

Installation

LENA Support

Version 1.3.2.0

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Chapter 1. OVERVIEW

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%8. 9. LENA : ; < % = > () 5 6. ?@A B C D E F G \$ () H I J K L M N. 9.

! " # \$ LENA 1.3.1c O; L % P Q D % 8 * N, 9 R S T A ? @ L U V. 9.

¥ LENA for Container W X Y Z / O- 1

[\ @] ^ 5 6. N _ ` a

[Server b c B N _ ` a

¥ LENA for Container 3 4

[Base Image Build

[Kubernetes %& 3 4

[Docker %& 3 4

[ECS %& 3 4

[VM / Host %& 3 4 (Manager, Session Server)

1.1. ! " # \$

LENA\$ Web Server, Application Server, Session Server2 Web Server: Status' de * \$ Node
Agent, Application Server5 3 4 Gf Status Og' EF * \$ Advertiser2 hi H5j EFG\$ kl hi
Cme ManagerD mn o 9.

1.1.1. Server

LENA5# EFG\$ #O: p q \$ Web Server, Application Server, Session Server 3 r s r t 9. u
#O: @C\$ Wv 2 T 9.

1. Web Server: ` @H - w5 x y Web Resource' EF. 9. Application Server EF * \$
z @#{ | : Front} ~L • € * • #, , f \ QD Load Balancing > g, ...† f (SSL)' EF * \$
} ~L • €. 9.

2. Application Server: JavaD ‡ n o z @ #{ | ' ^ € / EF . 9.

3. Session Server: Application Server%o ` @H: Š < L b s . 9.

1.1.2. Agent, Advertiser

Node, Server5 3 4 Gf Ef > Ą • Ž • %= L • ' * \$ Agent † 9.

¥ Node Agent

[Web Server ' " Ą • Ž • " † Ž' • l * – Manager5j EF . 9.

¥ Advertiser

[Application Server ' " Ą • Ž • " † Ž' • l * – Manager5j EF . 9.

1.1.3. Manager

Manager\$ Node Agent2 Advertiser' k * – Node2 Server: Ef > Ą • Ž • %= – L
EF * \$ Web Application† 9. 6 ~ \ QD Wv 2 T A %= L EF . 9.

%&	' (
Dashboard	¥ Server, Service Cluster ™Š ¥ Notification de
Server	¥ System (> i \ Server œ•) —ž /• O/Ÿ E
Service Cluster	¥ Service Cluster —ž /• O/Ÿ E ¥ —ž o Server ž , † j ¢ £ ¥ Service Cluster ¤ ¥ | , Revision hi ¥ 3O Template 9(DŠ' k . C I C D ¨ © %= ¥ ª « Terminal > Standard Out/Error Log ¢ £ (Kubernetes5 . V)
Resource	¥ Resource (Database, DataSource, Application,k8s config) —ž /• O/Ÿ E/¢ £ ¥ Resource' ` @* \$ Server ž ¢ £ > -r /E -
Diagnostics (£• Ž•)	¥ Server5 6. † ® ™Š £• Ž• %= ¥ Server5# ¨ ° . Event ¢ £ %=
Topology	¥ SystemB Server mn™Š ¢ £
Admin	¥ ` @H > ±. hi , ` @H/±. /² J I ³ ¥ ` @H () † j ¢ £ ¥ y†, | hi , ™Š ¢ £ > ´ DŠ ¥ Cloud Profile hi

1.2. Mechanism

LENA\$ Manager' k 7# Web/Application #O' £• Ž• > kI hi * \$ % = L EF. 9. 9µ,
%¶ Host/VM. S:] ^\ ¹ †° A Container5# m» G\$ Server\$ OrchestrationCm5 : 7
^ €† EF G¼, State' r ss ½\$ 9\$ ° † 9.

xy#, %¶ Host/VM] ^5# Agent' k. ^ ¾% Ef/3O hi . 6¿ ÄB Serverr
Container%» ¾° 5 Manager' k 7 3O Og > y†, | ' 9(DŠ Á\$. QD 3O Og'
EF * N, %» o Server: ' " ' Manager' k 7# £• Ž• * \$. QD hi . 9.

ServerÄ: mn- 1 D\$ %» ¾ 9(DŠ > Ä%3O % = L ` @* % Ä7# \$ u Server\$
Container¾‡ CommandD Ä@G\$ docker-entrypoint.shr t N, () G\$ Server: ' " ' ; Æ* %
Ä7 Web # O5\$ Node Agentr 34GN Application > Session Server\$? Ço (EÈL Ä@. 9.

WEB-WAS ¨ © ÉÊ5#C %¶ VM/Host] ^S: ¹ †r ¶É. 9. Container: ° n/1î 5 xy IPÍ
Î 1r Î » \e] ^5# Back-End Application Container2: sÐ\ e ¨ /L bs * % Ä7# \$ Load-
balancerr , - * ¼, † \$ Kubernetes: ServiceÍ ECS: Service Discovery, EKS/ECS: ELB c" D
EFGN t 9. %¶ VM/Host] ^5# WEB-WAS' ÑÒ ¨ / * N WEB # Or ÑÒ Load-balancingL
• €ÓÔ . A Container] ^5# \$ EFGs ½N ¥ÖÖ† EF * \$ Service Î 1 (Service Endpoint)D

Reverse Proxy / L E F . 9.

