

AI-03998 Google Cloud Platform Lesson Plan

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Tags	Project
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Look back in May 2026 when I started my Google Cloud Platform Journey, I would like to document my learnings via OpenProject Work Packages. List all the tasks which I've done related to GCP deployment including the setup, VM, Docker setup, ymls and troubleshooting. I just need a list of tasks which I can upload to my OpenProject Google Cloud Deployment Project. No need to explain, just the task list.

Here is the structured list of tasks based on your GCP deployment, architecture, and troubleshooting history from May and June 2026, formatted for direct upload or copy-paste into your OpenProject Work Packages:

- **GCP Infrastructure & VM Provisioning**

- Provision GCP Compute Engine VM instance for DockerLab architecture
- Configure GCP VPC firewall rules for external traffic (HTTP/HTTPS ports)
- Initialize Docker authentication on GCP VM using Google account credentials
- Set up local directory structures for persistent volumes
(`/home/rarcayan/inetpub/`)

- **Docker Lab Networking & Environment Setup**

- Create a unified external Docker network (`dockerlab-network`) for container communication
- Deploy shared database engines (Consolidated MySQL/MariaDB instance)
- Deploy shared database engines (Consolidated PostgreSQL instance)

- Install and configure Nginx Proxy Manager (NPM) for centralized domain routing
- **Service Deployments & Compose Configuration (YMLs)**
 - Configure and deploy `docker-compose.yml` for OpenProject instance
 - Configure and deploy `docker-compose.yml` for InvenTree instance
 - Configure and deploy `docker-compose.yml` for WordPress instance
 - Link individual application compose files to the external `dockerlab-network`
- **Domain & Proxy Configuration**
 - Map application containers to subdomains under `blindcaveman.duckdns.org`
 - Configure Forward Host settings in Nginx Proxy Manager using exact container names
 - Generate and bind SSL/TLS certificates for subdomains within NPM
- **Data Synchronization & Tooling**
 - Set up `rsync` scripts for localized container file synchronization
 - Configure Rclone for cloud backup orchestration on a headless VM environment
 - Establish SSH tunneling to authenticate Rclone via local browser session
- **Troubleshooting & System Optimization**
 - Resolve container volume permission issues using Linux ownership commands (`chown` for path access)
 - Debug NPM routing and Forward Host container name mismatches
 - Analyze Nginx error logs to resolve `403 Forbidden` statuses on autoindex files

Rewrite without using bullets and don't indent, just bold the Phases, the list will go to an Excel Macro spreadsheet

GCP Infrastructure and VM Provisioning

Provision GCP Compute Engine VM instance for DockerLab architecture

Configure GCP VPC firewall rules for external traffic HTTP HTTPS ports
Initialize Docker authentication on GCP VM using Google account credentials
Set up local directory structures for persistent volumes

Docker Lab Networking and Environment Setup

Create a unified external Docker network dockerlab network for container communication
Deploy shared database engines Consolidated MySQL MariaDB instance
Deploy shared database engines Consolidated PostgreSQL instance
Install and configure Nginx Proxy Manager NPM for centralized domain routing

Service Deployments and Compose Configuration

Configure and deploy docker compose yml for OpenProject instance
Configure and deploy docker compose yml for InvenTree instance
Configure and deploy docker compose yml for WordPress instance
Link individual application compose files to the external dockerlab network

Domain and Proxy Configuration

Map application containers to subdomains under blindcaveman duckdns org
Configure Forward Host settings in Nginx Proxy Manager using exact container names
Generate and bind SSL TLS certificates for subdomains within NPM

Data Synchronization and Tooling

Set up rsync scripts for localized container file synchronization
Configure Rclone for cloud backup orchestration on a headless VM environment
Establish SSH tunneling to authenticate Rclone via local browser session

Troubleshooting and System Optimization

Resolve container volume permission issues using Linux ownership commands
Debug NPM routing and Forward Host container name mismatches
Analyze Nginx error logs to resolve 403 Forbidden statuses on autoindex files

Next, create a similar list but this time a lesson plan of GCP, VM, Networking, Firewall, SSH etc. Also include lesson plans for Docker setup and deployment, what to know, Linux CLI commands to know, NPM, Docmost, InvenTree and bulk upload, n8n, OpenEMR and Bulk upload of patient info, OpenProject and bulk upload via API Excel Macro, pgAdmin, phpMyAdmin, Portainer, Wordpress, Zammad, DuckDNS, VSCode. Use a mindset that I am teaching someone from

Ground Zero of GCP to full learning of Docker, Docker Apps mentioned so that I can utilize the Project Plan Work Packages as teaching tool and guidance.

