OMNIWIFI PROJECT

Presented by
Darma

Prepared for
Darma

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About Me

Darmawan Syahputra S
Project Manager

Innovative Project Manager with a Strong IT & Education Background

A results-driven Project Manager with a background in Computer Science Education, blending technical expertise with leadership in software development, IT infrastructure, and project management. With over three years of experience, I have successfully led projects focusing on IT infrastructure, software development, and process optimization, ensuring efficiency and alignment with business goals.

Proficient in Software Development Life Cycle (SDLC), from analysis to deployment, I excel at strategic planning, risk management, and cross-functional collaboration. Passionate about leveraging technology to enhance learning experiences and drive innovation, I stay ahead of emerging trends and best practices in IT infrastructure and software development.

Skilled in stakeholder management, technical problem-solving, and process improvement, I thrive in dynamic environments, ensuring seamless execution of complex projects while maintaining high standards of quality and efficiency.

Background

In the modern corporate environment, seamless and high-speed wireless connectivity is essential for ensuring productivity, collaboration, and operational efficiency. PT Sukarame aims to implement a robust OmniWiFi solution to support its workforce across a two-story office building, each floor covering 3,200 m².

The office layout consists of multiple rooms partitioned by gypsum walls, which may impact wireless signal propagation. Additionally, the target user base comprises 234 employees, each expected to connect 3-4 devices (laptops, smartphones, tablets, etc.) to the WiFi network. This results in a high-density network environment requiring a well-optimized infrastructure to ensure stable, high-speed connectivity with minimal interference.

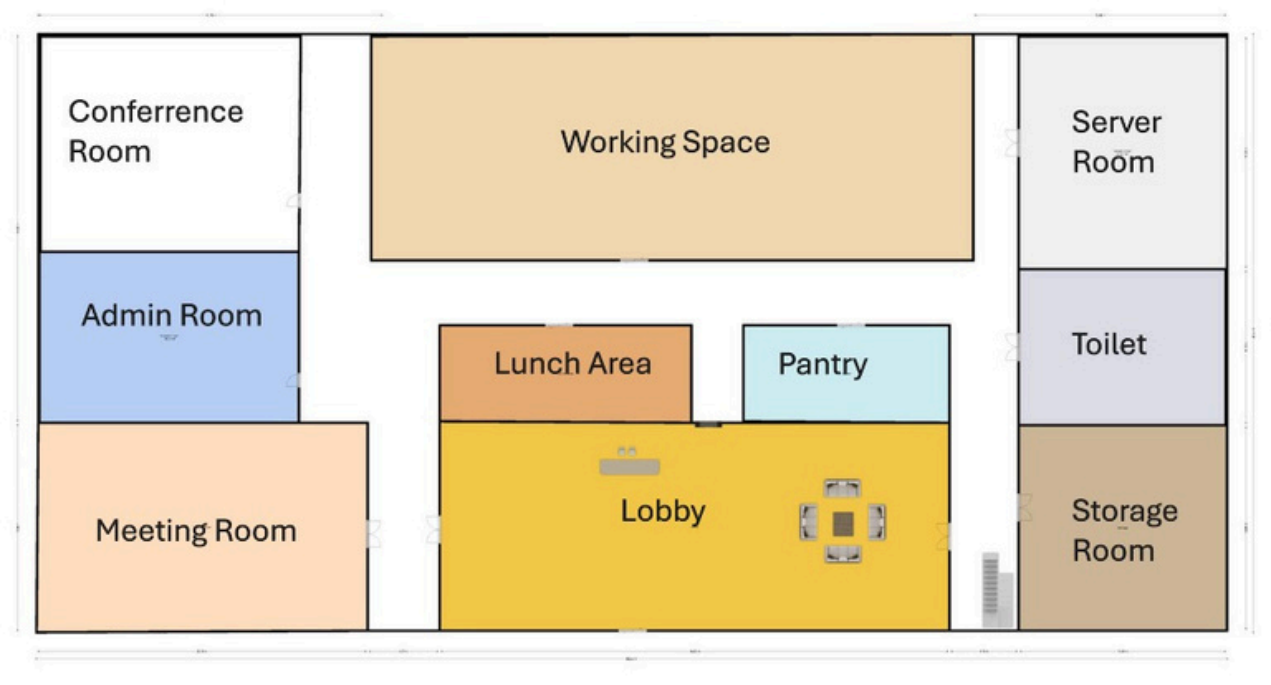
To meet these demands, this project will focus on:

1. **Strategic Access Point (AP) Deployment** – Ensuring optimal coverage across all office areas while mitigating signal loss due to partitions.
2. **High-Capacity Network Design** – Supporting concurrent connections from approximately 700-900 devices with minimal latency.
3. **Seamless Roaming & Load Balancing** – Implementing intelligent network management to ensure smooth transitions between APs without connection drops.
4. **Security & Access Control** – Implementing authentication protocols to manage user access and prevent unauthorized usage.
5. **Scalability & Future Expansion** – Designing the system to accommodate potential business growth and additional users.

