

TECHNICAL PROPOSAL

PT. Modern Data Solusi



PT Central Data Technology

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1. EXECUTIVE SUMMARY

Organizations of all types, sizes, and industries use the cloud for a variety of uses, such as data backup, disaster recovery, email, virtual desktops, software development and testing, big data analytics, and customer-facing web applications. Cloud computing provides many benefits to its user such as agility, elasticity, cost efficiency, and easily deploy infrastructure globally in minutes. No wonder if Cloud computing is very popular and a necessity that is quite important for almost all industries which help drives customer innovation.

Amazon Web Services (AWS) is one of the most comprehensive and broad-reaching cloud platforms, which offers more than 200 services that used by more than 1 million active users spread across more than 240 countries and regions. As the leader of Magic Quadrant for Cloud Infrastructure and Platform Services worldwide for 12 consecutive years, AWS is the right choice of cloud platform for your needs. PT Central Data Technology as Authorized Advanced Consulting Partner AWS have gathered deep experiences with clients from variety of industries, with the workload vary from small-medium workload until whole environment workload. At the 2022 ASEAN Partner Awards ceremony in Singapore, PT Central data Technology win the award for Partner of the Year – Indonesia for significantly growing its customer base, delivering exceptional cloud transformation projects for Indonesian customers. Aside from offering IaaS, PaaS, SaaS AWS Solution, CDT also offers local billing services, provisioning or implementation, and managed services in preventive and corrective maintenance.

2. ABOUT PT CENTRAL DATA TECHNOLOGY

PT Central Data Technology (CDT) is a value-added distributor that focuses on meeting business' IT needs in today's competitive market. As part of CTI Group, CDT has collaborated with more than 170 customers from all industries. From its wide portfolios and years of professional experiences, CDT is known as leading IT infrastructure solution, enterprise solution, network & security as well as cloud solution partner in Indonesia that is capable in delivering the best IT solutions that exceed customer's expectation.

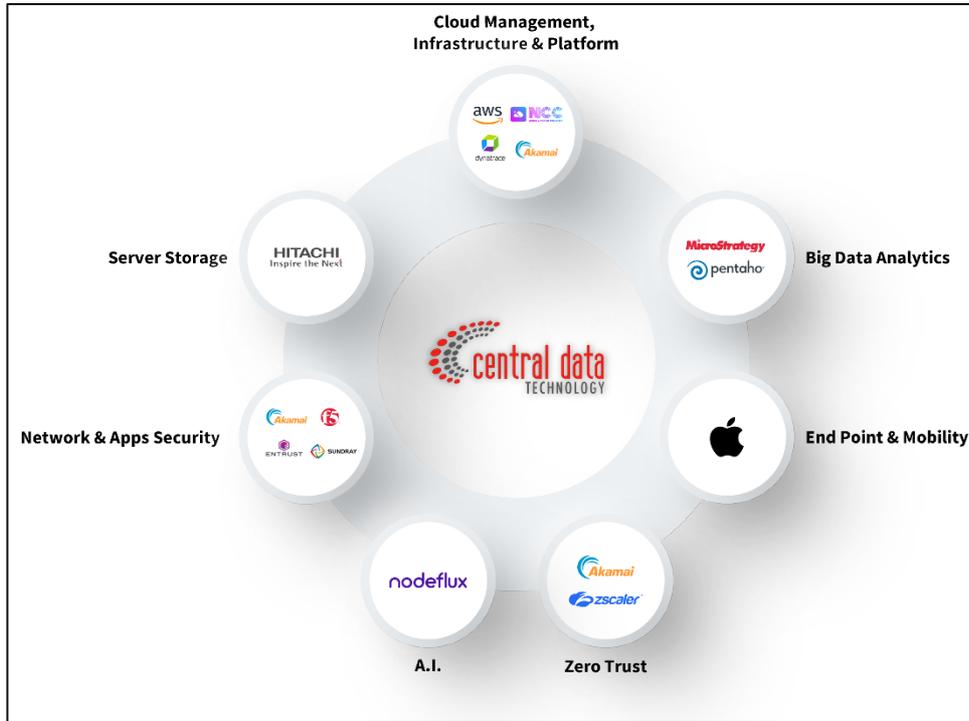


Figure 1 Product Solution

PT Central Data Technology is an AWS Partner in Indonesia since 2018 and currently we are AWS Advanced Consulting Partner, and an AWS Solution Provider since 2019 that have gathered deep experiences with clients from variety of industries such as manufacturing, construction, retail, E-commerce, hospitality, furniture, and many more with the workload vary from small-medium workload such as WebApp, App Server, DB App, Analytics, Data Recovery until whole environment workload such as test, development, and production as well as ERP Production such as SAP and Odoo. Aside from offering IaaS, PaaS, SaaS AWS Solution, CDT also offers managed services in preventive and corrective maintenance.



Figure 2 Partnership Badges

PT Central Data Technology (CDT) has partnered with AWS since 2018 and has been acknowledged as AWS APN Advanced Partner as well as APN Advanced Consulting Partner with all the sales and technical team are AWS Certified.



Figure 3 Certification Badges

At the 2022 ASEAN Partner Awards ceremony in Singapore, PT Central data Technology win the award for Partner of the Year – Indonesia for significantly growing its customer base, delivering exceptional cloud transformation projects for Indonesian customers.



Figure 4 Partner of the Year Trophy

3. CDT PORTOPOLIO & CUSTOMER REFERENCES

Table 1 CDT Portfolio & Customer References

No	Customer		Migration	Complexity of	Role
	Name/Description	Industry	Workload	Workload	
1	Rumah Sakit Lira Medika Reference link: https://aws.amazon.com/id/solutions/case-studies/lira-medika/	Hospital	Healthcare Apps (In-house), DB Migration	BPJS Apps, Employee Apps, and Internal Apps with high availability requirement for their databases	<ul style="list-style-type: none"> • Infra migration • DB Migration • Local Support • Billing Partner
2	A multi-national hospital group based in Indonesia and Malaysia	Hospital	HealthCare Systems by vendor, PACS	The first Trak Care workload in Indonesia that run on AWS Cloud	<ul style="list-style-type: none"> • Infra migration • Local Support • Billing Partner
3	One of the largest pharmaceutical companies in Indonesia with more than 40 subsidiaries	Pharmaceutical, Healthcare, and Nutrition Company	Oracle EBS, Apps & DB Migration	High requirement for their Oracle EBS that are required to comply to specific OS Oracle Linux requirement and other required requirement needed	<ul style="list-style-type: none"> • Consultation • Provisioning • Set up • Billing Partner
4	One of largest South Korea Bank in Indonesia supported by IFC	Banking	IT Asset Management & Web Applications	Web Apps with high availability requirement and can be integrated with Active Directory	<ul style="list-style-type: none"> • Consultation • Provisioning • Set up • Web App Migration • Billing Partner
5	Vivere Group References link: https://aws.amazon.com/id/solutions/case-studies/vivere/	Manufacturing	SAP, App Non-SAP, DB (Oracle, MySQL, PostGre)	<ul style="list-style-type: none"> • SAP Workload: Acceptance downtime is only 2x and for 1-hours only. AWS & CDT was 	<ul style="list-style-type: none"> • Infra migration • Provisioning • Local Support • Billing partner

No	Customer		Migration Workload	Complexity of Workload	Role
	Name/Description	Industry			
				<p>successfully fulfilling this requirement</p> <ul style="list-style-type: none"> • App&DB: Oracle server that were end of support (10G), so that CDT was successfully migrated and upgraded the version to 11G • Required to change the backup process from tape backup to automated backup solution that are available on AWS (EBS Snapshot, AWS Back Up) 	<ul style="list-style-type: none"> • Infra Migration & Creation
6	A company that produces products in plastics industry and other industries that use plastic and fiberglass as their main materials.	Manufacturing	Dynamix AX	Licensing requirement and migrate to dedicated host, and active directory migration	<ul style="list-style-type: none"> • Infra provisioning • OS level migration
7	One of the largest rubber latex production companies in Indonesia and owns rubber plantations	Manufacturing	SAP, Disaster Recovery	SAP Migration and Disaster Recovery Plan using AWS Cloud Endure Disaster Recovery	<ul style="list-style-type: none"> • Infra migration • Provisioning • Set up • Consultation

