

Relay Protection Virtual Platform Design



Overview

This whitepaper, co-authored by Intel and Kalkitech describes the virtual protection relay (VPR) concept – an architecture where software-defined and virtualized platforms are deployed to host the critical circuit protection functions for an advanced and agile grid. We assert that this use of Edge Analytics the availability of IEC-61850-3 certified servers built for substations and VMware vSphere supporting latency-sensitive workloads in the substation. Modern substations require standardized, flexible, scalable, and secure systems to build a data-driven power grid to improve the local. A Virtual Protection Relay is a protection system implemented entirely in software instead of a physical relay box. We outline virtualization technology and the networking aspects using performance benchmarks laid by IEC 61850 standards. Protective relays have evolved steadily over time. Early power systems relied on electromechanical relays, which were later. As the energy sector is confronted with the high penetration of renewable energy sources, one of the key aspects of the grid controls which are put under stress is the grid protection sub-system.



Article Content

Jan 25, 2026

Virtual Protection Relays: Complete Guide to IEC 61850

Learn how Virtual Protection Relays work, how IEC 61850-9-2 LE and Merging Units enable digital protection, and why VPRs are key to modern

Apr 24, 2026

Virtual Protection Relaying: The Future of Power Grid

This webinar describes the virtual protection relaying (VPR) concept – an architecture where software-defined and virtualized platforms are deployed to

Dec 02, 2025

Virtual Protection, Automation, and Control for

Virtual protection, automation, and control (vPAC) applications offer a compelling solution for management of increasingly complex power distribution

Dec 07, 2025

Virtual Protection Relay White Paper

In this whitepaper we describe the virtual protection relay (VPR) concept – an architecture where software-defined and virtualized platforms are

Jul 10, 2025

Whitepaper: Virtual Protection Relay

This whitepaper, co-authored by Intel and Kalkitech describes the virtual protection relay (VPR) concept – an architecture where software-defined

May 09, 2026

Virtual Protection Relay: Quantifying the Reality

Virtual Protection Relay: Quantifying the Reality Jose Ruiz - Principal Technical Application Engineer, Doble Engineering Anthony Sivesind, - Engineering Consultant, Salt River

Sep 07, 2025

Webinar: Virtual Protection Relays (VPR) for Modern

The grid needs modernization. Discover Virtual Protection Relays (VPR) to decouple protection from hardware, offering huge benefits in flexibility, cost reduction, and

Aug 01, 2025

VIRTUAL PROTECTION RELAY

R architectural options. A key objective is to prove that multiple protection relays can work in a virtualized environment meeting or even exceeding the system integrators to test and compare the

Apr 09, 2026

Simulation Software for Relay Protection

Simulation software for relay protection is a powerful tool that allows engineers to analyze and test relay protection schemes in electrical power networks. It provides a virtual

Feb 09, 2026

(PDF) Smart Operation and Maintenance Platform of

In order to solve the current network limitations and human-computer interaction limitations of relay protection and automation in power systems, an

Jul 04, 2025

Virtual Protection Relay: Myth or Reality? | IEEE Conference ...

Not long after the advent of the large-scale power grid over 100 years ago, the need for circuit protection was soon identified and developed. While grid protection began with fuses and later shifted to

Nov 06, 2025

VIRTUAL PROTECTION RELAY

le and intelligent grid. In this whitepaper we describe the virtual protection relay (VPR) concept – an architecture where software-defined and virtualized platforms are deployed to host the critical circuit

Aug 12, 2025

A new virtual relay protection simulation system of substation based

The intelligent substation uses the communication network instead of conventional secondary circuit, therefore virtual digital signal in the network replaces the physical electrical signal.

Dec 15, 2025

WHITE PAPER Virtualization of protection and control

Virtualization of protection and control – Evaluation and deployment considerations —
Virtualization of Protection and Control (VPC) allows the use of vendor-independent protection and control (P& C)

Dec 28, 2025

VIRTUAL RELAY DESIGN FOR FEEDER

The aim of this study is to design and implement an accurate virtual model of a basic feeder protection relay. The work focuses on certain sets of

Sep 14, 2025

Are Virtual Protection Relays the Future of Protection and Control?

What if your protection relays lived on a server? Virtual Protection Relays (VPRs) are turning that idea into reality. The notion is futuristic, and if you work in protection engineering or relay

Oct 15, 2025

Virtual Protection and Relay

What is Virtual Protection and Relay? Virtual Protection and Relay (VPR) is one of the essential building blocks for grid modernization.

Aug 11, 2025

Design and Application of Virtual Flexible Simulation

Therefore, a low-cost virtual flexible simulation experiment teaching platform (VFSETP) is developed. The platform uses Simulink to build the

Nov 18, 2025

Layer by Layer: Breaking Down Virtual Protection Relay

While the form factor has changed, the fundamental protection principles remain the same. By breaking the architecture down layer by layer, it

Nov 16, 2025

Design and Implementation of Universal Platform for Teaching ...

The platform structure is based on the modular principle. It can be programmed to input various microprocessor relay protection device parameters and control logic, so as to be compatible

Jul 23, 2025

Virtualization of Protection Systems in Distribution Substations ...

Over the past century, protection systems have evolved from electromechanical relays performing individual protection functions to microprocessor-based intelligent electronic devices (IEDs) that

Oct 14, 2025

Virtual relay design for feeder protection testing with online ...

The aim of this study is to design and implement an accurate virtual model of a basic feeder protection relay. The work focuses on certain sets of ANSI functions and COMTRADE (Std C37.111) to interact

Jan 27, 2026

Distance Protection Relay Testing Using Virtual Hardware-in-the-Loop ...

A methodology of creating virtual HIL distance protection relay based on Typhoon HIL (framework for the testing real-time embedded system) is proposed to allow protection engineers to

Sep 28, 2025

Layer by Layer: Breaking Down Virtual Protection Relay

Summary Virtual Protection Relays represent a natural evolution of grid protection, driven by advances in computing, networking, and software

Contact Us

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