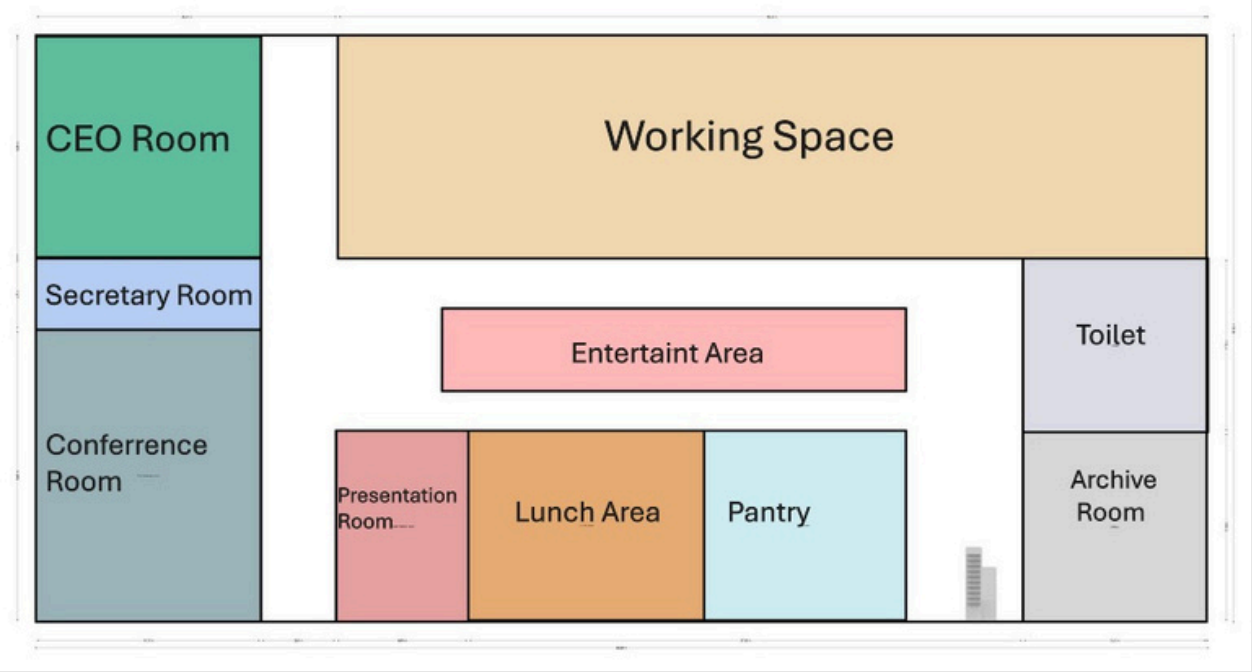
By implementing this OmniWiFi solution, PT Sukarame aims to enhance workplace efficiency, enable smooth digital communication, and provide a high-performance wireless network tailored to its operational needs.