No	Customer		Migration Workload	Complexity of Workload	Role
	Name/Description	Industry			
				that are requirement specific version to successfully migrated to AWS with minimal downtime	<ul style="list-style-type: none"> • Billing Partner
8	One of Sharia-based Securities Crowdfunding organizer in Indonesia	FinTech	Crowdfunding app & Master-slave Database replication	Crowdfunding app & Database require flexibility, cost efficient and high SLA	<ul style="list-style-type: none"> • Consultation • Infra Migration • Provisioning • Set Up • Billing Partner
9	Automotive company that imports new and used cars all over in Indonesia	Retail & Distribution	Odoo	Refactoring application with cloud native adaption (auto scale and managed services)	<ul style="list-style-type: none"> • Consultation • DB Migration • Cost optimization review • TCO Calculation
10	The fastest growing coal mining company in Indonesia and has many subsidiaries	Mining & Distribution	Web Apps	Core application that is used by mining field workers that has a large size (14TB)	<ul style="list-style-type: none"> • Apps Migration • DB Migration • OS Migration • Consultation
11	BNI Multifinance	Banking	Migrate Core Application on AWS	Implementation of new core systems	<ul style="list-style-type: none"> • Infrastructure Migration • Local Billing • Maintenance Support • Consultation

4. AMAZON WEB SERVICES (AWS)

4.1. About AWS

Amazon Web Services (AWS) is the world’s most comprehensive and broadly adopted cloud platform that offering over 200+ fully features services from data centers globally that has the most extensive global cloud infrastructure. That offers as many Regions as possible with multiple Availability Zones connected by low latency, high throughput, and high redundant networking.



Figure 5 Gartner Magic Quadrant for Cloud Infrastructure and Platform Services

Gartner Research positions AWS in the Leaders Quadrant of the new Magic Quadrant for Cloud Infrastructure as a Services (IaaS) Worldwide that define as a standardized, highly automated offering, where compute resources, complemented by storage and networking capabilities, are owned by a service provider, and offered to the customer on demand.

4.2. AWS Global Infrastructure

AWS Cloud menjangkau 102 Availability Zones dalam 32 wilayah geografis di seluruh dunia, dengan rencana yang telah diumumkan untuk 12 Availability Zones lainnya dan 4 Wilayah AWS lainnya di Kanada, Malaysia, Selandia Baru, dan Thailand.



Figure 6 AWS Global Cloud Infrastructure

The AWS Global Cloud Infrastructure is the most secure, extensive, and reliable cloud platform, offering over 200 fully featured services from data centers globally. Whether you need to deploy your application workloads across the globe in a single click, or you want to build and deploy specific applications closer to your end-users with single-digit millisecond latency, AWS provides you the cloud infrastructure where and when you need it.

Regions

AWS Regions are physical locations around the world where data centers are clustered, with each group of data centers called an Availability Zone. Unlike other cloud providers, AWS Regions consist of a minimum of three, physically separate and isolated AZs in a geographic area, offering advantages for customers. Each AZ has independent power, cooling, and physical security and is connected via redundant, ultra-low-latency networks. AWS has a more extensive global footprint than any other cloud provider and maintains multiple geographic Regions worldwide. Customers focused on high availability can design their applications to run in multiple AZs to achieve even greater fault-tolerance. AWS infrastructure Regions meet the highest levels of security, compliance, and data protection.

Availability Zones

An Availability Zone (AZ) in an AWS Region is a discrete data center or group of data centers with redundant power, networking, and connectivity. AZs provide customers with the ability to operate highly available, fault-tolerant, and scalable production applications and databases. All AZs in an AWS Region are interconnected with high-bandwidth, low-latency networking, over fully redundant, dedicated metro fiber, and all traffic between them is encrypted. AZs are physically separated by a meaningful distance, many kilometers, from any other AZ, making partitioning applications for high availability easy and protecting companies from issues such as power outages, lightning strikes, tornadoes, and earthquakes.

4.3. AWS Service Level Agreement

4.3.1. EC2 SLA

Instance-Level SLA

For each individual Amazon EC2 instance (Single EC2 Instance), AWS will use commercially reasonable efforts to make the Single EC2 Instance available with an Instance-Level Uptime Percentage of at least 99.5%, in each case during any monthly billing cycle the Instance-Level SLA. In the event any Single EC2 Instance does not meet the Instance-Level SLA, you will be eligible to receive a Service Credit as described below.

Instance-Level Uptime Percentage	Service Credit Percentage
Less than 99.5% but equal to or greater than 99.0%	10%
Less than 99.0% but equal to or greater than 95.0%	30%
Less than 95.0%	100%

Figure 7 EC2 Service Level Agreement

4.3.2. EBS SLA

Volume-Level SLA

For each Amazon EBS volume (Single EBS Volume), AWS will use commercially reasonable efforts to make the Single EBS Volume available with a Volume-Level Uptime Percentage as shown in the table below during any monthly billing cycle the Volume-Level SLA.

Volume-Level Uptime Percentage	Service Credit Percentage
Less than 99.9% but equal to or greater than 99.0%	10%
Less than 99.0% but equal to or greater than 95.0%	30%
Less than 95.0%	100%

Figure 8 EBS Service Level Agreement

4.3.3. ELB SLA

AWS makes two SLA commitments for Elastic Load Balancing: (1) a Multi-AZ Load Balancer SLA that governs each Load Balancer deployed across multiple AZs; and (2) a Single Load Balancer SLA that governs each Load Balancer or GWLB deployment individually.

Multi-AZ Elastic Load Balancer SLA

When a Load Balancer is deployed concurrently across two or more AZs ("Multi-AZ Load Balancer"), AWS will use commercially reasonable efforts to make each Multi-AZ Load Balancer available with a Monthly Uptime Percentage as shown in the table below during any monthly billing cycle (the "Multi-AZ Load Balancer SLA").

Monthly Uptime Percentage	Service Credit Percentage
Less than 99.99% but greater than or equal to 99.0%	10%
Less than 99.0% but greater than or equal to 95.0%	30%
Less than 95.0%	100%

Figure 9 ELB Multi-AZ Service Level Agreement

Single-Load Balancer SLA

When a Load Balancer or GWLB, as applicable, is deployed in only one AZ ("Single Load Balancer"), AWS will use commercially reasonable efforts to make the Single Load Balancer available with a Single Load Balancer Uptime Percentage as shown in the table below during any monthly billing cycle (the "Single Load Balancer SLA").

Single Load Balancer Uptime Percentage	Service Credit Percentage
Less than 99.9% but greater than or equal to 99.0%	10%
Less than 99.0% but greater than or equal to 95.0%	30%
Less than 95.0%	100%

Figure 10 ELB Single-AZ Service Level Agreement

4.3.4. AWS Backup SLA

Service Commitment

AWS will use commercially reasonable efforts to make AWS Backup available with a Monthly Uptime Percentage, as described below, during any monthly billing cycle the Service Commitment. In the event

AWS Backup does not meet the Service Commitment, you will be eligible to receive a Service Credit as described below.

Service Credit

Service Credits are calculated as a percentage of the total charges paid by you for AWS Backup in the AWS region affected for the billing cycle in which the Monthly Uptime Percentage fell within the ranges set forth in the table below.

