CloudAssist™ Detailed Report

CloudGenera

Prepared For:	Example User
Organization:	CloudGenera
Candidate Assessed:	Sample Development Stack - LAMP
Scenario Assessed:	2) LAMP Stack - Small (5 Node Deployment)
Date:	August 22nd, 2017 at 1:04 PM
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1. Overview

CloudGenera provides organizations with the analytics to automate the process of evaluating and selecting the best execution venue for their technology requirements. CloudGenera uses a holistic approach to assess the cloud readiness of application component, discreet application or composite application's cloud readiness.

CloudGenera helps analyze a cloud transformation or migration candidate across a variety of scenarios and presents recommendations for private, public, and hybrid cloud deployment models utilizing the following considerations:

- Candidate Purpose (Type, Functions, and Features)
- Scenarios (Do nothing, Upgrade, Transformation)
- User Demographics and Usage Behaviors
- Service Level Requirements
- Compliance, Privacy and Regulatory Concerns
- Technology Dependencies
- Total Cost of Ownership
- Cloud Governance

Once described, a candidate scenario is compared against a repository of cloud services and cloud operating models governed by an organization's preferred private, hybrid or public cloud providers. The outcome of this analysis presents recommendations for the best execution venue and most capable cloud providers to match the unique needs of the candidate scenario being assessed.

2. Purpose

The purpose of this report is to outline the best execution venue for the "**2) LAMP Stack - Small (5 Node Deployment)**" scenario within the "**Sample Development Stack - LAMP**" candidate. This report is intended to be used to accelerate and simplify cloud computing deployment decisions.

3. Candidate Overview

The following is a summary of the Candidate, and associated Scenario, that was analyzed:

Candidate Summary

Item	Value
Candidate Name	Sample Development Stack - LAMP
Description	Open Source Deployment Architectures (Linux). This candidate documents various Linux application stack deployment scenarios.
Scope	Discrete Application
Visibility	Score preferred service providers
Privacy	Private
Environment Type	Production
Functions	
Features	

Scenario Summary

Item	Value
Scenario Name	2) LAMP Stack - Small (5 Node Deployment)
Description	This scenario documents a reference deployment of Red Hat Enterprise Linux, Apache httpd, mySQL and php (LAMP) application stack in a three (3) tier architecture.
Current Deployment Model	New Workload
Preferred Deployment Model	Any
Preferred Service Model	IaaS
Desired Deployment Date	January 14th, 2017

Currency Preference	United States Dollar (USD)

4. Scorecard Results

Google Compute Engine - US	Amazon Web Services - US - On Demand	Microsoft Azure - US
87	**84**	**84**
CloudRank™	CloudRank™	CloudRank™
SERVICE LEVEL FIT 100	SERVICE LEVEL FIT 100	SERVICE LEVEL FIT 100
SECURITY FIT 100	SECURITY FIT 100	SECURITY FIT 100
TECHNOLOGY FIT 83	TECHNOLOGY FIT 83	TECHNOLOGY FIT 83
TOTAL COST OF OWNERSHIP	TOTAL COST OF OWNERSHIP	TOTAL COST OF OWNERSHIP
$13,850.02	$16,593.24	$17,088.09
Build your own	Build your own	Build your own
$25,653.65	$25,653.65	$25,653.65

5.1 Cloud Option: Google Compute Engine - US

The Cloud Option Detail provides a business and technology gap analysis along with a financial analysis.

Best Options for Tier: A) Web Tier

Web Server

Requested Node Profile

Item	Value
Compute Node Name	**Web Server**
Compute Node Quantity	2
CPUs	2
Memory (GB)	4.00
Local Disk (GB)	0
Performance Preference	General Purpose

Cloud Service Recommendation

Recommended Cloud Service	**Compute Engine - Cores 1-4** from Google Compute Engine - US
Recommended Cloud Service Type	IaaS

Costs

Item	Type	Cost
0-1TB	Americas Egress Bandwidth	$72.00
Persistent Disk (Standard)	Block Storage	$245.76