Layout

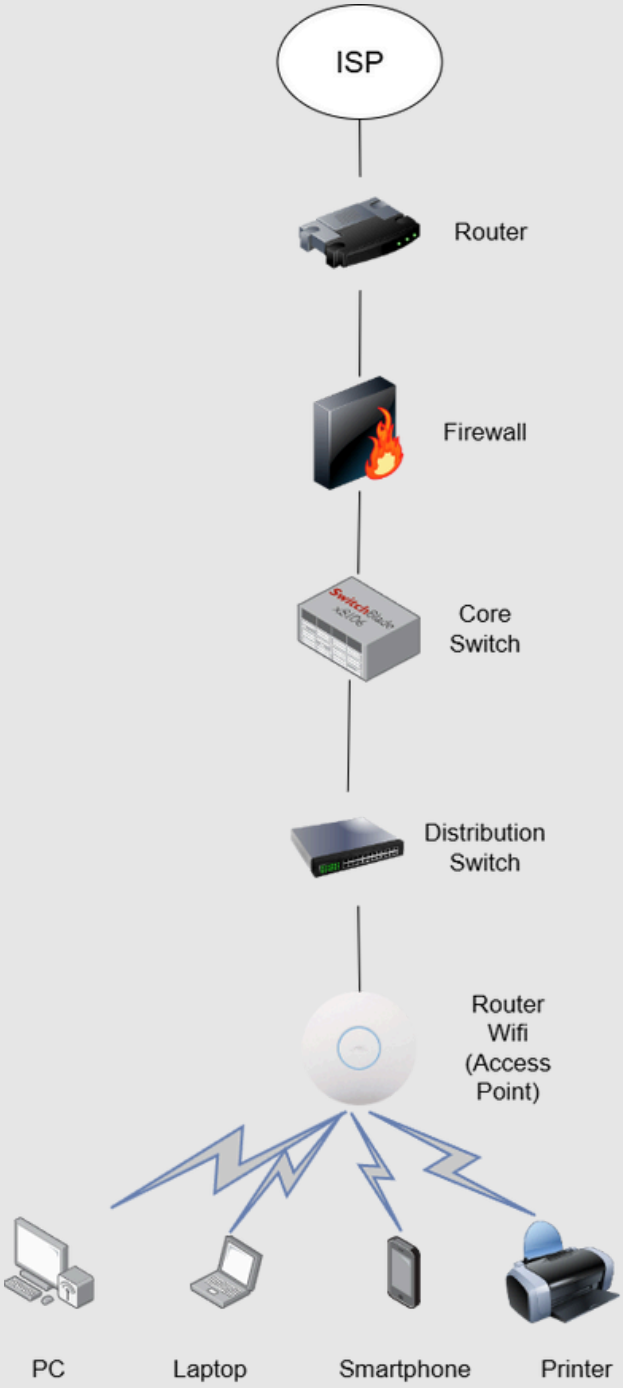
Ground Floor



SecondFloor



Topology


ISP
Router
Firewall
Core Switch
Distribution Switch
Router Wifi (Access Point)
PC
Laptop
Smartphone
Printer

Subnetting Plan

1. Network Requirements

- Total Users: 234
- Maximum Devices per User: 4
- Total Required IPs: 234 × 4 = 936 IPs
- Network Type: Private Network
- Addressing Scheme: IPv4 (Private IP Range)
- Subnetting Goal: Efficient IP allocation while minimizing waste

2. Choosing the Appropriate Subnet

To accommodate 936 devices, we need a subnet that provides at least 936 usable IPs.

- The closest power of 2 covering 936 is 1024 (since 1024 - 2 = 1022 usable IPs).
- The subnet mask required for 1024 addresses is /22 (which provides 1022 usable IPs).
- Subnet Block:
  - Example: 192.168.0.0/22
  - Usable IP Range: 192.168.0.1 – 192.168.3.254
  - Broadcast Address: 192.168.3.255
  - Total Usable IPs: 1022

Subnetting Plan

3. Subnet Allocation Strategy
To ensure efficient device distribution:

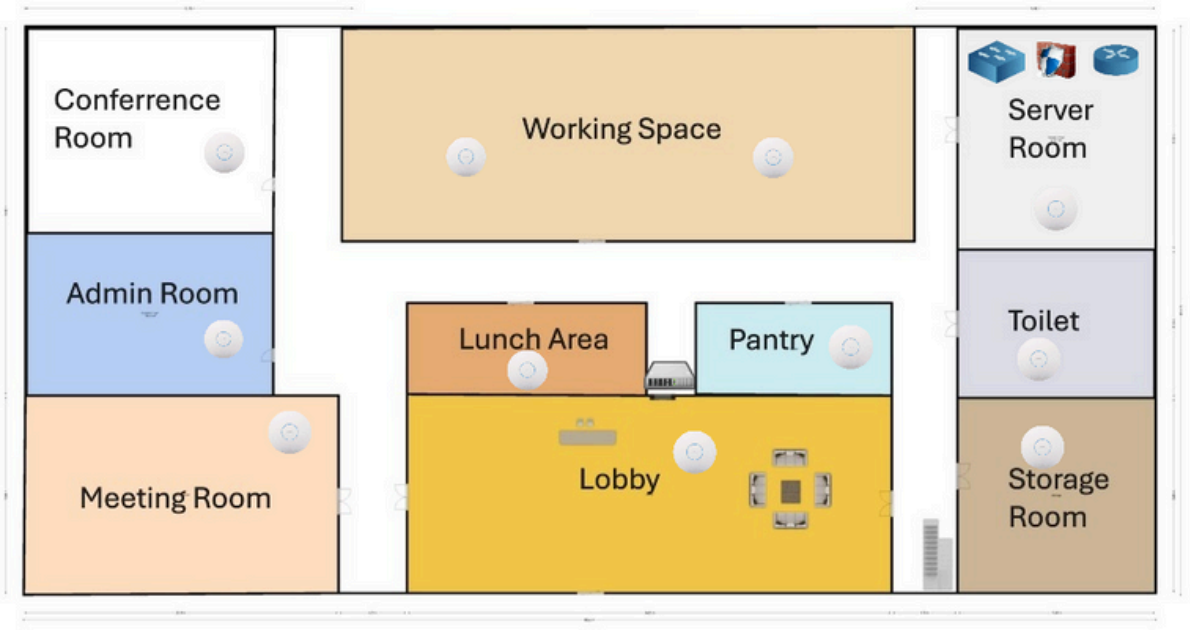
- Users are assigned IPs dynamically via DHCP.
- Static IPs reserved for network devices (e.g., routers, switches, servers).
- Subnet segmentation can be done per department or floor if required.