Monthly Uptime Percentage	Service Credit Percentage
Less than 99.9% but greater than or equal to 99.0%	10%
Less than 99.0% but greater than or equal to 95.0%	25%
Less than 95.0%	100%

Figure 11 AWS Backup Service Level Agreement

4.4. AWS Regulation and Compliance

4.4.1. COMPLIANCE

Amazon Web Services (AWS) has obtained several certifications and compliance standards, including ISO 27001 and 9001, demonstrating its commitment to providing secure and reliable cloud computing services. These certifications confirm that AWS has implemented robust security and quality management systems to safeguard customer data and ensure the highest levels of service quality. More information about AWS compliance can be found on [this](#).

4.4.2. DATA DELETION

Amazon Web Services (AWS) has implemented strict controls and procedures for data deletion to ensure that customer data is securely deleted from its systems. AWS follows a multi-step process for data deletion that includes both automated and manual procedures. Before any data is deleted, AWS verifies that it is no longer needed for business or legal purposes and that the data has been properly backed up. AWS also performs secure data destruction procedures to ensure that the data cannot be recovered (NIST 800-88). More information about AWS data deletion can be found on [this](#).

4.5. SECURITY OF AWS

Security and Compliance is a shared responsibility between AWS and the customer. This shared model can help relieve the customer’s operational burden as AWS operates, manages and controls the components from the host operating system and virtualization layer down to the physical security of the facilities in which the service operates. The customer assumes responsibility and management of the guest operating system (including updates and security patches), other associated application software as well as the configuration of the AWS provided security group firewall. Customers should carefully consider the services they choose as their responsibilities vary depending on the services used, the integration of those services into their IT environment, and applicable laws and regulations. The nature of this shared responsibility also provides the flexibility and customer control that permits the deployment. As shown in the chart below, this differentiation of responsibility is commonly referred to as Security “of” the Cloud versus Security “in” the Cloud.

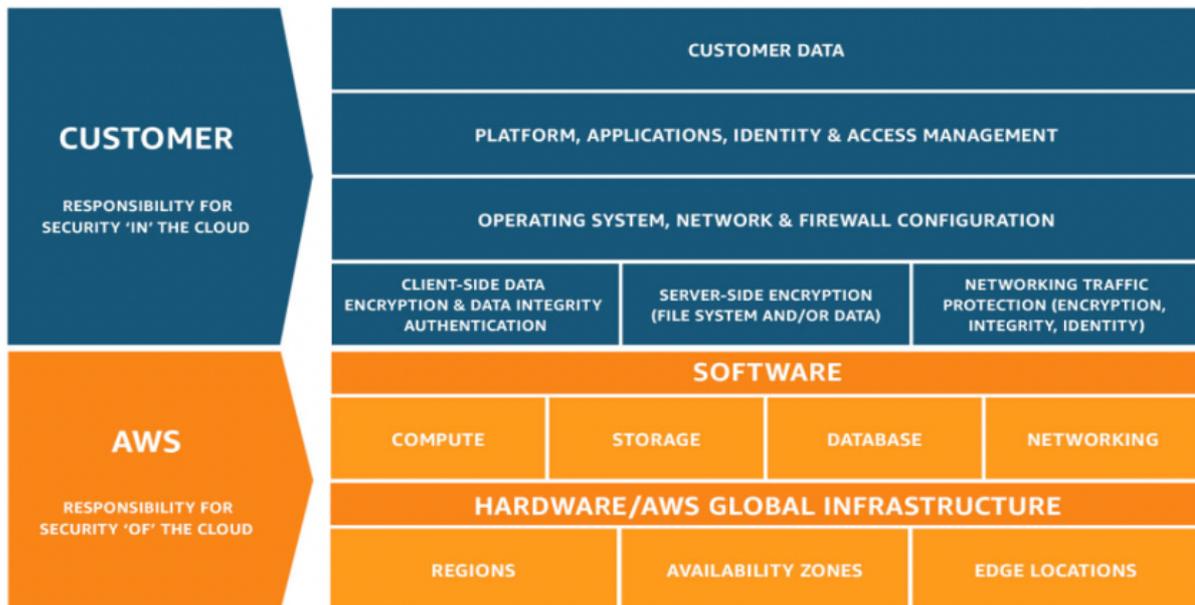


Figure 12 AWS Shared Responsibility Model

AWS responsibility (Security of the Cloud)

AWS is responsible for protecting the infrastructure that runs all of the services offered in the AWS Cloud. This infrastructure is composed of the hardware, software, networking, and facilities that run AWS Cloud services.

Customer responsibility (Security in the Cloud)

Customer responsibility will be determined by the AWS Cloud services that a customer selects. This determines the amount of configuration work the customer must perform as part of their security responsibilities. For example, a service such as Amazon Elastic Compute Cloud (Amazon EC2) is categorized as Infrastructure as a Service (IaaS) and, as such, requires the customer to perform all of the necessary security configuration and management tasks. Customers that deploy an Amazon EC2 instance are responsible for management of the guest operating system (including updates and security patches), any application software or utilities installed by the customer on the instances, and the configuration of the AWS-provided firewall (called a security group) on each instance. For abstracted services, such as Amazon S3 and Amazon DynamoDB, AWS operates the infrastructure layer, the operating system, and platforms, and customers access the endpoints to store and retrieve data. Customers are responsible for managing their data (including encryption options), classifying their assets, and using IAM tools to apply the appropriate permissions.

5. PROJECT SUCCESS CRITERIA

Customer Project Success Criteria are listed below:

A. Successful AWS Environment Establishment:

- AWS environment is set up according to MDS's requirements and best practices.
- AWS resources are configured correctly.

B. Performance and Scalability:

- AWS infrastructure provides the expected performance levels for production workloads.
- Scalability features of AWS are utilized to handle varying workloads and transaction volumes effectively.

C. High Availability and Reliability:

- Backup strategies are in place to minimize downtime and data loss.

D. Security and Compliance:

- Compliance with industry standards and best practices for data security is maintained to protect customer's data and applications in the AWS environment.

E. Resource Optimization and Cost Management:

- AWS resources are optimized to avoid unnecessary costs while meeting performance requirements.

6. BUSINESS OBJECTIVES & REQUIREMENT

PT Modern Data Solusi (MDS) requires a Cloud Partner Solution for a cloud workload scalability project to deliver:

- A. Auto Scaling: Successfully auto-scale backend server workload to optimize availability, costs, or a balance of both and ensure minimal downtime and continuous monitoring of workload health and demand.
- B. Availability: Maintain MDS's Workload Availability to deliver continuous service.
- C. Billing currency: Leverage CDT as an Indonesian AWS Cloud Partner Solution to provide local (IDR) currency for MDS's AWS billing.