2x4 - Custom Machine • CPUs: 2 • Memory: 4.00GB • Local Disk: 0GB • Performance Class: General Purpose	Compute	$1,473.99
0-1TB	Ingress Bandwidth	$0.00
Red Hat Enterprise Linux	Operating System	$1,051.20

Carryover Costs

Item	Type	Cost
Apache Httpd (Capital)	Middleware	$0.00
Apache Httpd (Maintenance)	Middleware	$0.00
Apache Httpd (Labor)	Middleware	$360.00
Red Hat Enterprise Linux (Labor)	Operating System	$102.00

Missing Items

Item	Type
Apache Httpd	Middleware
Virtual: VMware vSphere	Platform

Best Options for Tier: B) App Tier

Application Server

Requested Node Profile

Item	Value
Compute Node Name	**Application Server**
Compute Node Quantity	2

CPUs	4
Memory (GB)	8.00
Local Disk (GB)	0
Performance Preference	General Purpose

Cloud Service Recommendation

Recommended Cloud Service	**Compute Engine - Cores 1-4** from Google Compute Engine - US
Recommended Cloud Service Type	IaaS

Costs

Item	Type	Cost
0-1TB	Americas Egress Bandwidth	$72.00
Persistent Disk (Standard)	Block Storage	$245.76
4x8 - Custom Machine • CPUs: 4 • Memory: 8.00GB • Local Disk: 0GB • Performance Class: General Purpose	Compute	$2,947.99
0-1TB	Ingress Bandwidth	$0.00
Red Hat Enterprise Linux	Operating System	$1,051.20

Carryover Costs

Item	Type	Cost
PHP (Capital)	Middleware	$0.00
PHP (Maintenance)	Middleware	$0.00
PHP (Labor)	Middleware	$360.00
Red Hat Enterprise Linux (Labor)	Operating System	$102.00

Missing Items

Item	Type
PHP	Middleware
Virtual: VMware vSphere	Platform

Best Options for Tier: C) Data Tier

Database Server

Requested Node Profile

Item	Value
Compute Node Name	**Database Server**
Compute Node Quantity	1
CPUs	8
Memory (GB)	16.00
Local Disk (GB)	0
Performance Preference	General Purpose

Cloud Service Recommendation

Recommended Cloud Service	**Compute Engine - Cores >4** from Google Compute Engine - US
Recommended Cloud Service Type	IaaS

Costs

Item	Type	Cost

0-1TB	Americas Egress Bandwidth	$36.00
Persistent Disk (Standard)	Block Storage	$491.52
n1-standard-8 • CPUs: 8 • Memory: 30.00GB • Local Disk: 0GB • Performance Class: General Purpose	Compute	$3,328.80
0-1TB	Ingress Bandwidth	$0.00
Red Hat Enterprise Linux	Operating System	$1,138.80

Carryover Costs

Item	Type	Cost
MySQL (Capital)	Middleware	$0.00
MySQL (Maintenance)	Middleware	$0.00
MySQL (Labor)	Middleware	$720.00
Red Hat Enterprise Linux (Labor)	Operating System	$51.00

Missing Items

Item	Type
MySQL	Middleware
Virtual: VMware vSphere	Platform

5.2 Cloud Option: Amazon Web Services - US - On Demand

The Cloud Option Detail provides a business and technology gap analysis along with a financial analysis.

Best Options for Tier: A) Web Tier

Web Server

Requested Node Profile

Item	Value
Compute Node Name	**Web Server**
Compute Node Quantity	2
CPUs	2
Memory (GB)	4.00
Local Disk (GB)	0
Performance Preference	General Purpose

Cloud Service Recommendation

Recommended Cloud Service	**EC2 - On Demand - Red Hat Enterprise Linux** from Amazon Web Services - US - On Demand
Recommended Cloud Service Type	IaaS

Costs

Item	Type	Cost
2GB-10TB	Americas Egress Bandwidth	$52.92

0-1GB	Americas Egress Bandwidth	$0.00
EBS General Purpose SSD (gp2)	Block Storage	$612.00
t2.medium • CPUs: 2 • Memory: 4.00GB • Local Disk: 0GB • Performance Class: General Purpose	Compute	$1,874.64
2GB-10TB	Ingress Bandwidth	$0.00
0-1GB	Ingress Bandwidth	$0.00