4. Summary of the Plan

Total Devices : 936
Subnet Used : /22
Total Usable IPs : 1022
IP Range : 192.168.0.1 - 192.168.3.254
Subnet Mask : 255.255.252.0

Layout Plan

Ground Floor



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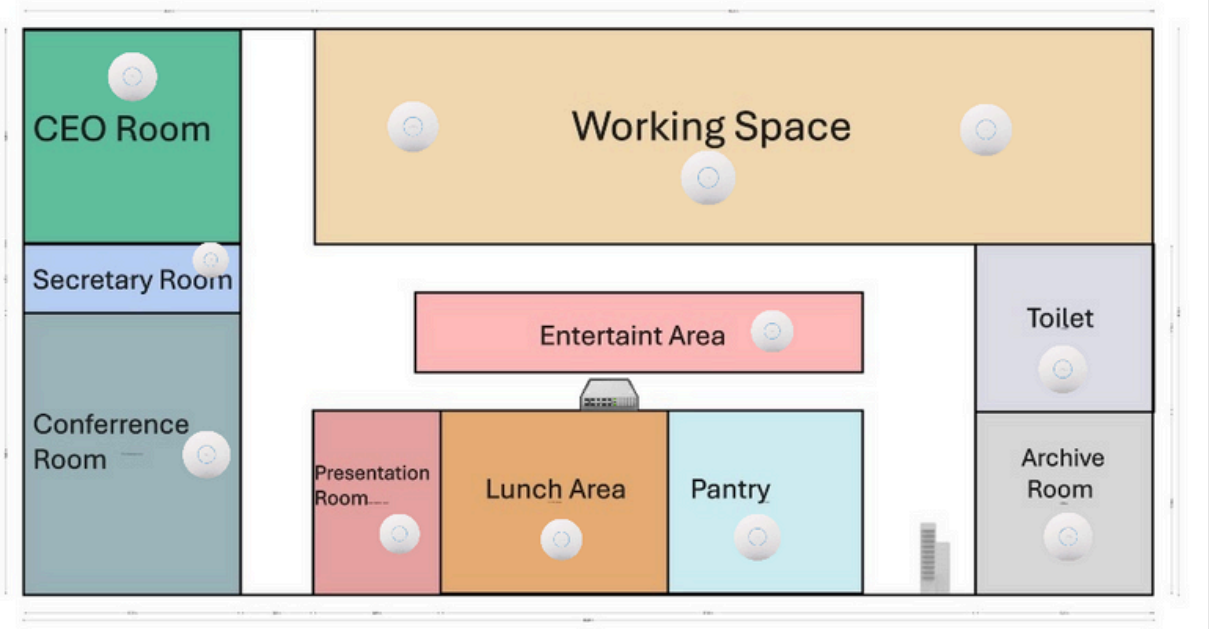


Risk Analysis

Risk	Mitigation
Signal Interference	Conduct site surveys, use high-gain antennas, optimize AP placement
Network Congestion	Implement load balancing, QoS policies, and sufficient bandwidth allocation
Roaming Issues	Configure seamless handover protocols, deploy mesh networking if necessary
Unauthorized Access	Use WPA3 encryption, implement multi-factor authentication (MFA)
Malware Threats	Enforce endpoint security policies, conduct cybersecurity training
Downtime Risks	Deploy redundant network components, schedule proactive maintenance
Scalability Issues	Design with modular expansion in mind, use cloud-based network management
Budget Overruns	Conduct detailed cost-benefit analysis, ensure phased implementation