7. CUSTOMER INVENTORY

Here is the customer inventory based on the initial meeting information that we received:

Table 2 Production Inventory

Resource Type	Quantity	Configuration Details	Billing Type	Description
IAM Policies	2	AmazonEC2RoleforSSM, AmazonSSMManagedInstanceCore	N/A	IAM policies for SSM and EC2 roles
RDS Instance	1	PostgreSQL, 200 GB storage, Encrypted, db.t4g.medium (Expandable)	Pay-Per-Use	RDS instance with specified configuration
EFS File System	1	Encrypted, General Purpose performance mode	Pay-Per-Use	EFS file system with specified configuration
EC2 Instances	3	Type: m6i.2xlarge, with associated EBS and Security Groups (200GB Storage + 100 GB Storage)	Pay-Per-Use	EC2 instances with specified configuration
Load Balancers	2	1 Application Load Balancer (Internal), 1 Network Load Balancer (External)	Pay-Per-Use	Internal and external load balancers with specified configuration
IAM Roles	2	Web Servers Role, RDS Enhanced Monitoring Role	N/A	IAM roles with attached policies
Networking				
VPC	1	CIDR: 10.0.0.0/16	Pre-paid	Virtual private cloud
Subnets (Private)	3	Various within VPC CIDR	Pre-paid	Private subnets for resources without internet access

Subnets (Public)	3	Various within VPC CIDR	Pre-paid	Public subnets for resources needing internet access
Internet Gateway	1	Attached to VPC	Pre-paid	Gateway allowing communication between VPC and internet
NAT Gateway	3	Associated with EIPs and public subnets	Pay-Per-Use	Gateway allowing outbound traffic from private subnets to internet
Elastic IP Addresses	3	Assigned to NAT Gateways	Pay-Per-Use	Public IPv4 addresses for dynamic cloud computing
Compute & Containers				
ECS Cluster	1		Pay-Per-Use	Cluster to manage containers
ECS Task Definitions	Multiple	Fargate, CPU: 2048, Memory: 8192	Pay-Per-Use	Definitions for containers and volumes for application
ECS Services	Multiple	1 desired count, Fargate launch type	Pay-Per-Use	Manages running instances of a task definition in ECS cluster
Monitoring & Management				
CloudWatch Alarms	Multiple	Based on log metrics for ECS tasks	Pay-Per-Use	Monitors AWS resources and applications, triggers alerts based on rules
CloudWatch Log Groups	Multiple	For ECS task logging	Pay-Per-Use	Collects, monitors, and stores log files from ECS tasks and other sources
Security & Identity				
Security Groups	Multiple	Specific to ECS tasks and ALB	Pre-paid	Controls traffic to and from AWS resources
Egress / Ingress			Pay per use	

Based on the information above and the discussions during the briefing, the selected solution is to leverage AWS Autoscaling, ECS Cluster, which involves an Elastic Load Balancer to distribute the workload

traffic and ensure availability and scalability. The goal is to achieve backend server scalability, reliability, and availability.

8. AWS SOLUTION

8.1. To be Architecture

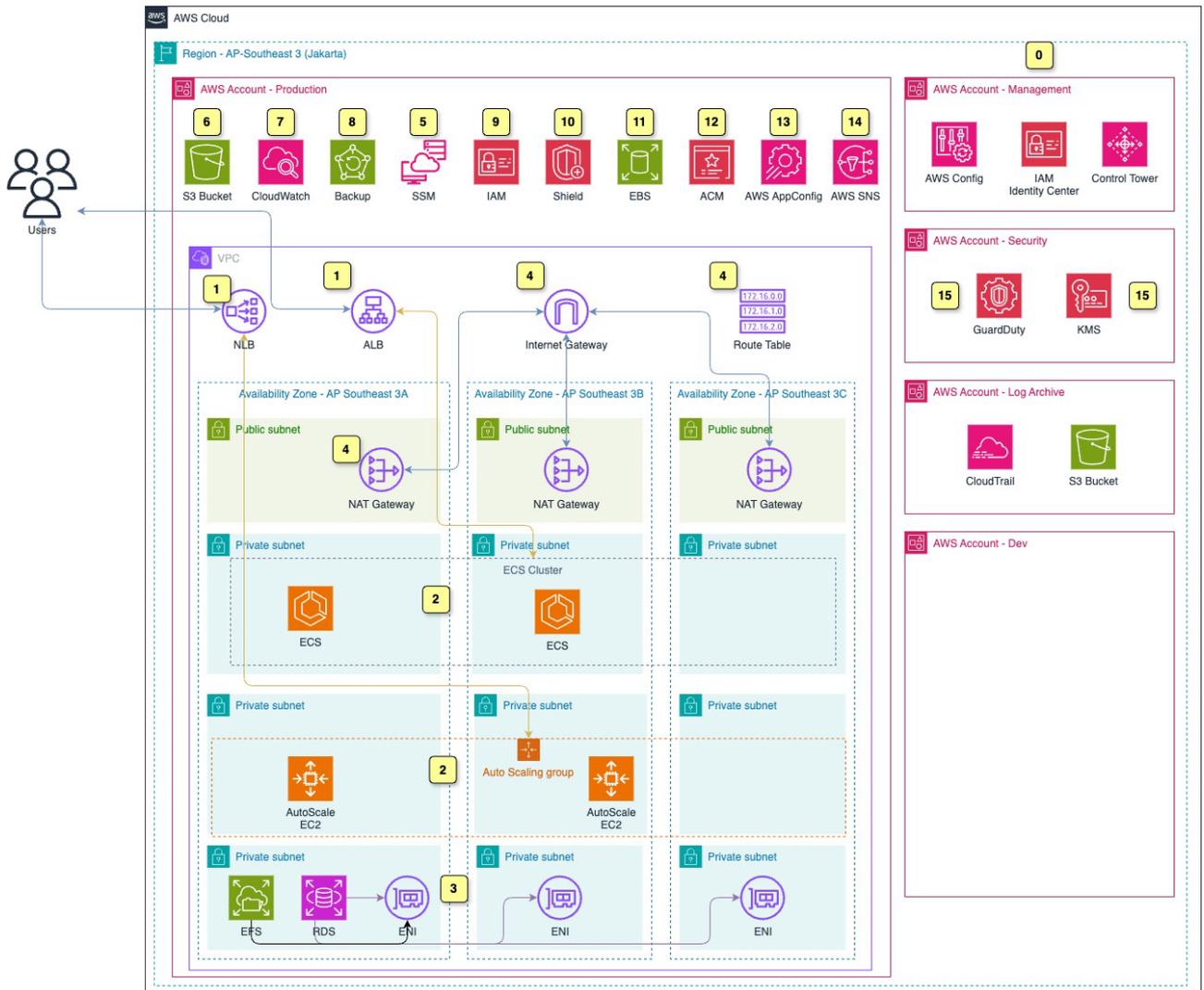


Figure 13 To be Architecture Topology

This Architecture shows how MDS's can run their Service on EC2 while maintaining its availability and Scalability on AWS. [Number] points to the legend on the architecture diagram.

[0] CDT will set up and govern a new, secure, landing zone with a multi-account AWS Environment using AWS Control Tower services. This landing zone will have:

- Account Management using AWS Organizations
- Centralized log archive using AWS CloudTrail, Cloudwatch
- Cross-account audit access using AWS IAM Identity Center and AWS Config
- Centralized security account for security services such as KMS

MDS will create and use a dedicated AWS Account for Production which can locate MDS's main workload and more production workload.

MDS Will use AWS Virtual Private Cloud (VPC) across 3 Availability Zone (AZ) for high availability design. Each AZ has separate and dedicated Public subnets and Private Subnets. Each private production workload has its own Private Subnet for security control and scalable design.

[1] User will have two routes of connection to access the Services, from HTTP/Layer 7 via Application Load Balancer, and from IP Address/Layer 3 via Network Load Balancer.

[2] Each Load Balancer redirects the traffic to the AWS ECS Cluster and the AWS Auto Scaling Group to ensure Service Availability and Scalability.

[3] RDS and EFS will Leverage Subnet Group to spread its service to another availability zone within VPC, where allowing the other resources on different AZ will still be able to access the RDS and EFS.

[4] Each production subnet is on a Private subnet, which means we need to leverage the NAT Gateway to allow the private subnet to access the internet for Remote purposes, Updates, and Monitoring through CloudWatch.

[4] The Public Subnet will leverage the Internet Gateway to access the Internet and allow the NAT gateway to provide an Internet connection to the Private Subnet.

[4] Route Table will help to separate and route the NAT gateway and Internet Gateway to each subnet.

[5] With all networks fully configured, we can leverage SSM or AWS System Manager to manage our Instance where located in a private subnet via IAM role.

[6] Amazon Simple Storage Service (Amazon S3) is an object storage service offering industry-leading scalability, data availability, security, and performance.