Carryover Costs

Item	Type	Cost
Apache Httpd (Capital)	Middleware	$0.00
Apache Httpd (Maintenance)	Middleware	$0.00
Apache Httpd (Labor)	Middleware	$360.00
Red Hat Enterprise Linux (Labor)	Operating System	$102.00

Missing Items

Item	Type
Apache Httpd	Middleware
Virtual: VMware vSphere	Platform

Best Options for Tier: B) App Tier

Application Server

Requested Node Profile

Item	Value

Compute Node Name	**Application Server**
Compute Node Quantity	2
CPUs	4
Memory (GB)	8.00
Local Disk (GB)	0
Performance Preference	General Purpose

Cloud Service Recommendation

Recommended Cloud Service	**EC2 - On Demand - Red Hat Enterprise Linux** from Amazon Web Services - US - On Demand
Recommended Cloud Service Type	IaaS

Costs

Item	Type	Cost
2GB-10TB	Americas Egress Bandwidth	$52.92
0-1GB	Americas Egress Bandwidth	$0.00
EBS General Purpose SSD (gp2)	Block Storage	$612.00
m3.xlarge • CPUs: 4 • Memory: 15.00GB • Local Disk: 80GB • Performance Class: General Purpose	Compute	$5,711.52
2GB-10TB	Ingress Bandwidth	$0.00
0-1GB	Ingress Bandwidth	$0.00

Carryover Costs

Item	Type	Cost
PHP (Capital)	Middleware	$0.00
PHP (Maintenance)	Middleware	$0.00
PHP (Labor)	Middleware	$360.00
Red Hat Enterprise Linux (Labor)	Operating System	$102.00

Missing Items

Item	Type
PHP	Middleware
Virtual: VMware vSphere	Platform

Best Options for Tier: C) Data Tier

Database Server

Requested Node Profile

Item	Value
Compute Node Name	**Database Server**
Compute Node Quantity	1
CPUs	8
Memory (GB)	16.00
Local Disk (GB)	0
Performance Preference	General Purpose

Cloud Service Recommendation

Recommended Cloud Service	**EC2 - On Demand - Red Hat Enterprise Linux** from Amazon Web Services - US - On

	Demand
Recommended Cloud Service Type	IaaS

Costs

Item	Type	Cost
2GB-10TB	Americas Egress Bandwidth	$25.92
0-1GB	Americas Egress Bandwidth	$0.00
Cold HDD (sc1)	Block Storage	$157.20
m3.2xlarge • CPUs: 8 • Memory: 30.00GB • Local Disk: 160GB • Performance Class: General Purpose	Compute	$5,799.12
2GB-10TB	Ingress Bandwidth	$0.00
0-1GB	Ingress Bandwidth	$0.00

Carryover Costs

Item	Type	Cost
MySQL (Capital)	Middleware	$0.00
MySQL (Maintenance)	Middleware	$0.00
MySQL (Labor)	Middleware	$720.00
Red Hat Enterprise Linux (Labor)	Operating System	$51.00

Missing Items

Item	Type
MySQL	Middleware
Virtual: VMware vSphere	Platform

5.3 Cloud Option: Microsoft Azure - US

The Cloud Option Detail provides a business and technology gap analysis along with a financial analysis.

Best Options for Tier: A) Web Tier

Web Server

Requested Node Profile

Item	Value
Compute Node Name	**Web Server**
Compute Node Quantity	2
CPUs	2
Memory (GB)	4.00
Local Disk (GB)	0
Performance Preference	General Purpose

Cloud Service Recommendation

Recommended Cloud Service	**Standard Tier - Red Hat (Cores 1-4) - Premium Storage** from Microsoft Azure - US
Recommended Cloud Service Type	IaaS