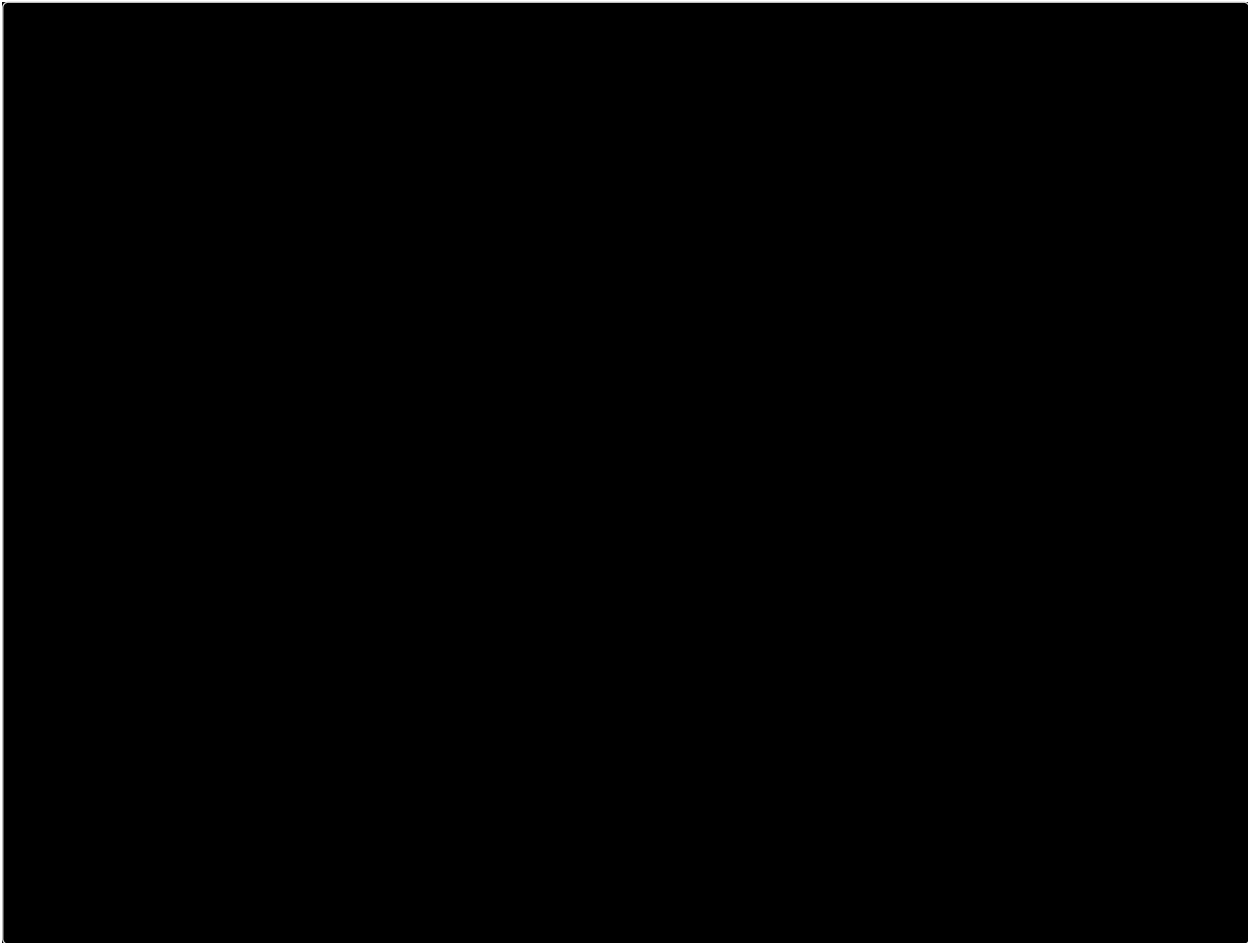


Figure 1. Container %& LENA Server%'' © mΦ (Kubernetes] ^)

%&	' () *
Application Server	Application Server Instance	
Web Server	Web Server Instance	
Session Server	Session Server Instance	
Manager	# O5 xUG\$ 3OØÛ hi > Server Æ• Ž• %= EF	
Manager Repository	Manager () L Ä. ØÛÚÇ Repository, u p 3OOg > DB Og' UVV	ÂÉÚÇ1DÊi r =
docker-entrypoint.sh	Container %» ¾5 ^ €G\$ Shell Script 1. %» ¾° 5 3OOg Ã%Û 2. ManagerD ÉŽ 3OOg/y †, | 9(D\$ 3. # O %» %=L • €V	

%&	' () *
Node Agent	Web #O Œ• Ž• " †Ž •I > Manager5j Æ¿, ManagerDÉŽ •¿. Ef /3O ÜÝ ^ €	
Advertiser	Œ• Ž• " †Ž •I > Manager5j Æ¿	Application Server5 kI

Container ()] ^: Þn†Í Eß5 xy Session Server Í Manager' VM/Host] ^5# () ~ • C
t N, LENA Manager\$ Containerc LENA Server àW• y, VM/Host %& LENA Server' hi * \$
%=C UV* N t QáD, 9RS TA WXYZD () â • C t 9.

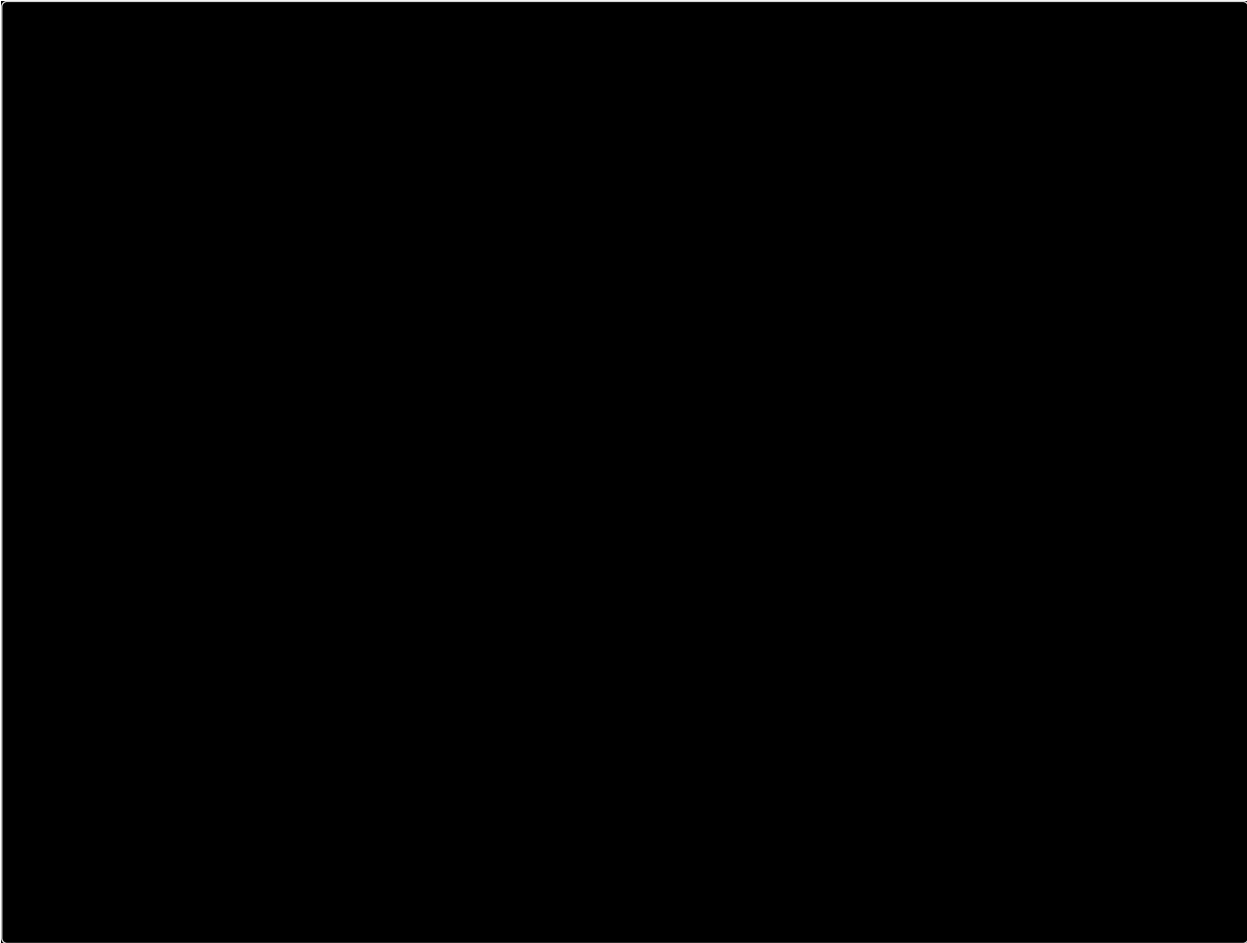


Figure 2. Container -VM/Host āI] ^5#: LENA Server% ¨ © mΦ

1.3. + , Asset

LENA for Container O; 5# \$ 9RS TA Asset EF o 9.

