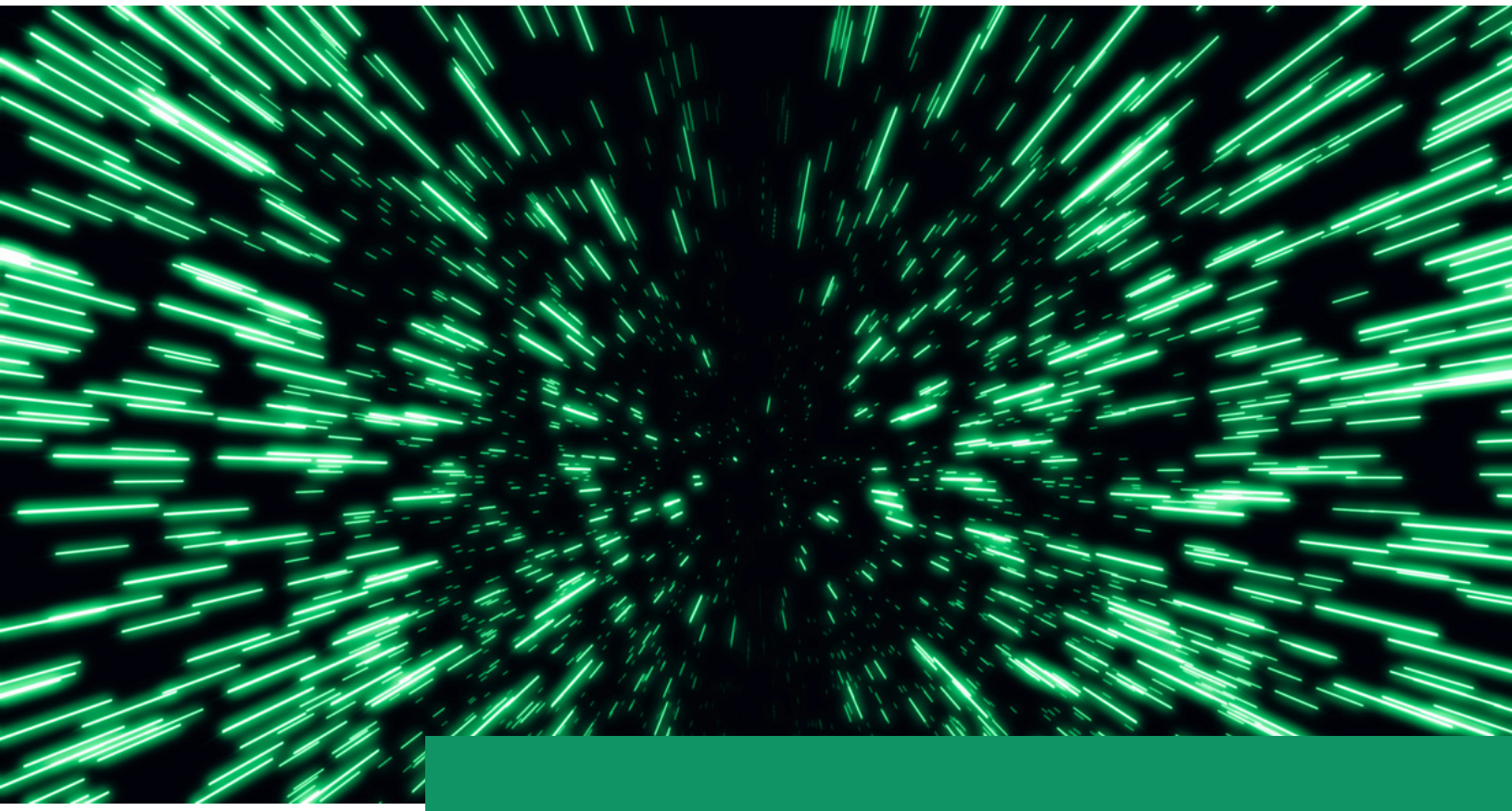
EdgeTunePower

Empowering Your Business At the **Edge**



Ultra-Fast Electric Grid Distributed Management System

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INTRODUCTION

As industries such as transportation, mining, agriculture, shipping, and marine continue to shift towards electrification, the demands placed on the existing electric grid infrastructure are increasing.