Costs

Item	Type	Cost
0-5GB Zone 1	Americas Egress Bandwidth	$0.00
	Americas Egress	

5GB-10TB Zone 1	Bandwidth	$46.98
P6 - Premium Managed Disk (SSD)	Block Storage	$43.49
FS2 • CPUs: 2 • Memory: 4.00GB • Local Disk: 32GB • Performance Class: Compute Optimized	Compute	$2,785.68
0-5GB Zone 1	Ingress Bandwidth	$0.00
5GB-10TB Zone 1	Ingress Bandwidth	$0.00
Red Hat Enterprise	Operating System	$1,051.20

Carryover Costs

Item	Type	Cost
Apache Httpd (Capital)	Middleware	$0.00
Apache Httpd (Maintenance)	Middleware	$0.00
Apache Httpd (Labor)	Middleware	$360.00
Red Hat Enterprise Linux (Labor)	Operating System	$102.00

Missing Items

Item	Type
Apache Httpd	Middleware
Virtual: VMware vSphere	Platform

Best Options for Tier: B) App Tier

Application Server

Requested Node Profile

Item	Value
Compute Node Name	**Application Server**
Compute Node Quantity	2
CPUs	4
Memory (GB)	8.00
Local Disk (GB)	0
Performance Preference	General Purpose

Cloud Service Recommendation

Recommended Cloud Service	**Standard Tier - Red Hat (Cores 1-4) - Premium Storage** from Microsoft Azure - US
Recommended Cloud Service Type	IaaS

Costs

Item	Type	Cost
0-5GB Zone 1	Americas Egress Bandwidth	$0.00
5GB-10TB Zone 1	Americas Egress Bandwidth	$46.98
P6 - Premium Managed Disk (SSD)	Block Storage	$43.49
FS4 • CPUs: 4 • Memory: 8.00GB • Local Disk: 64GB • Performance Class: Compute Optimized	Compute	$4,537.68
0-5GB Zone 1	Ingress Bandwidth	$0.00
5GB-10TB Zone 1	Ingress Bandwidth	$0.00
Red Hat Enterprise Linux	Operating System	$1,051.20

Carryover Costs

Item	Type	Cost
PHP (Capital)	Middleware	$0.00
PHP (Maintenance)	Middleware	$0.00
PHP (Labor)	Middleware	$360.00
Red Hat Enterprise Linux (Labor)	Operating System	$102.00

Missing Items

Item	Type
PHP	Middleware
Virtual: VMware vSphere	Platform

Best Options for Tier: C) Data Tier

Database Server

Requested Node Profile

Item	Value
Compute Node Name	**Database Server**
Compute Node Quantity	1
CPUs	8
Memory (GB)	16.00
Local Disk (GB)	0
Performance Preference	General Purpose

Cloud Service Recommendation

Recommended Cloud Service	**Standard Tier - Red Hat (Cores 8+) - Premium Storage** from Microsoft Azure - US
Recommended Cloud Service Type	IaaS

Costs

Item	Type	Cost
0-5GB Zone 1	Americas Egress Bandwidth	$0.00
5GB-10TB Zone 1	Americas Egress Bandwidth	$20.88
P30 - Premium Managed Disk (SSD)	Block Storage	$1.44
FS8 • CPUs: 8 • Memory: 16.00GB • Local Disk: 128GB • Performance Class: Compute Optimized	Compute	$4,625.28
0-5GB Zone 1	Ingress Bandwidth	$0.00
5GB-10TB Zone 1	Ingress Bandwidth	$0.00
Red Hat Enterprise Linux	Operating System	$1,138.80

Carryover Costs

Item	Type	Cost
MySQL (Capital)	Middleware	$0.00
MySQL (Maintenance)	Middleware	$0.00
MySQL (Labor)	Middleware	$720.00
Red Hat Enterprise Linux (Labor)	Operating System	$51.00

Missing Items

Item	Type
MySQL	Middleware
Virtual: VMware vSphere	Platform

6. Recommendations

Based on the analysis of the requirements defined, **Google Compute Engine - US**, has the best overall fit for the "**2) LAMP Stack - Small (5 Node Deployment)**" scenario, within the "**Sample Development Stack - LAMP**" candidate.