¥ Docker Image : Linux OS + JDK + LENA Server + , - Libraryr UVo Image' Docker Hub'
k 7# EF

- [Web Server : <https://hub.docker.com/r/lenacloud/lena-web>
- [Application Server : <https://hub.docker.com/r/lenacloud/lena-cluster>
- [Session Server : <https://hub.docker.com/r/lenacloud/lena-session>
- [Manager Server : <https://hub.docker.com/r/lenacloud/lena-manager>

¥ Kubernetes Manifest ØÛ : Kubernetes5 34 ¾ , - . Workload / Service / Config Map † %8o
LENA Server× U@ ØÛ

Docker Hub5# EF * \$ Image: SpecA 9RS T9.

! -	JVM	OS (Base Image)	. / Heap Memory
Application Server	Open JDK 1.8	¥ Cent OS 7 (centos:7)	1.0 GB
Web Server	Open JDK 1.8	¥ Cent OS 7 (centos:7)	64MB~256MB(Agent)
Session Server	Open JDK 1.8	¥ Cent OS 7 (centos:7)	1.0 GB
Manager	Open JDK 1.8	¥ Cent OS 7 (centos:7)	1.0 GB

1.4. O12 #! 3%

LENA for Container: u #O e | ä | 345 6. å 1 - m` aA 9RS T9.

! -	JVM	4\$ Memory	Image Size(Base Img + 5)	. / ' 6 Memory
Application Server	JDK 1.8	512M	β 900 MB (β 300MB)	1.25 GB
Web Server	JDK 1.8	512M	β820 MB (β 300MB)	-
Session Server	JDK 1.8	512M	β 900 MB (β 300MB)	1.25 GB
Manager	JDK 1.8	512M	β 1,000 MB (β 500MB)	1.25 GB

u #O 34 ¾ %! , - Memory %PQD 34 G¼, å 1 ` æ ĩ ^ ¾ 3O ç ĩ ^ † , - * 9. Image Size\$ OS + JDK + LENA Server + , - Library ; <' 34. Image è%† 9.

Chapter 2. Architecture 7 6 3%

2.1. 89

; < Architecture : ` / OS 34SOA Wv æéS T 9.

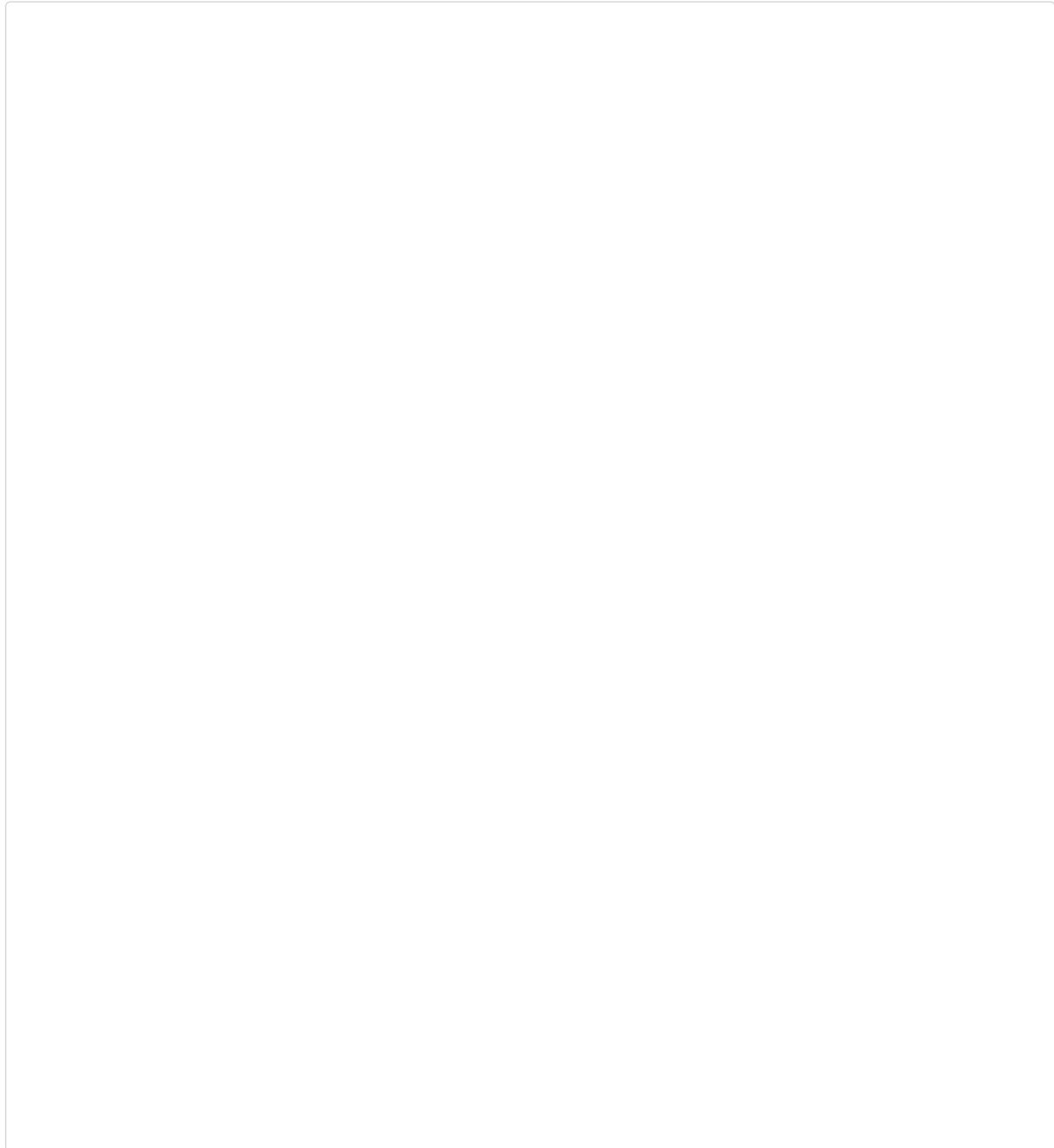


Figure 3. ; < Architecture : ` / OS 34SO

¥ Architecture : ` / O: ¾±A Container ¥ÖÖ: / OS () Container: OS2 JDK' / O* \$
ê†9. †5 x y LENA%& Image' , f* N, ¥ÖÖ5 xë xU. , † / Oo9.

¥ 34\$ WEB/WAS #O2 Manager/Session #O 34. , † 9i j í €o9. Û&\QD
Manager/SessionA LENA Image' EFG\$ æ6D ` @*j GN, WEB/WAS\$ LENA †î s'
%&QD ï DÖñBD , - D* \$ Application / Library—L ¬r 34* \$ ò| ó Base Image'
Build* – Å@* \$. , QD í €o9.

¥ WEB/WAS/Session #O' kI hi * % Ä7#\$ 7' Container' mn* % ; 5 LENA Manager'

Å@* – u ServiceB Service Cluster' ` ; 5 mn* – ô . 9. Service Cluster' ° n* N, Container] ^ 3 O 5 Manager Î 1 2 Service Cluster Og' – r * • Container %» ¾ 5 Template / License 9(D\$ ô 1 r • € G¼, %» ö Manager 5 # %» o Container: Serverr H» – ž GN Ē • Ž • Og' de ~ • t 9.