Device Requirement

Device	Amount	Unit
Router Core	1	Unit
Firewall	1	Unit
Switch Core	1	Unit
Switch Distribution	2	Unit
Router Access Point	23	Unit
UTP Cable Cat 5	2	Roll
RJ 45	2	Box
Crimping Tools	2	Unit
Lan Tester	2	Unit
Ladder	2	Unit
Pipe 0,5 inch	3	Meter

Manpower

Position	Role	Total
Project Manager	Oversees the project, ensuring timely completion and adherence to quality standards.	1
Network Engineer	Designs and configures the WiFi network, including Access Point (AP) placement and network security.	1
Installation Technician	Install and test the hardware components, including APs and cabling.	2
IT Support Specialist	Provides user support and addresses connectivity issues post-installation.	1
Security Specialist	Implements network security measures to protect against unauthorized access	1
Administrative Support	Handles documentation, scheduling, and coordination among team members.	1

Timeline

Day	Task	Responsible Team	Description
Day 1	Project Kickoff & Site Survey	Project Manager, Network Engineer	Conduct a site survey, assess building layout, and identify optimal Access Point (AP) locations.
Day 2	Network Design & Planning	Network Engineer, Security Specialist	Design network topology, determine bandwidth requirements, and plan security policies.
Day 3	Procurement & Equipment Preparation	Project Manager, IT Support	Procure necessary hardware (APs, routers, switches) and configure initial settings.
Day 4	Network Infrastructure Setup	Installation Technicians, IT Support	Install cabling, power sources, and networking hardware in designated locations.
Day 5	Access Point (AP) Deployment	Installation Technicians, Network Engineer	Mount APs in strategic locations and configure initial network parameters.
Day 6	Network Configuration & Optimization	Network Engineer, Security Specialist	Configure SSIDs, VLANs, QoS, and security settings to optimize network performance.
Day 7	Testing & Troubleshooting	IT Support, Network Engineer	Conduct connectivity tests, resolve signal interference issues, and optimize roaming.
Day 8	Load Testing & Performance Evaluation	Project Manager, Network Engineer	Simulate high-density usage (700-900 devices) to ensure stability and performance.
Day 9	Security Implementation & User Access Setup	Security Specialist, IT Support	Implement authentication methods (WPA3, MFA) and finalize access control settings.
Day 10	Final Review, Documentation & Handover	Project Manager, Administrative Support	Conduct a final review, document system configuration, and hand over to PT Sukarame IT team.

Pricing Device & Tools

Device	Amount	Unit	Price (IDR)	Total (IDR)
Router Core	1	Unit	18.200.000	18.200.000
Firewall	1	Unit	24.360.000	24.360.000
Switch Core	1	Unit	8.090.000	8.090.000
Switch Distribution	2	Unit	5.315.000	10.360.000
Router Access Point	23	Unit	2.075.000	47.725.000
UTP Cable Cat 5	2	Roll	2.171.000	4.342.000
RJ 45	2	Box	966.000	1.932.000
Crimping Tools	2	Unit	830.000	1.660.000
Lan Tester	2	Unit	590.000	1.180.000
Ladder	2	Unit	1.400.000	2.800.000
Pipe 0,5 inch	3	Meter	10.000	30.000
Total				**120.679.000**

Pricing Manpower

To implement the OmniWiFi project for PT Sukarame within a 10-day timeframe, the following manpower plan has been devised, aligning with INKINDO's 2023 billing rates.

Position	Cost per Day (IDR)	Duration (Days)	Total Cost (IDR)
Project Manager	2,500,000	10	25,000,000
Network Engineer	2,000,000	10	20,000,000
Installation Technician (2 Personnel)	1,500,000 per technician	10	30,000,000
IT Support Specialist	1,800,000	5	9,000,000
Security Specialist	2,200,000	3	6,600,000
Administrative Support	1,200,000	10	12,000,000
Total			**102,600,000**

Delivery (Project Phases & Deliverables)

Phase	Key Activities	Deliverables	Timeline
Phase 1: Planning & Site Survey	Conduct a detailed site survey, analyze floor plans, and assess wireless interference.	Site survey report, WiFi heatmap, network design document.	Day 1-2
Phase 2: Procurement & Preparation	Acquire networking equipment (APs, routers, firewalls, switches) and configure devices before deployment.	Equipment checklist, pre-configured network devices.	Day 3-4
Phase 3: Installation & Deployment	Install core & distribution switches, mount access points, set up the firewall & routing.	Installed APs, configured network infrastructure.	Day 5-7
Phase 4: Testing & Optimization	Conduct signal strength tests, optimize AP placements, implement load balancing, and check security settings.	Test results, performance report, issue log.	Day 8-9
Phase 5: Training & Handover	Train IT staff on network management, provide documentation, and finalize project handover.	User manuals, training materials, final acceptance report.	Day 10