Appendices

A1. User Demographics and Usage Behavior Requirements

Users

Item	Value
Total Number of Users	1
Number of Concurrent Users	1

User Demographics

Item	Value
Geographic Location(s)	• 100% of Users in **AMER (United States)**

Expected Utilization

Item	Value
Usage Frequency	Constant Access
Usage Duration	Perpetual
Average Daily Use per Region	24 hours

A2. Service Level Requirements

Service Level Preferences

Item	Value
Availability	99.9% Uptime
Response Time	1-2 Seconds
Reliability Options	
Monitoring & Management Options	
Scalability Options	

A3. Compliance, Privacy and Regulatory Requirements

ISO/IEC 27001

ISO/IEC 27001: specifies the requirements for establishing, implementing, maintaining and continually improving an information security management system. The adoption of an information security management system is a strategic decision for an organization. The establishment and implementation of an organization's information security management system is influenced by the organization's needs and objectives, security requirements, the organizational processes used and the size and structure of the organization. All of these influencing factors are expected to change over time.

The information security management system preserves the confidentiality, integrity and availability of information by applying a risk management process and gives confidence to interested parties that risks are adequately managed.

It is important that the information security management system is part of and integrated with the organization's processes and overall management structure and that information security is considered in the design of processes, information systems, and controls. It is expected that an information security management system implementation will be scaled in accordance with the needs of the organization."

PCI DSS

PCI security standards are technical and operational requirements set by the PCI Security Standards Council (PCI SSC) to protect cardholder data. The standards apply to all organizations that store, process or transmit cardholder data – with guidance for software developers and manufacturers of applications and devices used in those transactions. The Council is responsible for managing the security standards, while compliance with the PCI set of standards is enforced by the founding members of the Council, American Express, Discover Financial Services, JCB International, MasterCard Worldwide and Visa Inc

The PCI DSS applies to all entities that store, process, and/or transmit cardholder data. It covers technical and operational system components included in or connected to cardholder data. If you are a merchant who accepts or processes payment cards, you must comply with the PCI DSS.

A Merchant that meets any one or more of the following criteria is deemed to be a Level 1 Merchant and must validate compliance with the Payment Card Industry Data Security Standard:

• Any Merchant that has suffered a hack or an attack that resulted in an Account data compromise,

• Any Merchant having greater than six million total combined MasterCard and Maestro transactions annually,

• Any Merchant meeting the Level 1 criteria of Visa, and

• Any Merchant that MasterCard, in its sole discretion, determines should meet the Level 1 Merchant requirements to minimize risk to the system.

A4.1 Tier: A) Web Tier

Compute Requirements for Tier (A) Web Tier)

Compute Node: Web Server

Node Details

Item	Value
Name	Web Server
Description	This VM contains a configuration of Red Hat Enterprise Linux and Apache httpd
Depreciation Schedule (Years)	3
Quantity	2

Infrastructure Resources

Item	Value
CPUs	2
Memory (GB)	4
Local Disk (GB)	0
Performance Preference	General Purpose
Capital Cost	$0.00
Maintenance Cost (per Year)	$0.00
Labor Cost (per Month)	$3.25

Platform

Item	Value
Platform Type	Virtual: VMware vSphere
Capital Cost	$1,123.60

Maintenance Cost (per Year)	$0.00
Labor Cost (per Month)	$4.50

Operating System

Item	Value
Operating System Name	Red Hat Enterprise Linux
Capital Cost	$1,285.90
Maintenance Cost (per Year)	$0.00
Labor Cost (per Month)	$4.25

Middleware

Name	Capital Cost	Maintenance Cost / Year	Labor Cost / Year
Apache Httpd	$0.00	$0.00	$15.00

Storage Requirements for Tier (A) Web Tier)

Storage Node: Web Tier Storage

Node Details

Item	Value
Name	Web Tier Storage
Description	Storage for Web Tier of 3-Tier Stack
Depreciation Schedule (Years)	3
Quantity	2
Storage Type	Block
Size (GB)	256

Storage Component

Item	Value
Component Type	EMC VNX
Capital Cost	$2,895.36
Maintenance Cost (per Year)	$0.00
Labor Cost (per Month)	$0.16

Performance Preference (IOPS)

Item	Value
Performance Preference	No Preference
Read Operations (per Second)	0
Write Operations (per Second)	0