2.2. Container : ; < = > ? @ * A 3 %

ProviderB 9æ. Container ()] ^† EF GN t QÍ è j EKS/GKE/AKS—L UV* \$ Kubernetes] ^ S Amazon ECS 2 T A Docker %&] ^ 2 r s bc QD Í ÷ f ø • t 9.

Container] ^ B P n ù LENA' () * \$ ") ú L î 4 \$ Î - P n A 9 R S T 9.

1. mn Server% N/W k ¿

† N_` a A ¾ | ð L mn* \$ Server û † Container ()] ^ : ? É N/W 2 Â É N/W 5 Ê ü G f t L ^ ý, ' p k ¿ r = – É 5 6. N_` a † 9. Û & \ Q D P B. N/W E ß † 3 O G f t s ½ Q • outbound k ¿ † r = * ¼, LENA: ^ ý Server ý Manager, WAS ý Session Server: k ¿ † r = * – ô . 9. P ! , VM + Container' ã l * – mn ~ ^ ý ECS: vpc" ñ # è Ē S Z \$ Container 2 VM %: k ¿ † r =. N/W mn † , - * 9.

2. Load Balancing s^a

VM/Host 2 % i Container \$ • ¾ D ° n / 1 ð â • t Q ¼, † 5 x y IP Î 1 r Ĩ ^ o 9. x y #, Back-End 5 Ä 4. Container ° n / 1 ð ö 5 C s Ð \ e Service' b s * % Ä 7 # Back-End # { | : + & 5 Load-balancer' , - D * j o 9. Kubernetes \$ Load-Balancing L EF * \$ Service' EF * N, ECS \$ ELB " / ' \$ Service Discovery 3 O L k 7 Load-balancing %= L EF * N t 9.

3. Instance) Ð n s^a (h (- 1 : Session Server, Manager)

NO o Ä • : Container' NO o Î 1 D s Ð \ Q D () * \$ ê L : î * ¼, DBMS 2 T † F b G \$ H^a # { | ' Container D # { | ~) , - . P n Q D, LENA: mn - 1 ù Manager 2 Session Server: mn 5 , - * 9. Kubernetes: ^ ý \$ StatefulSet x U • L k 7 † P n L EF * N, ECS: ^ ý 5 \$ Replica 1 e Service' x U * – b ` * j () â • t 9.

4. Ä É Volume " / (h (- 1 : Manager)

Containerr State b s' g Ç ~ • * % 5 1 ð / % » † - ° * – C ` @ * \$ Data' s Ð \ Q D b s * % Ä 7 # \$ Ä É Ú Ç 1 (Volume) 5 Og' Ú Ç * – ô . 9. Û & \ Q D DBMS: DB" † Ž Ú Ç † Í + • Ä: Container 5 » Û Application L x U ~) Î D Ä @ o 9. LENA Manager' Container • Q D () ~ ^ ý Ē % » ö 5 C h i Og: Û h n L b s * % Ä 7 # Ä É Volume: " / L , - D . 9.

2.2.1. Container BCD E : ; < = F "

! ö 5 # \$ + 5 # , - . ()] ^ N_` a S h (o Container ¥ Ö Ö: P n L . / ! 9.

Kubernetes

Kubernetes \$ Container Û o Workload 2 Service' h i * % Ä. † , n † t N, d Ç r =. Container Orchestration C m † 9. Kubernetes \$ O i \ Q D \$ Container h i ' Ä. Control Plane S Worker Node D mn G \$ Cluster & Ä D 3 4 G f () o 9. Worker Node 5 \$ > i \ e † ´ F % e Namespace r Ê ü x 4 o 9. Kubernetes # { | \$ Container x U r =. å 1 & Ä e Pod S Pod L æ • Û * – h i * \$ & Ä e Workload, Workload' Network # { | D EF * \$ Service D mn GN, Workload > Service \$ Namespace 5 x 4 o 9.

Kubernetes: Network mΦ\$ Service ÆÈL Ä. Cluster Network† mnGf t N, †' k 7
HostD: Port Open, Load BalancingL EF. 9.



Figure 4. Kubernetes Cluster N/W

Kubernetes: Service\$ Pod 1l 5# ^ €ùe 2¥i 3†< L N/W #{ | D 45* \$ -' Ûo
· 6QD Pod5j Nb. IP Î 1 2 Pod 1l 5 6. &Û DNS ÛL É– * N Load-BalancingL EF. 9.
Kubernetes Service: bc 5\$ 9RS TA 4r sr t 9.

Cluster IP

Kubernetes N/W5# ?É NO IP / Domain Name† ~' GN, †' k 7 Cluster Load Balancing†
† 7f í 9.

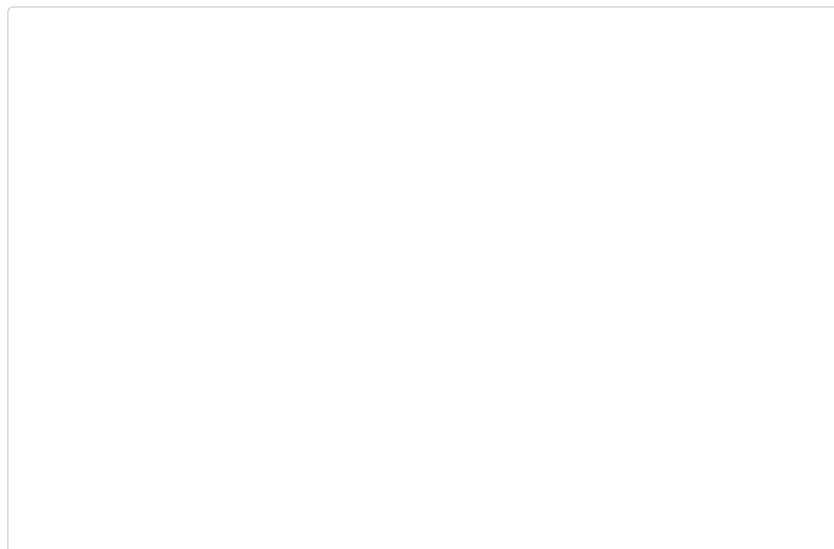


Figure 5. Kubernetes Deployment bc - Cluster Ip

Node Port

Cluster' mn * \$ 8 Node: Port' Container PortD `` / . 9. Node 30000-32767 9Ä:
Portr OpenGN, %! \QD\$: ; *j Portr sOGÍ NO\QDC sO~ • t 9.