However, reinforcing the grid at the transmission level can be both costly and time-consuming, without necessarily enhancing the grid's resiliency. This is where energy-storage technologies at the distribution level can come into play, especially with the increasing demand for interconnecting clean resources and fast-charging stations at the distribution level.
By integrating energy storage technologies at the distribution level, we can create a more resilient grid that can better accommodate the growing demand for electricity from various industries.

Although storage technologies have the capability to operate at high speeds, they are still non-intelligent components that need to be paired with high-speed management systems in order to maximize their full potential.
Therefore, a pressing question remains: Is there a commercially-available, fast, reliable, and affordable grid management system to maximize the utilization of storage technologies?

At EdgeTunePower (ETP), we offer an ultra-fast, industrial-grade, reliable, and affordable grid management system to fully utilize energy storage technologies and maximize your return on investment (ROI).

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OVERVIEW

We understand that grid management is a critical component of your operations. Our **Ultra-Fast Electric Grid Distributed Management System (UF-GDMS)** offers advanced features, benefits, and applications to meet your needs. The The **UF-GDMS** is designed to enhance the hosting capacity of grids for large-scale interconnection and operation of distributed energy resources (DERs) such as batteries, renewables and EV-charging stations. Our solution offers real-time edge control and protection systems that are designed to meet the power system operational requirements of your assets.

Features	Benefits	Application
Microseocond Operation Time-frame	Maximize Utilization of Storage Technologies (increase ROI)	Grid-connected, Islanded, and Isolated (Remote) Microgrid Systems
Real-time and Proactive Coordination Between DERs	Minimize Grid Outages. Avoiding Penalties from Power-Outage Legislation	Virtual-Power-Plant (VPP) and Behind-the-Meter Operation
Distributed Architecture	Overcome Communication Latency	Transportation Electrification (Interconnection of L-3 EV Charging Stations)

Features:

- **Microsecond Operation Time-frame:** Our technology avoids solving computationally-intensive algorithms and enables ultra-high-speed, event-driven decision-making process.
- **Real-time and Proactive Coordination Between DERs:** Our system coordinates and controls DERs in real-time, identifying both planned and unplanned grid events, and proactively takes remedial actions following each event.
- **Distributed Architecture:** Our system is designed with a distributed architecture that minimizes the physical distance between control units and DERs, while ensuring that the decision-making agents are not blocked by one another.

Benefits:

- **Maximize Utilization of Storage Technologies:** Storage technologies have the ability to operate within milliseconds; however, they require management systems that are faster in operation as they are non-intelligent components. Existing storage technologies are not being utilized to their full potential because of legacy management systems that operate within seconds and above, thus, failing to maximize revenue streams for customers. UF-GDMS is designed to operate within millisecond time-frames, which enables you to fully utilize batteries and provides maximum return on your investment.
- **Minimize Grid Outages:** Current management systems are reactive in nature, focusing on grid recovery rather than outage prevention. This approach often leads to costly penalties for DSOs, ISOs, and utilities. In contrast, our proactive management system operates quickly enough to prevent grid outages following any grid events, ultimately ensuring that you are not subjected to penalties as mandated by power-outage legislation.
- **Overcome Communication Latency:** Existing management systems often face significant communication latencies due to their centralized architecture when delivering commands to geographically dispersed DERs, posing a substantial risk to the successful commissioning of grid modernization projects. Our distributed architecture management system, on the other hand, overcomes these impediments by reducing communication delays, allowing you to effectively meet your operational objectives.

Applications:

- **Grid-connected, Islanded, and Isolated (Remote) Microgrid Systems:** Our UF-GDMS is the ideal supervisory control and management solution for microgrids in different operation modes.
- **Virtual-Power-Plant (VPP) and Behind-the-Meter Operation:** Our UF-GDMS realizes the concept of VPP and behind-the-meter operations, providing additional revenue streams for our customers.
- **Transportation Electrification (Interconnection of L-3 EV-Charging Stations):** Our UF-GDMS can enhance hosting capacity of distribution feeders via addressing congestion issues for interconnection of fast (L-3) EV-charging stations.

Our Solution & Services roadmap for **Ultra-Fast Electric Grid Distributed Management System (UF-GDMS)** comprises three main sections, each of which is designed to provide advanced solutions for specific aspects of grid management and protection.