Phase 1: Foundations of Cloud Infrastructure (GCP and Linux)

Understand Cloud Computing vs On-Premises Architecture
Create a Google Cloud Platform Account and Navigate the Console
Understand GCP Projects, Billing, and Resource Hierarchy
Provision a Compute Engine Virtual Machine Instance
Select the Optimal VM Machine Type, OS Image, and Boot Disk
Configure Static Internal and External IP Addresses for the VM
Understand Networking Concepts: Subnets, Routes, and Virtual Private Clouds
Configure GCP VPC Firewall Rules for Ingress and Egress Traffic
Open Ports 22, 80, 443, and Custom Application Ports in GCP Firewall
Understand the Principles of Public-Private Key Cryptography
Generate SSH Key Pairs and Manage SSH Keys in the GCP Console
Connect to a Headless Linux VM via Native Terminal and Third-Party Clients
Navigate the Linux File System Using Essential CLI Commands
Manage File and Directory Permissions Using chmod and chown
Monitor VM System Resources Using top, htop, df, and free
Install Updates and Manage Packages Using the apt Package Manager

Phase 2: Docker Core Concepts and Container Orchestration

Understand Containerization vs Hardware Virtualization
Install Docker Engine and Docker Compose on Ubuntu Server
Manage the Docker Daemon and Configure Non-Root User Access
Understand Docker Images, Layers, and the Local Image Cache
Pull, Run, Stop, Restart, and Remove Docker Containers
Understand Container Ephemerality and the Necessity of Persistent Volumes
Configure Named Volumes and Bind Mounts for Persistent Storage
Understand Docker Networking Drivers: Bridge, Host, and Overlay
Create and Manage a Dedicated External Docker Bridge Network
Analyze Container Logs and Troubleshoot Crashes Using docker logs
Execute Commands Inside Running Containers Using docker exec
Understand the Structure and Syntax of a docker-compose.yml File
Manage Multi-Container Applications Using docker-compose CLI Commands
Optimize Environment Variables and env Files for Secure Configurations

Phase 3: Development Tools and Edge Infrastructure

Install and Configure Visual Studio Code for Remote Development
Connect VS Code to a GCP VM Securely via the Remote-SSH Extension
Manage Container Files and Edit Code Directly on the Host via VS Code
Understand Dynamic DNS and Domain Name Resolution
Configure a DuckDNS Account and Set Up Automated Token Scripts
Install and Deploy Portainer for Graphical Container Management
Navigate the Portainer Dashboard to Monitor Containers, Networks, and Volumes
Deploy Nginx Proxy Manager NPM for Centralized Reverse Proxy Management
Configure NPM Forward Hosts Using Internal Docker Network Container Names
Generate and Renew Let's Encrypt SSL Certificates Automatically via NPM
Force SSL, HTTP/2, and Block Common Exploits in NPM Settings
Deploy phpMyAdmin for Graphical Management of MySQL and MariaDB Databases
Connect phpMyAdmin to an Isolated Database Container via Docker Network
Deploy pgAdmin for Graphical Management of PostgreSQL Databases
Configure pgAdmin Server Connections and Manage Database Schemas

Phase 4: Deploying Core Productivity and Management Applications

Deploy WordPress via Docker Compose with an External Database Dependency
Configure WordPress Environment Variables for Database Connectivity
Deploy Zammad Ticketing System and Understand Its Multi-Container Architecture
Configure Zammad Storage, Elasticsearch Dependencies, and Email Gateways
Deploy Docmost for Open Source Collaborative Documentation and Knowledge Base
Configure Docmost Environment Variables and Persistent Storage Volumes
Deploy OpenProject via Docker Compose for Enterprise Project Management
Configure OpenProject System Settings, Email Notifications, and Storage Modules

Phase 5: Deploying Specialized Enterprise and Automation Platforms

Deploy InvenTree via Docker Compose for Inventory and Asset Management
Configure InvenTree Worker, Web, and Database Service Dependencies
Understand the InvenTree Database Schema and Relational Asset Structures
Deploy n8n via Docker Compose for Workflow and Node-Based Automation
Configure n8n Environment Variables for Encryption Keys and Webhook URLs
Understand n8n Executions, Active Workflows, and Custom Credential Storage

Deploy OpenEMR via Docker Compose for Electronic Medical Records Management

Configure OpenEMR Security Certificates, Port Routing, and Database Initialization

Phase 6: Advanced Data Integration, API Automation, and Bulk Uploads

Understand REST API Principles: Endpoints, Methods, Headers, and Payloads

Generate API Tokens and Manage Authentication Keys in OpenProject

Design an Excel Macro Workbook Using VBA to Interact with HTTP APIs

Construct JSON Strings inside Excel VBA for OpenProject Work Package Creation

Execute Bulk Upload of Project Work Packages via OpenProject API from Excel

Understand InvenTree Bulk Import Templates and Data Mapping Fields

Execute Bulk Upload of Parts, Categories, and Suppliers into InvenTree via CSV

Understand OpenEMR Patient Data Import Structures and Layouts

Execute Bulk Upload of Patient Demographics and Records into OpenEMR

Build n8n Workflows to Parse CSV Files and Automate Application Ingestion

Troubleshoot API Error Codes, Data Mismatches, and Rate Limits Across Platforms