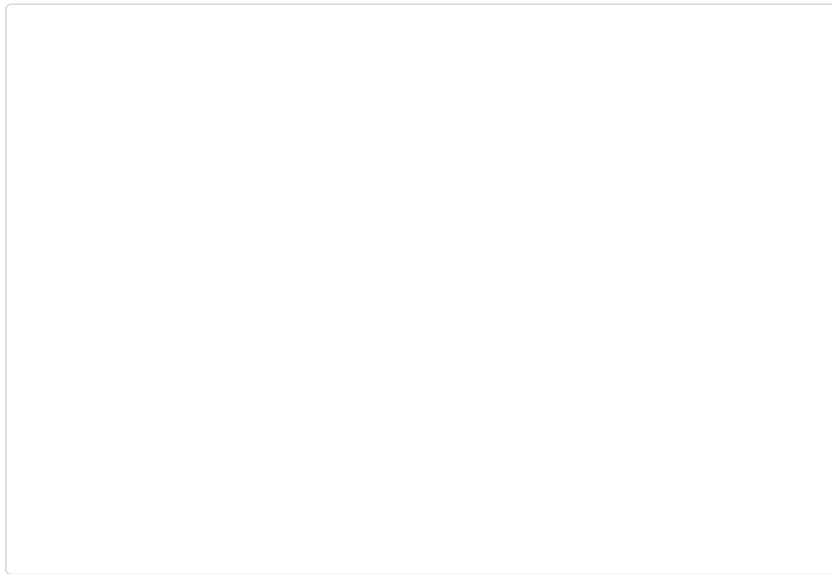


Figure 6. Kubernetes Deployment bc - Node Port

Load Balancer

Node Port' <=VS » 345 Container N/W 5 t \$ LoadBalancer' `` ©* – Service' 45. 9.
EKS2 TA Cloud Service5# \$ Cloud Service Provider5# EF * \$ Load Balancer' ° n* –
`` / . 9.

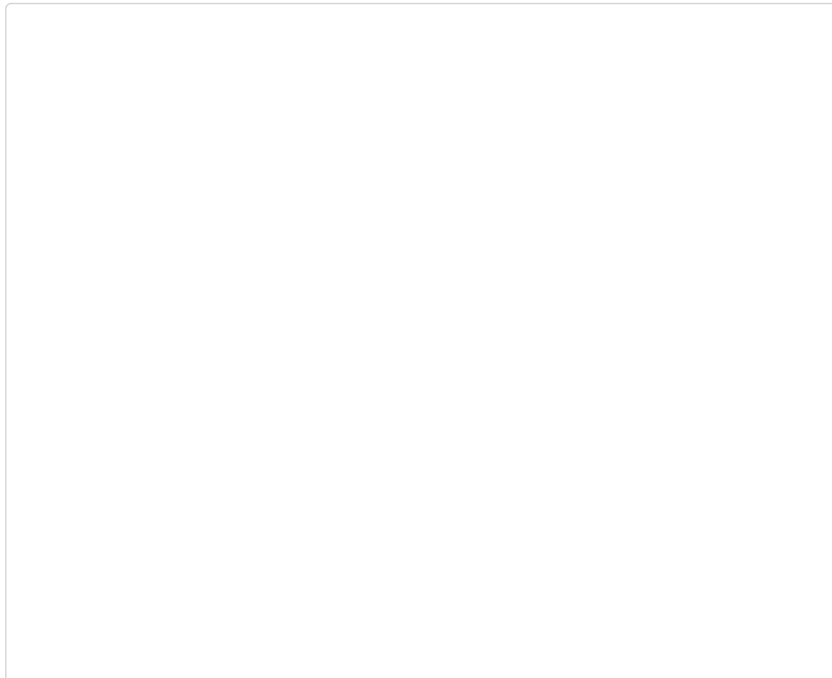


Figure 7. Kubernetes Deployment bc - Load Balancer

Headless

BC: Service Cluster IP * † Domain NameµL k. Load Balancing • €. 9. Pod BD uu:
Domain† sOGN, Stateful Set' †@* \$ ^ý Î D` @o9.

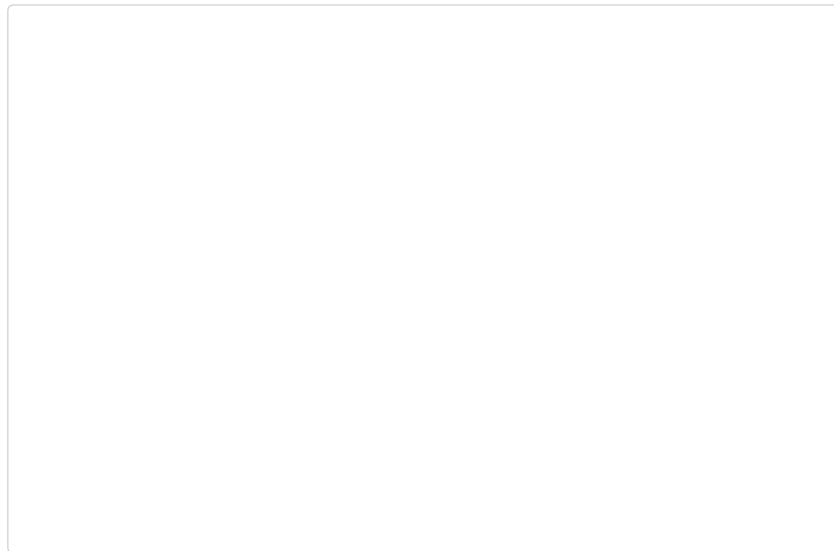


Figure 8. Kubernetes Deployment bc - Headless

Kubernetes\$ 9æ. bc: Container(Pod) xU . 5 L s^a . 9. Û&\ QD Deployment(Replica Set)L ` @* sµ NOo Instance Å• ' , - D* \$ LENA Manager, Session Server5\$ Stateful Set \@† \I * 9.

Replica Set

Node Å• 2 h©* † - wo • µ>: Replica' ° n. 9. Æ8 Pod† » Û. Persistent VolumeL Fb* \$ c" Dmn~ • t 9.

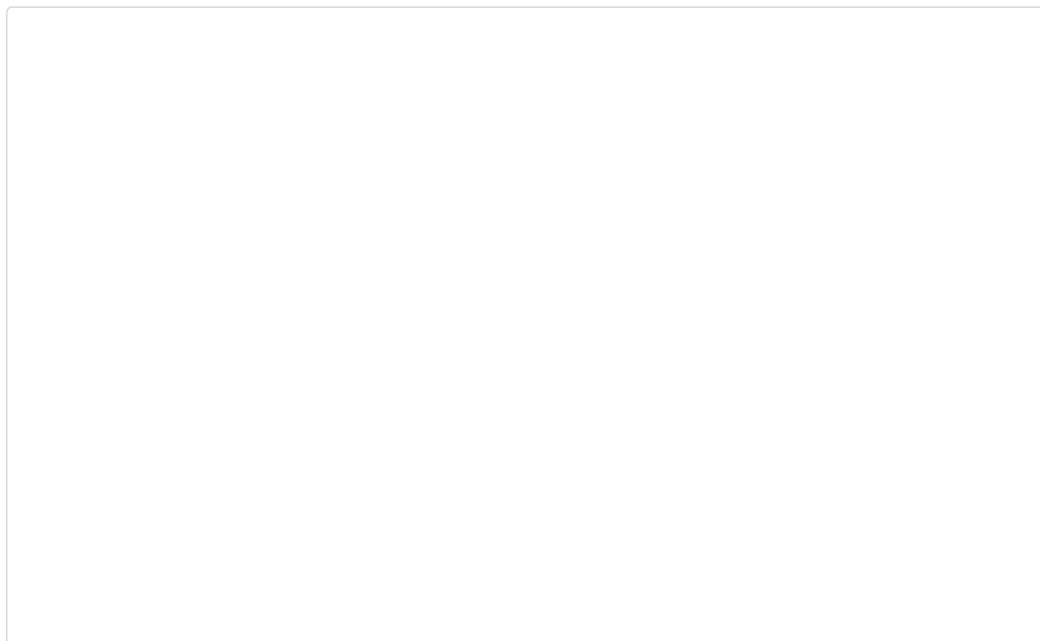


Figure 9. Kubernetes Workload bc - Replica Set

Deployment

Replica SetL Ë° n ~ • t N, Versioning ~ • t 9. Û&\ QD WEB #O, Application #O' xU~) ` @o 9.

