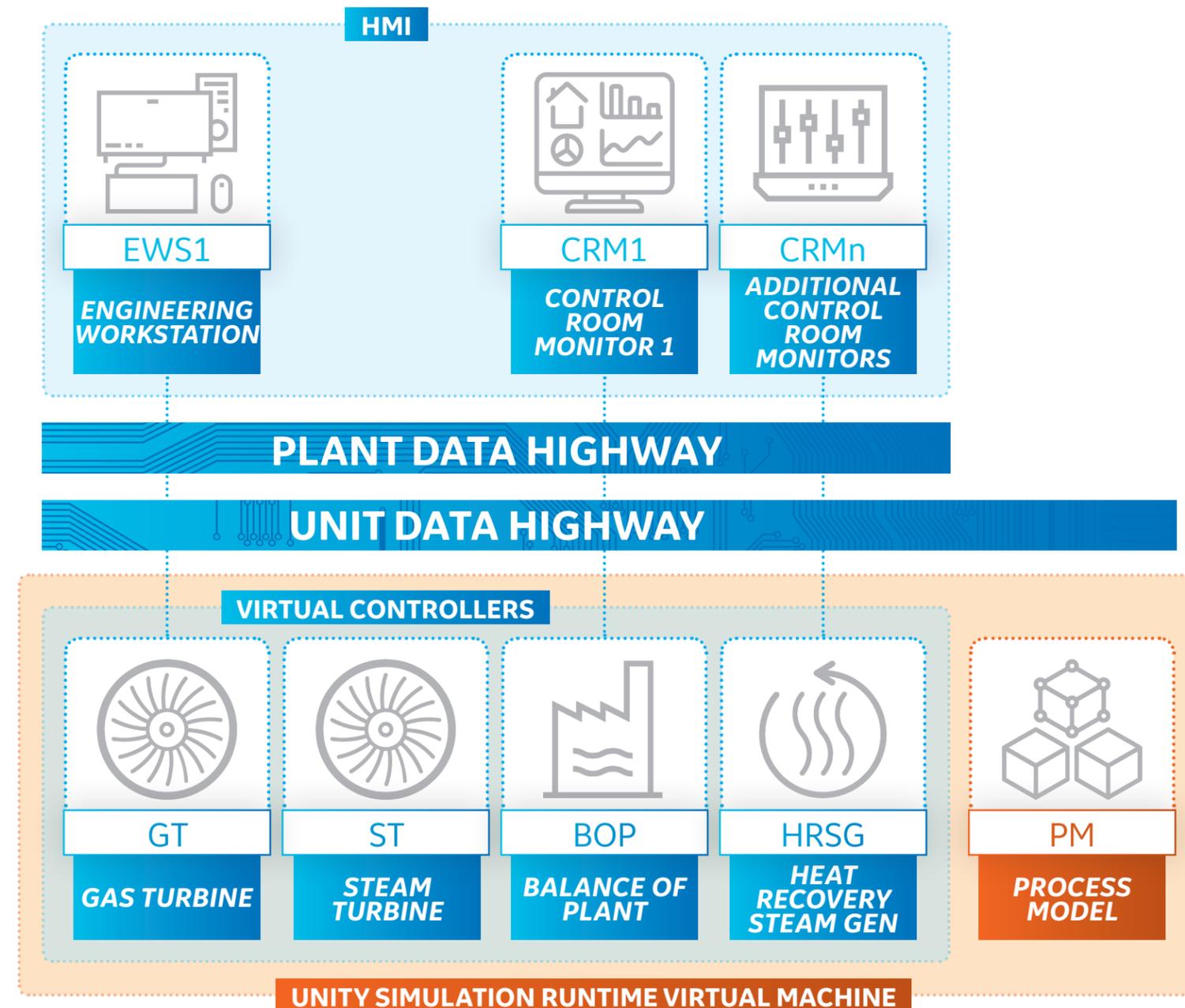
VIPS Standard Architecture



The UNITY simulation environment hosts virtual Mark* Vle controllers running your application code.

The Process Model feeds high-fidelity data to the virtual controllers replicating the site field devices.

The Virtual Controllers, Process Model and Operator Stations communicate over your sites' PDH and UDH networks.



Meeting your continuous learning needs

Continuous and progressive curriculum of study helps plant personnel gain the knowledge and skills needed to run an efficient, successful plant.

In addition to our simulator training solutions, we can suggest the right mix of additional training options to align with your plant configuration, equipment technology, employee audience, and time constraints.

Site-Specific Courses

Our highest value training service offers a variety of 200 courses that are tailored to your specific site by your assigned GE instructor and personal training project manager. They are delivered either at your site or at one of our Power Services global learning centers in the language of your choice, and on a schedule that works for you. Courses may contain a mix of classroom learning, site walkdowns, and hands-on training.

Open Enrollment Courses

With technology-specific content, our Open Enrollment training offers a comprehensive selection of more than 75 English language courses

for small staff or new team member training, or to expand the skills of select employees. Your employees train at one of our Power Services learning centers with students from around the world. Courses offer a mix of classroom learning techniques, and may contain walkdowns and/or hands-on training.

Online Courses

A cost-effective solution for a broad range of employees, our 25-plus Online English language courses let you train your personnel anytime, anywhere, and at their own pace. Each course ranges in duration from one to four consecutive hours, and can be started and stopped at the student's discretion.

Multi-Year Training Agreements

Simplify your training budgeting and planning efforts with our long-term flexible training offering. This agreement entitles you to a fixed number of annual training days for GE's Site-Specific and/or Open Enrollment courses, unlimited use of all our available Online courses, plus exclusive access to our Remote Turbine Operations Simulator. We work with you throughout your plant's lifecycle to help you select the training solutions that best meet your evolving needs.



Contact your Power Services representative from GE for more information.
Visit www.geenergytechnicaltraining.com for additional details.

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