[7] While the Cloud Infrastructure is fully configured, we can leverage the CloudWach to enables organizations to gain deep insights into the performance and operational health of their AWS resources with real-time monitoring and customizable dashboards. With CloudWatch, users can set alarms, automate actions, and troubleshoot issues efficiently, ensuring a proactive and responsive approach to maintaining optimal system performance in the AWS cloud.

[8] AWS Backup simplifies the management of data protection by offering a centralized and fully managed service for backing up data across AWS services. With AWS Backup, we can secure the Single Zone Service to have a backup and restore it whenever we needed.

[9] With IAM we can set the required policy and role for each service or resource like role for the SSM.

[10] AWS Shield provides automatic DDoS protection against common layer 3/4 attacks by continually inspecting traffic from the internet.

[11] Amazon EBS is an easy-to-use, scalable, high-performance block-storage service that used by the EC2 instance and the backup snapshot.

[12] Use AWS Certificate Manager (ACM) to provision, manage, and deploy public and private SSL/TLS certificates for use with AWS services and your internal connected resources. ACM removes the time-consuming manual process of purchasing, uploading, and renewing SSL/TLS certificates.

[13] AWS AppConfig, a feature of AWS Systems Manager, makes it easy for customers to quickly and safely configure, validate, and deploy feature flags and application configurations.

[14] Amazon Simple Notification Service (Amazon SNS) sends notifications two ways, A2A and A2P. A2A provides high-throughput, push-based, many-to-many messaging between distributed systems, microservices, and event-driven serverless applications.

[15] AWS Key Management Service (KMS) simplifies the management of cryptographic keys used to encrypt data, providing a secure and scalable solution for safeguarding sensitive information. With AWS KMS, organizations can easily create, rotate, and control access to encryption keys, enhancing data protection and compliance with industry standards.

[15] AWS GuardDuty provides enhanced threat detection capabilities by continuously monitoring and analyzing AWS CloudTrail, VPC Flow Logs, and DNS logs to identify potential security threats and vulnerabilities in real time. With its machine learning algorithms and threat intelligence feeds, GuardDuty offers proactive and automated threat detection, reducing the time to identify and respond to security incidents and helping organizations strengthen their overall security posture.

9. BACKUP PLAN

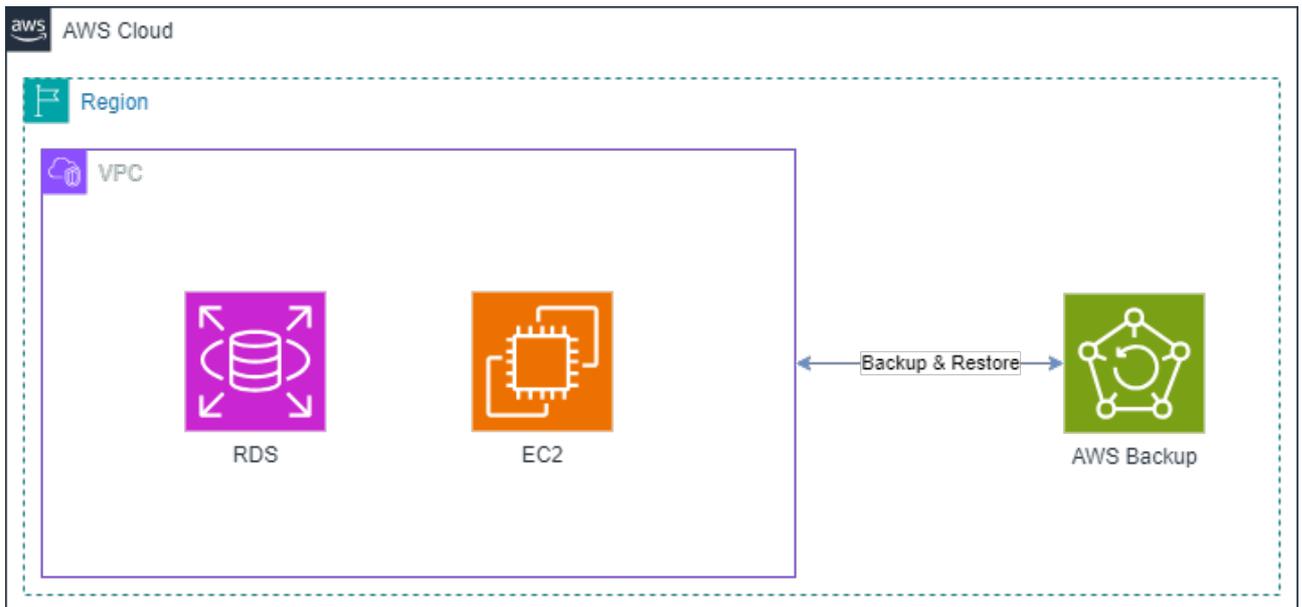


Figure 14 Backup Plan Using AWS Backup

To prevent data loss, we offer AWS Backup as a tool for performing disk server backups. AWS Backup supports scheduling backups and managing backup retention. AWS Backup features:

- Backup scheduling and retention management automation
- Centralized backup for various AWS Services
- Supports incremental backups, except for DynamoDB, Aurora, Document DB, and Neptune
- Integration with AWS KMS for encryption support
- Write-once, read-many (WORM) with AWS Backup Vault Lock

10. SECURITY CHECKLIST

Table 3 Security Checklist

No	Category	What is it	AWS Services	Checklist
1	Identity & Access Management	Secure the AWS account.	Using AWS Organizations, MFA enabled, Account Contacts (AWS IAM and Identity Center)	v
2	Advanced Persistent Threat & Detection	Track user activity and API usage	AWS CloudTrail	v
		Configure monitoring and alerts and investigate events.	AWS CloudWatch dashboard and alarm, Billing alert	v
3	Network and Infrastructure Protection	Implement L3-L4 distributed denial-of-service (DDoS) protection for your internet facing resources.	AWS Shield Standard	v
		Control access using VPC Security Groups and subnet layers.	Security Group	v
4	Data Protection	Protect data at rest	AWS KMS for EBS	v
		Encrypt data in transit	Using AWS Certificate Manager to provides SSL certificate	v

No	Category	What is it	AWS Services	Checklist
5	Incident Response	Make sure that someone is notified to take action on critical findings.	Using AWS GuardDuty to notified	v

11. SCOPE OF WORK

Here is the scope of work of this project:

Table 4 Scope of Work

No	Activity
1	Prerequisite
2	Assessment & Consulting
3	Detailed Design Document & Technical Validation
4	Kick Off Meeting Pre Implementation
5	AWS Management & Monitoring Configuration
6	Create AWS Control Tower & Account Setup
7	Create AWS IAM User, Role, & Group
8	Configure Amazon CloudTrail Management Event
9	Create AWS KMS - Customer Managed Key
10	AWS Network & Security Configuration
11	Check/Enable Shield Free
12	Check/Enable Cloudtrail trail management events
13	Create & Configure NAT Gateway & Internet Gateway
14	Create & Configure Network Environment (VPC, Subnet, Route Table)
15	Create & Configure Security Group
16	Enable & Configure Amazon GuardDuty + Alarm Notification
17	Configure AWS Certificate Manager (ACM)
18	Backup & Monitoring Preparation
19	Create & Configure Amazon CloudWatch Dashboard & Alarm Notification
20	Setup AWS Backup for Automatic Backup Snapshot Scheduling
21	Configure SSM Agent & Cloudwatch Agent in EC2 Instances for Memory, Disk Metric, & Management
22	Create and Configure CloudWatch Dashboard and Alarm

23	Enable VPC Flow Log (Set Retention 3 Months)
24	Auto Scaling Group Preparation
25	AWS RDS Preparation
26	AWS EFS Preparation
27	Configure EC2 Instance to Integrate with NLB
28	Setup golden AMI EC2 (integrated with RDS and EFS for Scale-out support)
29	Create Launch Template
30	Create Auto Scaling Group
31	Integrate Auto Scaling Group with NLB
32	Application Functionality Testing
33	Repointing DNS in DNS Management
34	ECS Cluster Preparation
35	AWS ECS Cluster Preparation
36	AWS ECS Task Definitions Setup
37	Integrate ECS Cluster with ALB
38	Application Functionality Testing
39	Repointing DNS in DNS Management
40	Post Implementation
41	Perform UAT for AWS Environment & Services Function level
42	Generate Amazon Trusted Advisor/Service Screener Report
43	Sharing Knowledge (Optional)
44	Documentation & Handover
45	BAST

12. PROJECT MANAGEMENT

12.1. Methodology

PT. Central Data Technology adopts Project Management Body Of Knowledge (PMBOK) Methodology which is standard from the Project Management Institute (PMI) in the project implementation process.