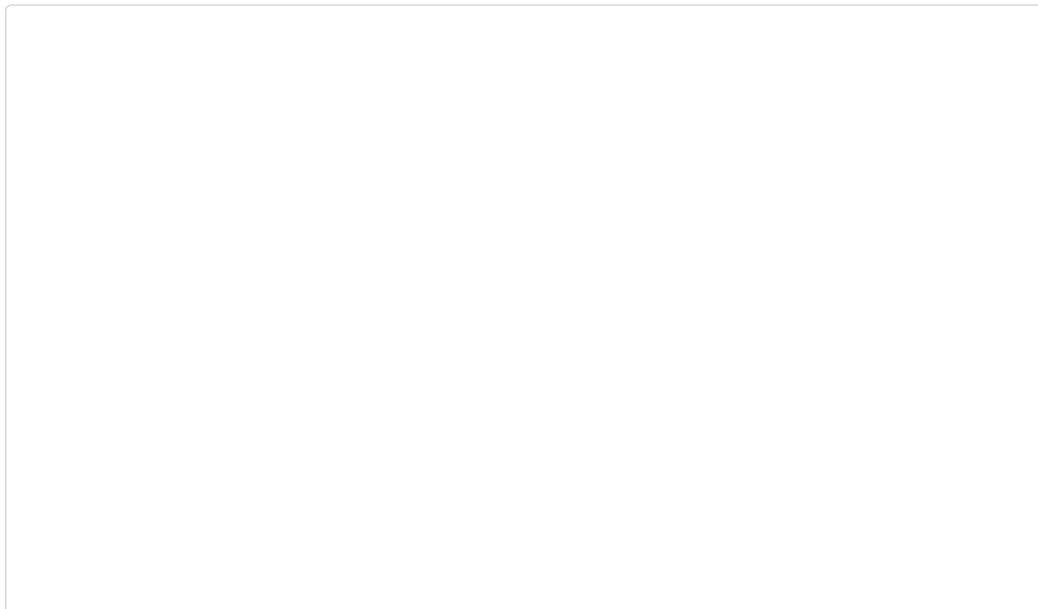


Figure 10. Kubernetes Workload bC - Deployment

Stateful Set

NOo Å• : PodL bS ~ • t N, Pod BD Master / Slave —: ' " çL r ? • t N, Pod BD
 uu: Persistent Volume ~' † r = * 9. Û&\ QD DBMS, Session Server —) Ðn† , - .
 #{ | ' xU~) ` @. 9.

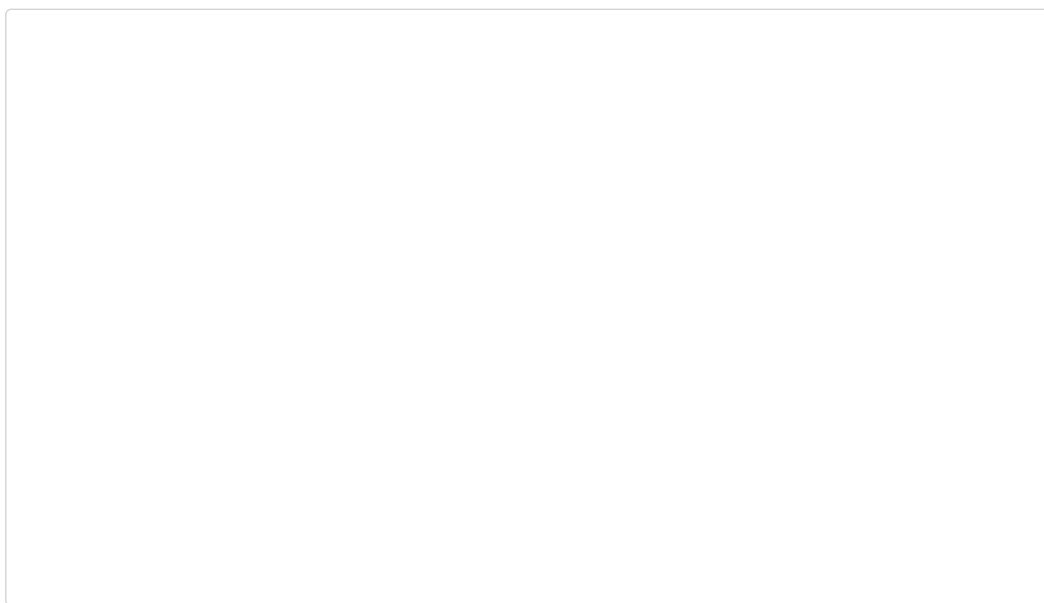


Figure 11. Kubernetes Workload bC - Stateful Set

Daemon Set

Kubernetes Cluster: Worker Node Å• 2 » Û. Pod† Node BD xUGN bso9. Û&\ QD
 Standard OutQD 5j o Log • 1, NodeB Æ• Ž• Og • 1, Ingress' 6ç * \$ Web #O' xU~
 ^ý ` @â • t 9.



Figure 12. Kubernetes Workload bC - Daemon Set

ECS

AWS: ECS\$ Task (Kubernetes Pod2 b`)2 N/W, Replica Set—L 3O~ • t \$ ServiceD mn o9.
 ECS: Service' mn * \$ Task Instance5 6. Load BalancingA 1) ELB • ' \$ 2) Service Discovery
 • QD EF~ • t9. ELB • A Service O: 5# ELB' sO*— 3O~ • t9. Service Discovery
 • A ECS #{ | : Task Instancer ° nG• # Service5 3Oo DNS †@QD Amazon Route 535
 H» —ž*— †' †@. Load BalancingL EF* \$ • †9. ÆÉ ñvA5 : . É* > BC†D
 ' " 5 xy #{ | r dÇG-Í E1GFyC Route 53 p| G) } † âž ' " D bsGáD
 VPC? É5# u #{ | : ' " ' %PQD DNSD `` / † o9. Route 53A Namespace, Task IPB A
 ...H\$ > †' IP+ UñB SRV ...H\$' ° n*— Service5 `` / o9.

ECS Î - mn - 1

```
¥ Namespace Ð " I | J † | $ ñvAL yýG~ 6' C²e †@(K: internal, local, corp)L
sO. 9." I | J † | $ #DLMr=*j m™Gf ô * $ #{ | %o: > i \ ^©†9.

¥ Service Ð #{ | $ " I | J † | „ 5 UVo 2¥i 3†<: Set†9. #{ | 5$ #{ |
e | ä | (Task)r UVGf t9.

¥ Task Ð Kubernetes: PodS b` . ObjectD &Û ' $ +• Æ: Container' *Í : InstanceD
œ• ³ *— hi * ¼ Container Instance: Image / ] ^3O / Entry Point— L 3O~ • t9.
```



Figure 13. ECS Service Discovery

Container BCD E F" GH

LENA: () · S h(o u] ^û: PnL Oi * • 9RS T 9.