Feasibility & Test

- **Grid Modeling and Simulation.** Every detail of your electric grid, including all elements of energy resources (such as batteries, renewables, and electric machines), transformers, lines, and energy consumers (loads), are modeled. The grid model is then simulated in real-time, using an advanced modeling and simulation approach. This enables you to gain a comprehensive understanding of the power grid's behavior and performance, and the resulting insights help identify areas for improvement and optimize grid operations for maximum efficiency.
- **Design & Testing of Grid Management & Protection Systems**. By combining advanced technologies and proven methodologies, we rigorously test the UF-GDMS and other embedded control and protection systems. This minimizes project time, costs, and risks while ensuring the safe, reliable, and efficient operation of the grid under all conditions. Our testing procedures help protect your valuable assets and ensure their longevity.

Engineering & Solution

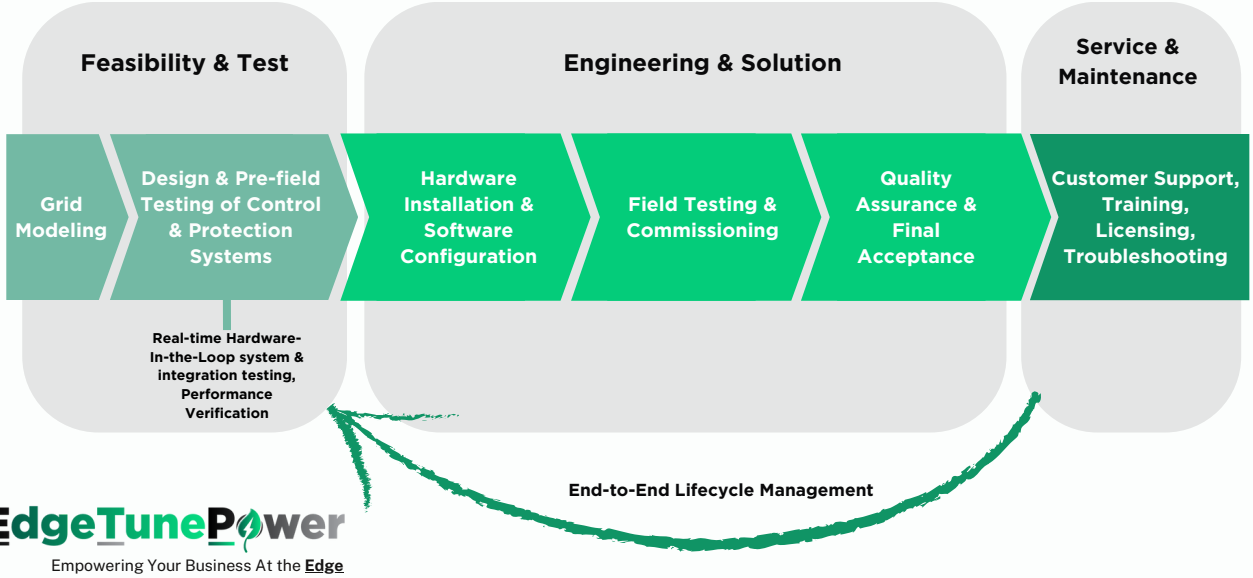
- **Hardware installation & software configuration.** Our team of experts will work closely with your organization to install the necessary hardware and configure the required software components for UF-GDMS. Proven methodologies and best practices are used to ensure the installation process is smooth and efficient, while each component is tested to ensure it functions correctly. Our goal is to achieve seamless integration and retrofit with your existing infrastructure.
- **Field Testing & Commissioning.** The Field Testing & Commissioning part is a critical step in the successful implementation of UF-GDMS. Our team will conduct rigorous testing of the system's performance under various operating scenarios to ensure it meets the required specifications, and compliance codes. We will also work with your organization to commission the system and ensure it is operating correctly. Our testing and commissioning procedures are designed to minimize downtime and to ensure continuity of your grid's operation.
- **Quality Assurance & Final Acceptance.** Comprehensive review and evaluation of the system's performance to ensure it meets your organization's expectations and requirements. Providing detailed reports and recommendations for any necessary adjustments or improvements. Our ultimate goal is to ensure the successful implementation of our UF-GDMS.