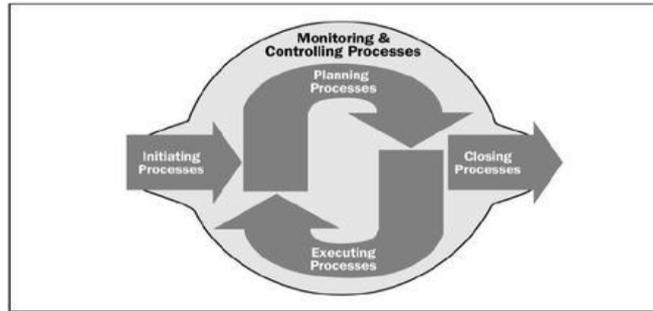


Figure 15 Process Implementation Methodology Project

PT. Central Data Technology has also implemented Jira Software to monitor its project. The explanation of the project methodology implementation process at PT Central Data Technology is as follows;

Table 5 Process Implementation Methodology Project

External Process	Customer Ask for RFP/RFI	SPK/PO Awarded	Project Execution		Project Closing and Invoicing
Internal Process	Initiation	Planning	Executing	Monitoring and Controlling	Closing
	Project Preparation	Kick Off meeting Document	Final Assessment and design	Progress Status Report	BAST
	Detail Doc	External Kick Off Meeting	Project Execution	Progress Status Meeting	Lesson Learn Doc
	Project Charter and Internal Kick Off Meeting Doc		Migration Plan Doc		Invoicing
	Internal Kick Off Meeting				

12.2. RACI Matrix

Table 6 RACI Matrix

No	Activity	RACI	
		CDT	MDS
1	Prerequisite		
2	Assessment & Consulting	R,A	C,I
3	Detailed Design Document & Technical Validation	R,A	C,I
4	Kick Off Meeting Pre Implementation	R,A	C,I
5	AWS Management & Monitoring Configuration		
6	Create AWS Control Tower & Account Setup	R,A	C,I
7	Create AWS IAM User, Role, & Group	R,A	C,I
8	Configure Amazon CloudTrail Management Event	R,A	C,I
9	Create AWS KMS - Customer Managed Key	R, C	A, I
10	AWS Network & Security Configuration		
11	Check/Enable Shield Free	R,A	C,I
12	Check/Enable Cloudtrail trail management events	R,A	C,I
13	Create & Configure NAT Gateway & Internet Gateway	R,A	C,I
14	Create & Configure Network Environment (VPC, Subnet, Route Table)	R,A	C,I
15	Create & Configure Security Group	R,A	C,I
16	Enable & Configure Amazon GuardDuty + Alarm Notification	R,A	C,I
17	Configure AWS Certificate Manager (ACM)	R,A	C,I
18	Backup & Monitoring Preparation		
19	Create & Configure Amazon CloudWatch Dashboard & Alarm Notification	R,A	C,I
20	Setup AWS Backup for Automatic Backup Snapshot Scheduling	R,A	C,I
21	Configure SSM Agent & Cloudwatch Agent in EC2 Instances for Memory, Disk Metric, & Management	R,A	C,I
22	Create and Configure CloudWatch Dashboard and Alarm	R,A	C,I
23	Enable VPC Flow Log (Set Retention 3 Months)	R,A	C,I
24	Auto Scaling Group Preparation		
25	AWS RDS Preparation	R,A	C,I
26	AWS EFS Preparation	R,A	C,I
27	Configure EC2 Instance to Integrate with NLB	R,A	C,I
28	Setup golden AMI EC2 (integrated with RDS and EFS for Scale-out support)	R,A	C,I
29	Create Launch Template	R,A	C,I
30	Create Auto Scaling Group	R,A	C,I

31	Integrate Auto Scaling Group with NLB	R,A	C,I
32	Application Functionality Testing	C,I	R,A
33	Repointing DNS in DNS Management	C,I	R,A
34	ECS Cluster Preparation		
35	AWS ECS Cluster Preparation	R,A	C,I
36	AWS ECS Task Definitions Setup	R,C,I	R,A,C
37	Integrate ECS Cluster with ALB	R,A	C,I
38	Application Functionality Testing	C,I	R,A
39	Repointing DNS in DNS Management	C,I	R,A
40	Post Implementation		
41	Perform UAT for AWS Environment & Services Function level	R,A	R,C,I
42	Generate Amazon Trusted Advisor/Service Screener Report	R,A	I
43	Sharing Knowledge (Optional)	R,A	I
44	Documentation & Handover	R,A	I
45	BAST	R,A	I

12.3. Timeline

Table 7 Timeline

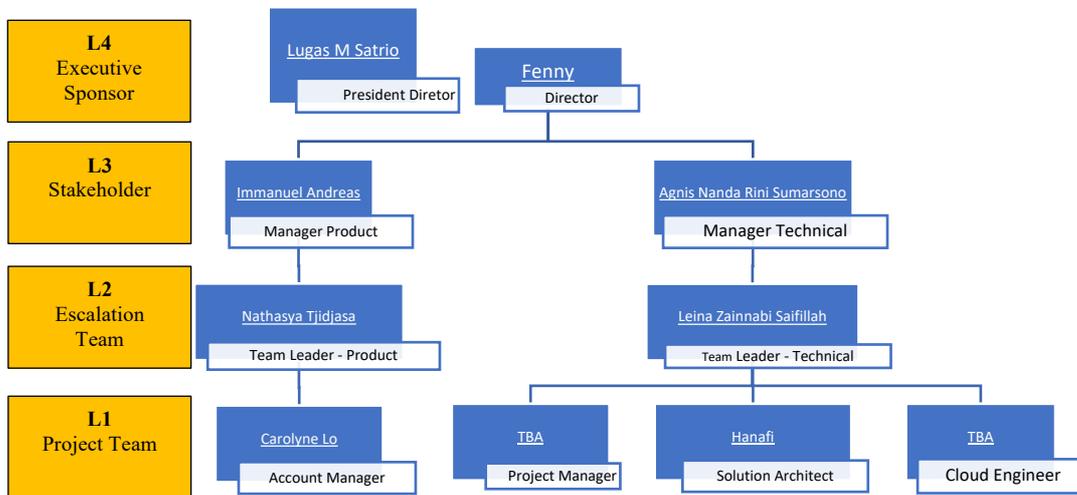
No	Activity	Days		
		1	2	3
1	Assessment & Consulting			
2	Detailed Design Document & Technical Validation			
3	Kick Off Meeting Pre Implementation			
4	AWS Management & Monitoring Configuration			
5	AWS Network & Security Configuration			
6	AWS Compute, Storage & Backup Configuration			
7	ECS Cluster Deployment			
7	Auto Scaling Group Deployment			
8	Testing and Monitoring			
9	Post Implementation			
10	Sharing Knowledge (optional)			
11	Checkpoint, Report, & Documentation			