Container : ; < =		5I N/WJ K	L/BLM	Instance ; N"	* 6 O\$	5I Volume P7
Kubernetes %&	Û&	r =	Service L/BS ^a	s ^a	s ^a	s ^a
	EKS	VPC? k¿	Service, ELB'' /	s ^a	s ^a	s ^a
Docker %&	ECS	VPC ? k¿ (VPC N/W Æ\$)	ELB, Service Discovery s ^a	s ^a (Service Replica=1)	s ^a (Service Discovery)	s ^a (EFS)

2.2.2. LENA Server QRE : ; ST

Ä Pn5 x y Container] ^S LENA ServerbcB s^a r =. () · S A 9RS T 9.

Container : ; < =		WEB Server	WAS	Session Server	Manager
Kubernetes %&	Û&	Container	Container	Container (statefulset), VM/Host	Container (statefulset), VM/Host
Docker %&	ECS	Container	Container	VM, Container	VM, Container

2.3. , J * A3%

9RA Server bc5 h©* † Fk\QD N_7ô ~ - 1†9.

2.3.1. OS

LENA Image %PQD 9RS TA OS' ` @. 9. † \$ LENA ImageOS¼ ` @G\$ Base Image† 9.

LENA Image +, OS	LENA ImageU Base Image
Cent OS 7	centos:7



Cent OS 8, Ubuntu, Debian — P OS' ` @~ ^ý LENA %8sª L k 7# Base Image' Ě° n7ô . 9.

2.3.2. JDK

LENA Image' %PQD OS%! JDK 1.8 (yum / apt-getQD 34) ' \$ Adopt Open JDK 1.8L 34 ` @. 9. 34 QXs >] ^İ • \$ 9RS T9.

OS	JDK ' (
Cent OS 7	¥ 34 QXs : java-1.8.0-openjdk-devel.x86_64 ¥ JAVA_HOME : /usr/lib/jvm/java

P JDK' ` @~ ^ý, Project@ Base Image° n¼5 34r r =* Í JAVA_HOME: Path\$ r - \ %¶S » Û*j 34* \$ êL ±N. 9.



\$JAVA_HOME] ^İ • çA u Server: env.sh (manager: ^ý env-manager.sh), LENA 34 Og ({LENA_HOME}/etc/info/java-home.info)5 % ÚÇGf t QáD, JDK Ě34¼5\$ \$JAVA_HOME5 RCž %¶ ØÛ Og • O† , - * 9.

2.3.3. VW User

LENA Image %P ^€ User\$ ŕrootŕ †9. †' İ ^* NH * \$ ^ý LENA Image' İ ^* – ô * ¼ LENA %8sª L - w* – İ ^* – ô . 9.

2.3.4. Library

LENA: Image5 34Gf t \$ Library\$ 9RS T9.

Library	XY	OSE Z X[I	Z X Server
net-tools	wget— N/W bSi T	(F k \ @)	(F k \ @)
hostname	Hostname d e @	CentOS	(F k \ @)
initscript	Service (Daemon) m» @	CentOS	(F k \ @)
procps	Process h (bSi T	CentOS	(F k \ @)
unzip	Server 3OØÛ UE 7 E @	(F k \ @)	(F k \ @)
file	File UV ° L @	(F k \ @)	(F k \ @)
curl	ØÛ 9(D\$ @	Ubuntu / Debian	(F k \ @)
cronie-noanacron	Crontab m» @	CentOS	(F k \ @)
logrotate	WEB/WAS: File Log Rotate Z i @	(F k \ @)	(F k \ @)
libxml2-utils	XML Validation @ (License ØÛ Validation)	Debian	(F k \ @)
locales	Locale 3O @	Ubuntu / Debian	(F k \ @)
libapr1	Web Server ` @ Library	Ubuntu / Debian	(F k \ @)
libaprutil1	Web Server ` @ Library	Ubuntu / Debian	(F k \ @)
tzdata	Time Zone 3O	Ubuntu / Debian	(F k \ @)
openssl	Web / WAS ` @ Library	(F k \ @)	(F k \ @)
awscli	Manager5# EKS API p5 @	(F k \ @)	Manager
pip			

2.4. Server QRE * A 3% Ð Manager

2.4.1. \]

Manager: xU\$ Container ' \$ VM/Host xU ÆW r = * N, æ · , L \ @ * % Ä. Eß` aA 9RS T 9.

1. NO Domain ' \$ IP Î 1 ~'

Container5 34o Serverr 3O ØÛ/y t, | 9(D\$ > Æ• Ž• Og' Ä¿ * áD, sÐ\ e
#{ | ' Ä7# ĚÉG/Ě° n ö5C NOo Î 1 D #{ | r Gf ô V.

2. Server ý Manager % N/Wk¿

Manager 9(D\$ #{ | ` @ > Æ• Ž• Og EFL Ä. &· ú k¿ t , - . %! 3O %PQD
TCP Port 7700, UDP / TCP Port 16100 ØÐ† X@Gf ô V

3. Persistent Volume

Container5 34o Manager: ^ý È%» ö5C #{ | `` ÐnL EF*% Ä7 DB, 3OOg, Æ• Ž• " †Ž—L ÚÇ~ • † \$ ÂÉ Volume† , - . NFS, EBS Disk, Local Node Disk—L Å@. Persistent Volume' dg* N, Manager Container5 ~' * - ` @

4. Instance) Ðn gÇ

Manager: Instance\$ #{ | `` Ðn EFL Ä7 Instance) ÐnL gÇÁWô . 9. Û& VM /Host\$ %! \QD) ÐnL gÇ*sµ, Container] ^5#\$ Kubernetes: StatefulSetZ\$) ÐnL gÇ*\$ \$· , QD xUGf ô V

\] ST	+ ^(_#) 3%
Container x U	¥ Persistent Volume ¥ Server ý Manager % N/W kç (TCP Port 7700, UDP/TCP Port 16100) ¥ NO C² e ' \$ NO IP ~' ¥ Container) Ðn gÇ
VM/Host 34	¥ Server ý Manager % N/W kç (TCP Port 7700, UDP/TCP Port 16100) ¥ NO C² e ' \$ NO IP ~'

2.4.2. 3`

Manager Server' () *% Ä7# , - . ` æA 9RS T9.

Memory

Manager Server: Heap Memory Size\$ å1 512Mbyte' , - D * N Image5\$ 9RS T† %! 3O† Gf t9.

¥ Heap Memory : 1024 Mbyte

¥ Metaspace Memory : 256 Mbyte

†' İ ^* NH * • 9R] ^İ • ' 3O*— ¢O . 9.

¥ LENA_JVM_HEAP_SIZE

¥ LENA_JVM_METASPACE_SIZE

!

Ä] ^ İ • : çA MByte&Ä† ¼ &§¾ YH+ôm c " : UV (K : 1024m) c , QD sOGf ô . 9. UV† ZÜ4 * • \@Gs ½\$9.