Service & Maintenance

- Our Service & Maintenance section provides ongoing support to ensure the safe and reliable operation of our **UF-GDM**. Some Services include: Customer Support, Training, Licensing, Troubleshooting,...
- We are committed to providing comprehensive support to ensure your organization's success with our advanced grid management and protection system.

ROADMAP

Solution & Services Roadmap



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APPLICATION

Microgrid Systems

Enabling real-time coordination among distributed energy resources (DERs) in microgrid systems, allowing for seamless transitions between grid-connected and islanded modes of operation. This helps to minimize grid outages.

Fast EV-Charging Interconnection

Incorporating various storage technologies to maximize the capacity of electric grids, facilitating the rapid interconnection of Level-3 EV charging stations.

Power-Quality Control

Our solution offers high-speed, real-time commands for storage technologies to manage power quality issues, including dynamic voltage fluctuations, ride-through capabilities, harmonic compensation, and frequency fluctuation mitigation.

Behind-the-Meter Operation

Our technology utilizes various storage technologies to support real-time demand response, peak shaving, load leveling, frequency regulation, reactive power compensation, as well as volt-watt and watt-var support.

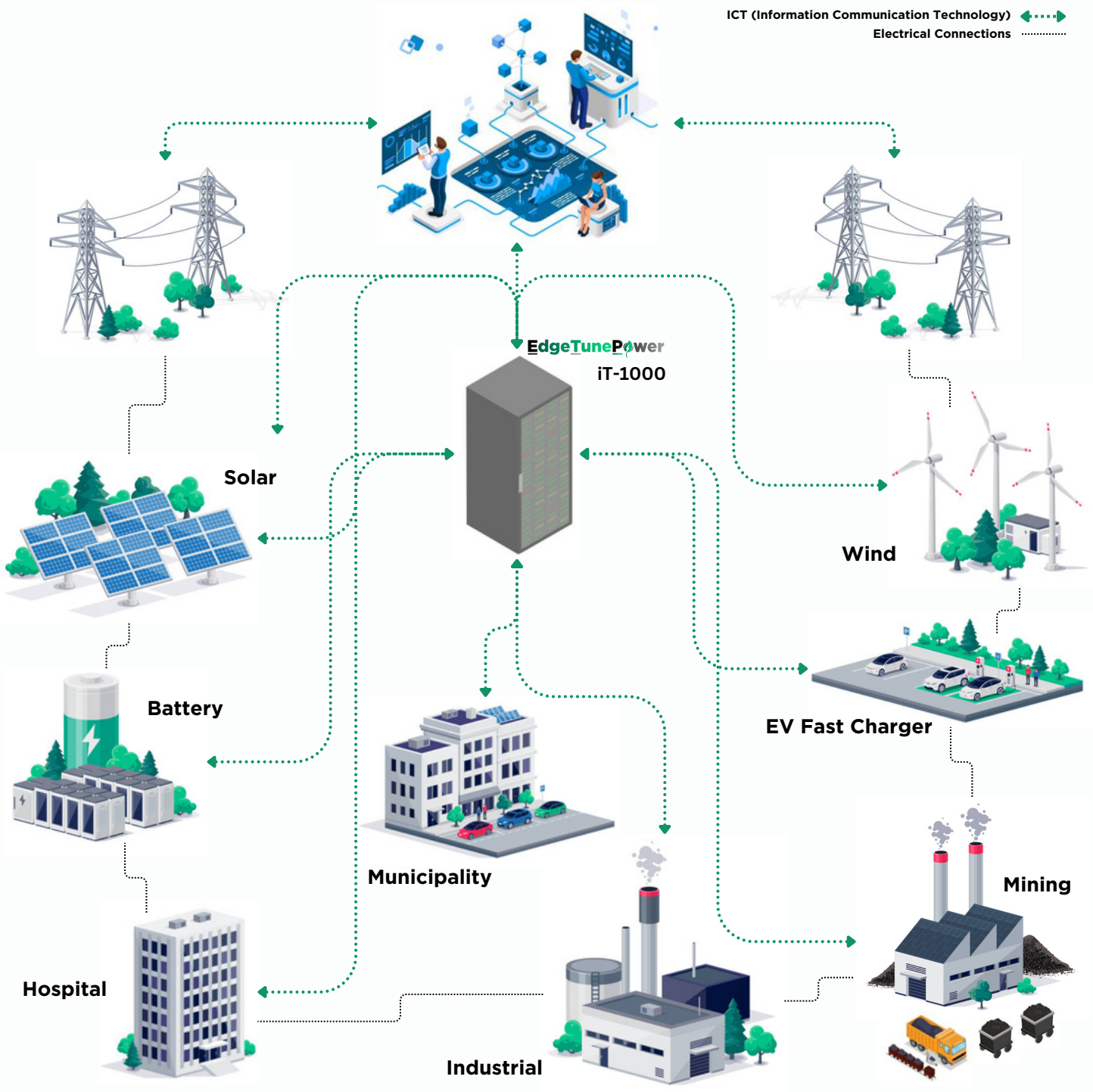
Virtual-Power-Plant (VPP)