12.4. Timeframe

Table 8 Timeframe

Project Team	Mandays	Manpower
Project Manager	1	1
Cloud Solution Architect	1	1
Cloud Engineer	3	1
Total Timeframe	3-Office days	

12.5. Project Chart



12.6. Contact Information

Partner Executive Sponsor

Name	Title	Description	Email / Contact Info
PT Central Data Technology			
Lugas Mondo Satrio	President Director	President Director in Central Data Technology	lugas.satrio@centraldatatech.com
Fenny	Associate Director	Associate Director in Central Data Technology	fenny@centraldatatech.com
PT Modern Data Solusi			



Technical Proposal



Project Stakeholders

Name	Title	Stakeholder for	Email / Contact Info
PT Central Data Technology			
Agnis Nanda Rini Sumarsono	AWS Technical Manager	Technical Manager	agnis.sumarsono@centraldatatech.com
Immanuel Andreas Setiawan	AWS Product Manager	Sales Manager	immanuel.andreas@centraldatatech.com
PT Modern Data Solusi			

Partner Project Team

Name	Title	Role	Email / Contact Info
PT Central Data Technology			
Nathasya Tjidjasa	Product Specialist	Sales Lead	nathasya.t@centraldatatech.com
Carolyne Lo	Product Specialist	Account Manager	carolyne.lo@centraldatatech.com
Hanafi	Solution Architect	Architect	hanafi@centraldatatech.com
TBA	Project Manager, Technical	Project Manager, Technical	
TBA	Post-sales	Engineer	
PT Modern Data Solusi			
Erik Reinaldo	IT Infrastructure	IT Infrastructure	erik@moderndatasolusi.com

Project Escalation Contacts

Name	Title	Role	Email / Contact Info
PT Central Data Technology			
Nathasya Tjidjasa	AWS Product Lead	Sales Lead	nathasya.t@centraldatatech.com
Leina Zainabi Saifillah	AWS Technical Lead	Technical Lead	leina.saifillah@centraldatatech.com
PT. Modern Data Solusi			

13. ASSUMPTION

Here is the CDT Assumption regarding this project:

1. Deployment will be done in MDS's new AWS Account and resource with multi-account architecture.
2. Scale-out is supported for applications or workloads operating in Backend EC2 Instance.
3. Application and Database Deployment & testing will be done by Wahana Meditek Indonesia.
4. Auto Scaling Group leverage image (AMI) as launch template, any update to EC2 Application or workloads, requires to creation of another version of AMI with the latest update of the Application or workloads version.
5. ECS Fargate Type can't Integrated with EFS.
6. CDT only provides AWS environments/infrastructure that are stated in the scope of work.
7. Scopes that are not stated in the Scope of Work, are considered as Out of scope.

14. CONSIDERATIONS

Here is the CDT Considerations regarding this project:

1. The Application may be vulnerable to Layer7 Attacks due to not being protected by WAF.
2. Data saved inside the EC2 instance Auto Scaling Group will be deleted when the scale-in event is triggered, we assume the EC2 data will placed on the EFS.

15. CDT OUT OF SCOPE

Additionally, here is the CDT Out of Scope regarding this project:

1. Application Installation, Configuration & Tuning.
2. Application or Workloads Functional Testing.
3. Pointing DNS to Application Load Balancer (ALB) in DNS Manager.
4. SSL Verification in DNS Manager.
5. ECS Task & Definition Services Application Setup.
6. Configuration outside AWS Environment and Services.



PT Central Data Technology
AWS Services
Price Info No: 0786/CDT/PI/05/2024

Company: PT Modern Data Solusi
Address: Jl. Sultan Hasanuddin Dalam No.72, RW.1, Melawai,
 Kec. Kby. Baru, Daerah Khusus Ibukota Jakarta 12160
Up: Bapak Erik Reinaldo
Contact: erik@moderndatasolusi.com

Date: 08-May-24
Validity Period: 14-days
Account Manager: Carolyn Lo
Contact: carolyn.lo@centraldatatech.com

Description	Services	Configuration summary	Pricing Strategy	Currency	Monthly Cost
Region: Asia Pacific (Jakarta)					
Compute					
Servers - 3 units	Amazon EC2	Tenancy (Shared Instances), Operating system (Linux), Workload (Consistent, Number of instances: 1), Advance EC2 instance (m6i.2xlarge), 8 vCPU, 32 GiB RAM, Number of instance (3)	On-Demand	IDR	17,344,800
	Amazon EBS	Storage amount per volume (200 GB), Provisioning IOPS per volume (gp3) (3000), General Purpose SSD (gp3) - Throughput (125 MBps), Snapshot Frequency (daily), Amount changed per snapshot (1 GB), Number of volume (3)	On-Demand	IDR	1,482,525
Database	Amazon RDS for PostgreSQL	Storage volume (General Purpose SSD (gp3)), Storage amount (200 GB), Nodes (1), Instance Type (db.t4g.medium), 2vCPU, 4 GiB RAM, Deployment Option (Single-AZ)	On-Demand	IDR	1,683,990
	AWS Fargate	Operating system (Linux), CPU Architecture (x86), Average duration (620 minutes), Number of tasks or pods (2 per day), Amount of ephemeral storage allocated for Amazon ECS (20 GB), Amount of vCPU allocated (2 GB), Amount of memory allocated (8 GB)	On-Demand	IDR	1,508,595
Compute - Total Monthly Cost (Estimation)				IDR	22,019,910
Storage					
Additional Disk - 3 units	Amazon EBS	Storage amount per volume (100 GB), Provisioning IOPS per volume (gp3) (3000), General Purpose SSD (gp3) - Throughput (125 MBps), Snapshot Frequency (daily), Amount changed per snapshot (1 GB), Number of volume (3)	On-Demand	IDR	759,825
	Amazon Elastic File System	Desired Storage Capacity (7 GB per month), Percentage of data that is frequently accessed (20%)	On-Demand	IDR	10,725
	Amazon Simple Storage Services (S3)	S3 Standard storage (400 GB per month), PUT, COPY, POST, LIST requests to S3 Standard (4000), GET, SELECT, and all other requests from S3 Standard (8300), Data returned by S3 Select (1 GB per month), Data scanned by S3 Select (1 GB per month), S3 Standard Average Object Size (2 MB)	On-Demand	IDR	165,495
Storage - Total Monthly Cost (Estimation)				IDR	936,045
Others					
	Network Address Translation (NAT) Gateway	Number of NAT Gateways (3), Data Processed per NAT Gateway per month (100 GB)	On-Demand	IDR	2,424,015
	Network Load Balancer	Number of Network Load Balancers (1), Processed bytes per NLB for TCP (100 GB per month)	On-Demand	IDR	313,500
	Application Load Balancer	Number of Application Load Balancers (1), Processed bytes (EC2 Instances and IP addresses as targets) (100 GB per month), Average number of rule evaluations per request (1 million)	On-Demand	IDR	316,800
	Amazon CloudWatch	Number of Metrics (includes detailed and custom metrics) (15), Standard Logs: Data Ingested (1 GB), Logs Delivered to CloudWatch Logs: Data Ingested (1 GB), Number of Dashboards (1), Number of High Resolution Alarm Metrics (10)	On-Demand	IDR	147,015
	AWS CloudTrail	Management events units (millions), Write management trails (1), Read management trails (1), Data events units (millions), S3 trails (1), Lambda trails (1), Insight events units (millions), Trails with Insight events (1), Write management events (1 per month), Read management events (1 per month), S3 operations (1 per month)	On-Demand	IDR	16,500
	Amazon Simple Notification Service (SNS)	Email/Email-JSON notifications (1,000) - FREE TIER	On-Demand	IDR	-
	Data Transfer	DT Outbound: Internet (100 GB per month)	On-Demand	IDR	217,800