Business Continuity and Disaster Recovery

Item	Value
Recovery Point Objective (RPO)	0 hours
Recovery Time Objective (RTO)	0 hours

A4.2 Tier: B) App Tier

Compute Requirements for Tier (B) App Tier)

Compute Node: Application Server

Node Details

Item	Value
Name	Application Server
Description	This VM contains a configuration of Red Hat Enterprise Linux and php
Depreciation Schedule (Years)	3
Quantity	2

Infrastructure Resources

Item	Value
CPUs	4
Memory (GB)	8
Local Disk (GB)	0
Performance Preference	General Purpose
Capital Cost	$0.00
Maintenance Cost (per Year)	$0.00
Labor Cost (per Month)	$6.50

Platform

Item	Value
Platform Type	Virtual: VMware vSphere
Capital Cost	$2,247.20

Maintenance Cost (per Year)	$0.00
Labor Cost (per Month)	$4.50

Operating System

Item	Value
Operating System Name	Red Hat Enterprise Linux
Capital Cost	$2,571.80
Maintenance Cost (per Year)	$0.00
Labor Cost (per Month)	$4.25

Middleware

Name	Capital Cost	Maintenance Cost / Year	Labor Cost / Year
PHP	$0.00	$0.00	$15.00

Storage Requirements for Tier (B) App Tier)

Storage Node: Application Tier Storage

Node Details

Item	Value
Name	Application Tier Storage
Description	Storage for Application Tier of 3-Tier Stack
Depreciation Schedule (Years)	3
Quantity	2
Storage Type	Block
Size (GB)	256

Storage Component

Item	Value
Component Type	EMC VNX
Capital Cost	$2,895.36
Maintenance Cost (per Year)	$0.00
Labor Cost (per Month)	$0.16

Performance Preference (IOPS)

Item	Value
Performance Preference	No Preference
Read Operations (per Second)	0
Write Operations (per Second)	0

Business Continuity and Disaster Recovery

Item	Value
Recovery Point Objective (RPO)	0 hours
Recovery Time Objective (RTO)	0 hours

A4.3 Tier: C) Data Tier

Compute Requirements for Tier (C) Data Tier)

Compute Node: Database Server

Node Details

Item	Value
Name	Database Server
Description	This VM contains a configuration of Red Hat Enterprise Linux and mySQL
Depreciation Schedule (Years)	3
Quantity	1

Infrastructure Resources

Item	Value
CPUs	8
Memory (GB)	16
Local Disk (GB)	0
Performance Preference	General Purpose
Capital Cost	$0.00
Maintenance Cost (per Year)	$0.00
Labor Cost (per Month)	$13.00

Platform

Item	Value
Platform Type	Virtual: VMware vSphere
Capital Cost	$4,494.40

Maintenance Cost (per Year)	$0.00
Labor Cost (per Month)	$4.50

Operating System

Item	Value
Operating System Name	Red Hat Enterprise Linux
Capital Cost	$5,143.60
Maintenance Cost (per Year)	$0.00
Labor Cost (per Month)	$4.25

Middleware

Name	Capital Cost	Maintenance Cost / Year	Labor Cost / Year
MySQL	$0.00	$0.00	$60.00

Storage Requirements for Tier (C) Data Tier)

Storage Node: Database Tier Storage

Node Details

Item	Value
Name	Database Tier Storage
Description	Storage for Database Tier of 3-Tier Stack
Depreciation Schedule (Years)	3
Quantity	1
Storage Type	Block
Size (GB)	1024

Storage Component

Item	Value
Component Type	EMC VNX
Capital Cost	$11,581.44
Maintenance Cost (per Year)	$0.00
Labor Cost (per Month)	$0.64

Performance Preference (IOPS)

Item	Value
Performance Preference	No Preference
Read Operations (per Second)	0
Write Operations (per Second)	0

Business Continuity and Disaster Recovery

Item	Value
Recovery Point Objective (RPO)	0 hours
Recovery Time Objective (RTO)	0 hours

A5. Other Costs

Other Capital Costs

No information specified.

Other Operational Costs

No information specified.