ETP's technology enables grid-connected feeders to operate as virtual power plants (VPPs), facilitating real-time exchange of real and reactive power between asset owners and utilities.

Grid Outage Prevention

Enabling utility-owned MW-level storage technologies can reduce utility distribution feeder outages and help avoid million-dollar penalties enforced by power-outage legislation.

Real-Time Management Between DERs, Power System Critical Loads, and Utility Dispatch Center



ETP's software-hardware management system is designed to receive real-time information from energy generation and consumption resources, as well as from utilities. Using this data, the system commands storage systems to maximize the grid's reliability and resiliency.

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Introducing

iT-1000 Platform

- **Electric grid edge controller and conditioner**
- **Best in class, modular and scalable**
- **Complementing Energy-Management-Systems (EMS)**

In-millisecond Operation Time-frame (including communication delay) For Maximum Grid Resiliency

Computationally Powerful, Patented Decision-Making Algorithm to Minimize Grid Outages

CSA & UL Certification IEEE-1547 and NERC System-level Compliance

Modular, Scalable, & Future Proof for Management of Geographically-diverse Distribution Grids

Next-level of On-Premise Industrial Cyber-security

Ready for Operation in Harsh Environments

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DATA SHEET

01

Performance | Compliance Data	
Grid Code Compliance (IEEE-1547 - CSA - NERC - FERC)	UL and CSA component certificate
IEC-61850 Compliance	Standard Warranty: 3 years Extended Warranty: 4 to 10 years (available)

02

Specifications | Physical Features			
High-definition HMI panel	Web panel with 25.7 cm / 10.1" TFT-display (projective-capacitive (PCAP)), 1280 x 800 pixel(s) (WXGA), 16.7 million colors, Arm® Cortex®-A53, 4x 1.2 GHz, 2x USB host 2.0, 1 x Ethernet (10/100 Mbps), RJ45, Yocto/Linux and user software: Chromium Browser.	**HVAC System**	Designed to prevent condensation and maintain minimum temperature in the enclosure, built in thermostat. (-18 °C to +38 °C) (0 °F to +100 °F) Fan Auto/On switch with pilot light for Heat On indication High temperature safety protection Aluminum alloy outer casing
PLCnext Technology	PLCnext Control for the direct control of Axioline F I/Os. With two Ethernet interfaces. Complete with connector and bus base module.	**Power-supply System**	Primary-switched power supply unit, QUINT POWER, Screw connection, DIN rail mounting, SFB Technology (Selective Fuse Breaking), input: 1-phase, output: 24 V DC / 10 A
Input-Output Modules	Axioline F, Analog input module, Analog inputs: 8, Analog outputs: 8, 0 V ... 5 V, -5 V ... 5 V, 0 V ...10 V, -10 V ... 10 V, 0 mA ... 20 mA, 4 mA ... 20 mA, -20 mA ... 20 mA, connection technology: 2-conductor	**Cabinet Rating**	NEMA 3R / IP44
Cellular-based Module	Industrial LTE 4G router, European version, fallback to 3G UMTS/HSPA and 2G GPRS/EDGE, 2 Ethernet interfaces, firewall, NAT, 2x SMA-F antenna socket, SMS and e-mail transmission	**Single Cabinet Dimensions (W x H x D)**	800 mm (W) x 1200 mm (H) x 400 mm (D) 31.5” (W) x 3.98” (H) x 2.67” (D)

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CONTACT INFO

To learn more about our reliable and cost-effective control and protection solutions for your projects, get in touch with our team to schedule a real-time live demo!

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