(Optional)	AWS Support (Business Support Plan)	Supports 24/7 phone, chat, and email access to Cloud Support Engineers for unlimited contacts, with and a response time of less than 1 hour.	On-Demand	IDR	2,639,175
Others - Total Monthly Cost (Estimation)				IDR	6,074,805
Total Monthly Cost (Estimation)				IDR	29,030,760
Total Yearly Cost (Estimation)				IDR	348,369,120

Additional Services for Suggestion Best Practices Architecture

Description	Services	Configuration summary	Pricing Strategy	Currency	Monthly Cost
Region: Asia Pacific (Jakarta)					
Others					
Additional Suggestions	Amazon GuardDuty	EC2 VPC Flow Log Analysis (2 GB per month), AWS CloudTrail Management Event Analysis (1 million per month)	On-Demand	IDR	113,850
Additional Suggestions	AWS Key Management Service	Number of customer managed Customer Master Keys (CMK) (5), Number of symmetric requests (100000)	On-Demand	IDR	87,450
Additional Suggestions	AWS Config	Number of Configuration items recorded (20), Number of Config rule evaluations (5000)	On-Demand	IDR	83,490
Others - Total Monthly Cost (Estimation)				IDR	284,790
Total Monthly Cost (Estimation)				IDR	284,790

Optional Commitment Plan for Compute Service

Description	Services	Configuration summary	Pricing Strategy	Currency	Monthly Cost
Region: Asia Pacific (Jakarta)					
Compute					
Servers - 3 units	Amazon EC2	Tenancy (Shared Instances), Operating system (Linux), Workload (Consistent, Number of instances: 1), Advance EC2 instance (m6i.2xlarge), 8 vCPU, 32 GiB RAM, Number of instance (3)	1 Year EC2 Saving Plan No Upfront	IDR	11,473,605
Database	Amazon RDS for PostgreSQL	Storage volume (General Purpose SSD (gp3)), Storage amount (200 GB), Nodes (1), Instance Type (db.t4g.medium), 2vCPU, 4 GiB RAM, Deployment Option (Single-AZ)	1 Year Reserved No Upfront	IDR	1,421,475

Important Notes:

Exchange Rate Used IDR 16,500

AWS Support Type Business - 10% from monthly usage or minimum USD 100

- Quantity of services is only assumption, charges is based on real customer usage

- By default customer have **Basic** Support Plan (for billing support only) free of charge

- If there's technical issues happen, we suggest to upgrade support plan to **Business** for faster process and response once the issue solved, customer can revert support plan can back to Basic

- All services are assumed running **On Demand**, however We recommend to have pricing plan 1 or 3 year commitment for compute service if the VM require to run 24/7 for cost saving

- Table 2 is for Additional Services if MDS prefer using Best Practices Architecture proposed by CDT

- Table 3 is Optional Commitment Plan Option for Compute Services

Terms & Conditions

- Price Info only eligible for above quantity
- Price Info above in under IDR and exclude PPN
- Monthly Subscription Base
- Penalty on late payment 1 per mille (0.1%) per day
- Price can be changed depends on usage
- Exchange rate: Kurs Jual BI + 100 (every 3rd of the month)
- Term of Payment: 14-calendar days after invoiced received, any Terms changes applied charges 1.2% per month
- Purchase order from Buyer is non cancellable, any payment is non refundable and services delivered is non returnable
- Provision will be started when PO and Agreement received by PT Central Data Technology

Regards,



Carolyne Lo



PT Central Data Technology
CDT Professional Services
Quotation No: 0787/CDT/Q/05/2024

Company: PT Modern Data Solusi
Address: Jl. Sultan Hasanuddin Dalam No.72, RW.1, Melawai,
 Kec. Kby. Baru, Daerah Khusus Ibukota Jakarta 12160
Up: Bapak Erik Reinaldo
Contact: erik@moderndatasolusi.com

Date: 08-May-24
Validity Period: 14-days
Account Manager: Carolyn Lo
Contact: carolyn.lo@centraldatatech.com

Services	Description	Lot	Unit Price	Total Price
Implementation (3 mandays)	Scope of Work	1 Lot	21,300,000	21,300,000
	Prerequisite			
	Assessment & Consulting			
	Detailed Design Document & Technical Validation			
	Kick Off Meeting Pre Implementation			
	AWS Management & Monitoring Configuration			
	Create AWS Control Tower & Account Setup			
	Create AWS IAM User, Role, & Group			
	Configure Amazon CloudTrail Management Event			
	Create AWS KMS - Customer Managed Key			
	AWS Network & Security Configuration			
	Check/Enable Shield Free			
	Check/Enable Cloudtrail trail management events			
	Create & Configure NAT Gateway & Internet Gateway			
	Create & Configure Network Environment (VPC, Subnet, Route Table)			
	Create & Configure Security Group			
	Enable & Configure Amazon GuardDuty + Alarm Notification			
	Configure AWS Certificate Manager (ACM)			
	Backup & Monitoring Preparation			
	Create & Configure Amazon CloudWatch Dashboard & Alarm Notification			
	Setup AWS Backup for Automatic Backup Snapshot Scheduling			
	Configure SSM Agent & Cloudwatch Agent in EC2 Instances for Memory, Disk Metric, & Management			
	Create and Configure CloudWatch Dashboard and Alarm			
	Enable VPC Flow Log (Set Retention 3 Months)			
	Auto Scaling Group Preparation			
	AWS RDS Preparation			
	AWS EFS Preparation			
	Configure EC2 Instance to Integrate with NLB			
	Setup golden AMI EC2 (integrated with RDS and EFS for Scale-out support)			
	Create Launch Template			
	Create Auto Scaling Group			
	Integrate Auto Scaling Group with NLB			
	Application Functionality Testing			
	Repointing DNS in DNS Management			
	ECS Cluster Preparation			
	AWS ECS Cluster Preparation			
	AWS ECS Task Definitions Setup			
	Integrate ECS Cluster with ALB			
	Application Functionality Testing			
	Repointing DNS in DNS Management			
Post Implementation				
Perform UAT for AWS Environment & Services Function level				
Generate Amazon Trusted Advisor/Service Screener Report				
Sharing Knowledge (Optional)				
Documentation & Handover				
BAST				
Out of Scope				

Application Installation, Configuration & Tuning.		
Application or Workloads Functional Testing.		
Pointing DNS to Application Load Balancer (ALB) in DNS Manager.		
SSL Verification in DNS Manager.		
ECS Task & Definition Services Application Setup.		
Configuration outside AWS Environment and Services.		
Assumption		
Deployment will be done in MDS's new AWS Account and using Software Vendor Architecture Recommendation, based on the last meeting with MDS.		
Scale-out is supported for applications or workloads operating in Backend EC2 Instance.		
Application and Database Deployment & testing will be done by Wahana Meditek Indonesia.		
Auto Scaling Group leverage image (AMI) as launch template, any update to EC2 Application or workloads, requires to creation of another version of AMI with the latest update of the Application or workloads version.		
ECS Fargate Type can't Integrated with EFS.		
CDT only provides AWS environments/infrastructure that are stated in the scope of work.		
Scopes that are not stated in the Scope of Work, are considered as Out of scope.		
	Total Cost	IDR 21,300,000
	AWS Investment	IDR 21,300,000
	Total Cost to Customer	IDR -

Remarks : Additional Scope for Best Practices Architecture Option

Terms & Conditions

1. Quotation only eligible for above services
2. Quotation above in under IDR and **exclude PPN**
3. One Time Subscription Base
4. Penalty on late payment 1 per mile (0.1%) per day
5. Validity period of this Quotation is 14 days
6. Term of Payment : 100% payment before Implementation
7. Purchase order from Buyer is non cancellable, any payment is non refundable
8. Provision will be started when PO and Agreement received by PT Central Data Technology

Regards,



Carolyne Lo