Delivery(Project Delivery Approach)

A. Deployment Strategy

- Wireless Coverage Optimization: Placement of APs based on site survey results to ensure full coverage with minimal signal interference.
- Network Segmentation & VLANs: Separate VLANs for employees, guests, and IoT devices to improve security and performance.
- Redundant & Scalable Design: Ensuring future expansion capability with additional APs and network components.

B. Security Implementation

- FortiGate Firewall Policies: Implement access control, intrusion prevention, and content filtering.
- User Authentication: Enforce WPA3 security, 802.1X authentication, and role-based access control (RBAC).
- Monitoring & Logging: Enable logs and monitoring through MikroTik & Fortinet solutions.

C. Testing & Quality Assurance

- Coverage Testing: Ensure all office areas have seamless WiFi access with heatmap validation.
- Device Load Testing: Simulate 700-900 concurrent connections to validate network capacity.
- Failover & Redundancy Tests: Ensure minimal downtime in case of hardware failure.

Delivery(Project Handover & Documentation)

At the end of the project, we will provide PT Sukarame with:

- Network topology diagram (logical & physical)
- Configuration files & settings for routers, switches, and firewalls
- User guides for managing OmniWiFi infrastructure
- Issue resolution log and recommendations for future upgrades
- Warranty & support details for hardware and software

Attachements

Routerboard CCR1036-12G-4S(v2)

Spesification :

The CCR1036-12G-4S (v2) is a high-performance Cloud Core Router (CCR) designed for enterprise networks, data centers, and ISPs. It features a powerful 36-core TILE-Gx36 CPU running at 1.2 GHz with 4GB ECC RAM, ensuring high-speed packet processing and stable performance.
This router comes with 12 Gigabit Ethernet ports and 4 SFP ports for fiber connectivity. It supports advanced routing protocols like BGP, OSPF, and MPLS, making it ideal for large-scale deployments.
For security and traffic management, it includes firewall rules, NAT, VPN (IPsec, L2TP, OpenVPN), and QoS capabilities. It also supports load balancing, failover, and Layer-7 filtering for efficient traffic control.
Designed for 24/7 reliability, it features dual redundant power supplies and active cooling to prevent overheating. With RouterOS Level 6 License, it provides full control over networking configurations.

Attachements

Fortinet FortiGate FG-80F Network Security/Firewall Appliance

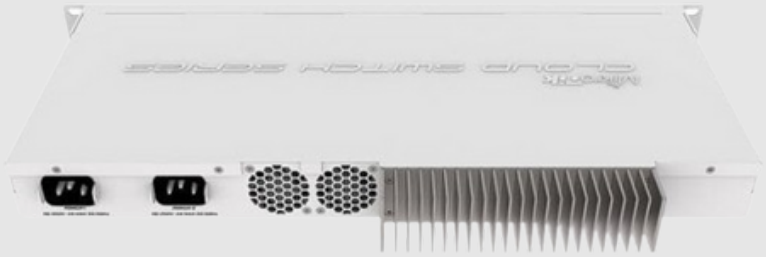
Spesification :

The FortiGate FG-80F is a high-performance firewall for mid-sized businesses, offering 4 Gbps firewall throughput and 1 Gbps threat protection. It features 10 Gigabit RJ45 ports, 2 SFP fiber ports, and supports VPN (IPsec & SSL), SD-WAN, and advanced security with AI-driven threat protection.

- **Firewall & IPS** – Deep packet inspection, application control, and intrusion prevention
- **VPN & Remote Access** – Secure connectivity for branch offices and remote users
- **SD-WAN & Traffic Optimization** – Improves cloud and WAN performance
- **Cloud & IoT Security** – Integrated with FortiCloud for centralized management

A solid choice for OmniWiFi network security, ensuring high-speed protection and scalability

Attachements



Mikrotik CRS317-1G-16S+RM , Cloud Router Switch 16 port SFP+ 10G , 1 x Gigabit

Spesification :

The CRS317-1G-16S+RM is a Cloud Router Switch designed for high-speed networking, featuring 16 SFP+ 10G ports for fiber connectivity and 1 Gigabit Ethernet port for management. It is ideal for enterprise networks, data centers, and high-bandwidth environments.
Key Features:

- 16x SFP+ 10G ports – Supports high-speed fiber connections
- 1x Gigabit Ethernet port – For management and fallback
- Switching Capacity – 320 Gbps
- Throughput (Non-Blocking Mode) – 317 Gbps
- CPU – Dual-Core 800 MHz
- RAM – 1GB
- Cooling – Dual Redundant Fans
- Power Supply – Dual Redundant PSU
- Operating System – RouterOS or SwitchOS (dual boot)

Advantages:

- High-speed 10G switching for smooth data transfer
- Redundant power & cooling for reliability
- Layer 3 features for advanced routing needs
- Ideal for core switching in OmniWiFi deployment

Attachements

Mikrotik CRS318-16P-2S+Out netPower 16port netPower 16P

Spesification :

The CRS317-1G-16S+RM is a Cloud Router Switch designed for high-speed networking, featuring 16 SFP+ 10G ports for fiber connectivity and 1 Gigabit Ethernet port for management. It is ideal for enterprise networks, data centers, and high-bandwidth environments.
Key Features:

- 16x SFP+ 10G ports – Supports high-speed fiber connections
- 1x Gigabit Ethernet port – For management and fallback
- Switching Capacity – 320 Gbps
- Throughput (Non-Blocking Mode) – 317 Gbps
- CPU – Dual-Core 800 MHz
- RAM – 1GB
- Cooling – Dual Redundant Fans
- Power Supply – Dual Redundant PSU
- Operating System – RouterOS or SwitchOS (dual boot)

Advantages:

- High-speed 10G switching for smooth data transfer
- Redundant power & cooling for reliability
- Layer 3 features for advanced routing needs
- Ideal for core switching in OmniWiFi deployment

Attachements

Ubiquiti Access Point UAP-AC-LR

Spesification :

The Ubiquiti UniFi UAP-AC-LR is a long-range, high-performance WiFi access point, designed for indoor deployments in offices, schools, and enterprise environments. It provides strong coverage, dual-band support, and seamless integration with the UniFi ecosystem.
Key Specifications:

- WiFi Standards – 802.11ac (WiFi 5), 2.4 GHz & 5 GHz
- Speed – 450 Mbps (2.4 GHz) + 867 Mbps (5 GHz)
- Antenna – Long-Range (3 dBi – 2.4 GHz, 6 dBi – 5 GHz)
- Max Power Output – 22 dBm
- Ethernet Port – 1x Gigabit RJ45 (PoE-In Support)
- Power Input – Passive PoE (24V) or 802.3af
- Coverage Area – Up to 183 meters (600 feet)
- Mounting – Ceiling/Wall Mount
- Management – UniFi Controller Software

Advantages:

- Long-range coverage – Ideal for large office spaces
- Dual-band support – Reduces congestion for better performance
- Seamless roaming – Works with multiple UniFi APs
- Easy management – Controlled via UniFi Controller

A great option for OmniWiFi networks, ensuring wide coverage and stable connectivity.

Attachements

Kabel COMMSCOPE / AMP UTP Cat6 Cable 305M

Spesification :

The COMMSCOPE / AMP UTP Cat6 Cable is a high-performance network cable designed for Gigabit Ethernet, PoE applications, and high-speed data transmission. It is suitable for enterprise networks, data centers, and OmniWiFi deployments.
Key Specifications:

- Cable Type – Unshielded Twisted Pair (UTP) Cat6
- Length – 305 meters (1,000 feet) per box
- Conductor – 23 AWG Solid Copper
- Bandwidth – 250 MHz
- Data Rate – Up to 1 Gbps (10 Gbps at short distances)
- Jacket Material – PVC or LSZH (Low Smoke Zero Halogen)
- Compliance – ANSI/TIA-568-C.2, RoHS, UL Listed

Advantages:

- High-speed transmission – Supports Gigabit and 10G Ethernet
- Low crosstalk – Ensures stable and interference-free communication
- PoE Compatible – Supports Power over Ethernet (PoE, PoE+, and PoE++)
- Durable & Reliable – Suitable for indoor structured cabling

A trusted choice for OmniWiFi networks, ensuring high-performance connectivity

Attachements

LS EZ LS-CT-UC6-EZ crimping tool rj45

Spesification :

The LS EZ LS-CT-UC6-EZ is a professional-grade crimping tool designed for RJ45 Cat6 and Cat5e connectors, ensuring precise terminations and reliable network connections.
Key Specifications:

- Compatible Connectors – RJ45 (8P8C) Cat6 & Cat5e EZ Pass-Through Connectors
- Crimping Mechanism – Precision blade system for clean cuts and secure crimps
- Material – Durable steel body with ergonomic grip for comfortable use
- Functions – Crimping, Cutting, and Stripping
- EZ Pass-Through Support – Allows faster and more accurate terminations
- Weight – Lightweight and compact design for easy handling

Advantages:

- Fast & Efficient – Reduces cable waste and installation time
- Precise Crimping – Ensures strong, error-free connections
- Comfortable Grip – Minimizes hand fatigue during extended use
- Multi-Function – Crimps, strips, and cuts in one tool

A reliable choice for OmniWiFi network installations, making RJ45 termination easier and more efficient.

Attachements

Noyafa NF-488 , Cable Tester RJ45 STP / UTP Power over Ethernet POE Checker

Spesification :

The Noyafa NF-488 is a multi-functional network cable tester designed for RJ45 STP/UTP cable testing and PoE (Power over Ethernet) checking, making it ideal for network installation, troubleshooting, and maintenance.
Key Specifications:

- Cable Compatibility – RJ45 (STP/UTP) Ethernet cables
- PoE Testing – Detects voltage, current, and power of PoE devices
- Cable Testing Functions – Wire continuity, open, short, and miswiring detection
- PoE Standards Supported – IEEE 802.3af, 802.3at (PoE, PoE+), and 802.3bt
- Voltage Detection Range – DC 5V ~ 60V
- LCD Display – Clear digital screen for easy readings
- Power Supply – 9V Battery (Not Included)
- Port Compatibility – Detects PoE power sourcing from switches, injectors, and routers

Advantages:

- Accurate PoE Detection – Identifies power type (End-span/Mid-span), voltage, and polarity
- Reliable Cable Testing – Checks continuity, open circuits, shorts, and miswiring
- Easy to Use – Compact and lightweight for field technicians
- LCD Display – Clear status indicators for quick diagnostics

An essential tool for OmniWiFi network deployment, ensuring proper cable connections and PoE functionality

Summary

Project Overview

The OmniWiFi project for PT Sukarame aims to establish a high-speed, reliable, and secure wireless network within a two-story office building (3,200 m² per floor). The network will support 234 employees, each connecting 3-4 devices, resulting in a high-density environment with 700-900 concurrent connections.

Network Infrastructure & Devices

To meet these demands, the following equipment and tools have been selected:

- Core Network:
  - Router: MikroTik CCR1036-12G-4S(v2) – High-performance router for efficient traffic management.
  - Firewall: Fortinet FortiGate FG-80F – Ensures network security with advanced threat protection.
  - Core Switch: MikroTik CRS317-1G-16S+RM – Provides high-speed 10G fiber connectivity for optimal network performance.
- Distribution & Access Layer:
  - Distribution Switches: MikroTik CRS318-16P-2S+Out (netPower 16P) – PoE-powered distribution for APs and other network devices.
  - Access Points: Ubiquiti UAP-AC-LR – Ensures long-range, high-speed WiFi coverage.
- Cabling & Connectors:
  - Cables: COMMSCOPE Cat6 UTP 305M – Ensures Gigabit Ethernet performance and PoE compatibility.
  - RJ45 Connectors: AMP COMMSCOPE Cat6 RJ45 – Provides reliable terminations for structured cabling.
- Installation Tools & Testing Equipment:
  - Crimping Tool: LS EZ LS-CT-UC6-EZ – Ensures precise RJ45 termination.
  - Cable Tester: Noyafa NF-488 – Used for cable continuity and PoE testing.
  - Ladders: Required for AP and cabling installation.

Manpower & Project Execution

The project will be completed within 10 days, requiring a skilled team to handle installation, configuration, and testing. The workforce includes:

- Network Engineer(s) – Responsible for network design, configuration, and security implementation.
- Technicians – Handling cabling, device mounting, and PoE configurations.
- Project Manager – Ensuring timely execution and alignment with PT Sukarame's operational needs.

Expected Outcome

Upon completion, PT Sukarame will benefit from:

- Seamless high-speed wireless connectivity across all office areas.
- Secure and efficient network management with firewall protection and access control.
- Scalability for future expansion, ensuring long-term operational efficiency.

This OmniWiFi solution will enhance productivity, collaboration, and digital communication,

For Inquiries, Contact Me

darmasukarame@gmail.com

https://www.linkedin.com/in/darmasukarame/