Disk

LENA Image %POD ` @G\$ Image è%\$ B 1,000 MbyteD † \$ OS + JDK + LENA + Library: [I QD Image: ' Ä Layer @\] s UV. @\†9.

—%5 →r \QD N_7ô ~ Disk@\A 1) Manager Log ØÛ @\S 2) Repository (DB > ØÛÚÇ1) †9. Manager5# ` @G\$ Repository : Ä4\$ \${LENA_HOME}/repository† N, 5GB OC: @\L , - D . 9. æi N, Container5 34â ^ý5\$ † Repository\$ Persistent Volume5 `` / * — ContainerÄÉ5 ÚÇ*—ô . 9.



Manager5# `@G\$ Repository : Ä4\$ \${LENA_HOME}/repository†N,
Container Ê%»¾45C hi "†Ž: sĐnL Ä7 Container5 34â ^ý5\$
Persistent Volume5 ``/* – ContainerÄÉ5 ÚÇ*%' ±N. 9.

2.4.3. ' 6

abcd

- 1. " ñ#èÎ 1
Manager\$ &§¾ NO Domain ' \$ IPÎ 1' ~' * – ô . 9. (! " # xUMÇ)
- 2. #{ | Uñ
Manager: #{ | Uñ\$ 9RS T† NOGf t9.
[Http (TCP) Port 7700: kI hi #{ | > Rest API #{ | EF
[UDP Port 16100: Ē• Ž• "†Ž• 1
[TCP Port 16100: Thread / Service Dump "†Ž ° n / • 1

ÊUñ\$ LENA Manager Image5 NOGf tN, Ĩ ^L *NH *\$ ^ý
LENA Image Ĩ ^g9\$ Container: %! 3O ` ' 5 xy Port MappingL
Ĩ ^~ êL ±N. 9.



LENA Manager: Service Uñ Ĩ ^A P Server2: ``» Port Ĩ ^L : î *¼,
Ĩ ^¾45\$ ``» Gf t\$ Ē8 Server: 3OL Ĩ ^/Ë¾±L , - D . 9.

<=ef

Manager Container5 \@ r =. Î -] ^İ • \$ 9RS T9.

<=ef	' (	. / g	e=hi
LENA_JVM_HEAP_SIZE	¥ Heap Memory è% sO	1024m	^
LENA_JVM_METASPACE_SIZE	¥ Metaspace Memoryè%	256m	^
LENA_MANAGER_DOMAIN_ENABLED	¥ Domain Name ÄnÛ – É ¥ 0Y0' \$ 0N0	Y	^
LENA_MANAGER_ADDRESS	¥ ÄÉD 45G\$ (Serverû† e , * \$) Manager Î 1 ¥ c , : IP / DomainÎ 1 :#{ | Uñ K) Kubernetes: ^ý : Service Domain		^
JAVA_DOMAIN_CACHE_TTL	¥ Domain Î 1 Cache ¾4% (Ä)	3	^
LENA_SERVER_TYPE	¥ Server bc	manager	–

<=ef	' (	. / g	e = hi
LENA_HOME	¥ LENA 3 4 Ä 4	/usr/local/l ena	_
LENA_JVM_OPTIONS	¥ ` @H O: JVM OPTION		^
LENA_USER	¥ Manager %» 5 ` @~ OS ` @H©O	root	^
LENA_USER_GROUP	¥ Manager %» 5 ` @~ OS ` @Hœ•	root	^



JAVA_DOMAIN_CACHE_TTL ç† 3OG` L ¾
\${JAVA_HOME}/jre/lib/security/java.security ØÙ: networkaddress.cache.ttl ç L
İ ^ . 9.

Directory ! j

LENA Image %P %! 3 4 Ä 4\$ '/usr/local/lena' † N, œ * Ä m¢\$ 9RS T 9.

k l mn (\${LENA_HOME} op)	' () *
bin	Manager: Start/Stop scripts	
depot	3 4' Ä. Local Repository	
etc	%P ² P Og > 3O ØÙ	
license	License Og' hi * \$ a b c i	
logs dlena-manager	Dœ ØÙ ÚÇ1 Home Manager LogØÙ ÚÇ1	
modules d lena-manager	LENA E F ÆÈ: ÚÇ1 Home lena-manager ^ €5 , - . ÆÈ† Ä4* \$ ^ D	
repository dbackup dconfig dcontainer ddatabase dlicense dmonitoringDB dresource dtemplate	Manager" † Ž ÚÇ1 Home e ´ " † Ž ÚÇ1 Manager 3OOg ÚÇ1 Container 3OOg ÚÇ1 Manager " † Ž f † | ÚÇ1 y† , | ØÙ ÚÇ1 Æ• Ž• " † Ž ÚÇ1 Resource ´ D\$ ØÙ ÚÇ1 Server 3O Template ÚÇ1	Container5# ÂÉ øg ` @ ±N
tmp	I ¾a b c i	

Log & Dump q r

Log > Dump\$ Standard Out / ErrorD 5i * \$ 'console' · S FileD 5i * \$ 'file' · † sª GN,
] ^İ • 'LOG_OUTPUT_TYPEØ: ç L 'console' ' \$ 'fileØD 3O VQD# 5i · L ;] ~ • t 9.

1. Console 5i

Û&\QD Container] ^5# h† Å@G\$. ¸ †9. Manager: Application Log, Access Log, GC Log' ÆW Standard OutQD 5j . 9. Docker5 3Oo Log Driver5 : 7 Node(Host): sOÄ4 (%! Ä4 : /var/lib/docker/containers/[container-id]/[container-id]-json.log)5 ÚÇG- Í FluentD2 TA Log Aggregator5 : 7 • 1 / ÚÇ* – kl hi ' ~ • t9.

2. ØÙ 5j

ØÙ 5j 3O ¾ LogØÙ > Dump ØÙA \${LENA_HOME}/logs/lena-manager* Ä5 Daily Rolling . ¸ QD ÚÇo9. ÚÇo ØÙA %! 3O5 xy å p %ž os30Ù †' ^So LogØÙL I Û ÿÉ. 9.

† . ¸ A Managerr VM/Host] ^5# () G- Í Manager Log' BCD • 1 * s ½\$] ^5# ` @~ • t9.

Health Check

Health Check\$ Kubernetes' %PQD 3Ü. 9.

Health Check\$ %» ¾ Container: #{ | P{ – É' i &* \$ 1) Readiness Probe2 (@ù O' \e #{ | – É' <è * \$ 2) Liveness Probe, œi N Application ¾‡ – É' i &* \$3) Startup Prober t9.

! -	XY
Readiness (Probe)	%» ¾°, BC†Dr - wL Zi ~ P{ r G` \$s – É
Liveness (Probe)	() ¾°, BC†Dr O' » ‡ ùes – É
Startup (Probe)	BC†D?: 2¥i 3†< † ¾‡ G` \$s – É

Check . ¸ (Action)5\$ 9R 3r s bc† t9.

! - (Action)	ST
TCP Socket (TCPSocketAction)	Port k¿ – É D Health Check
Http URL Query (HTTPGetAction)	URL p5 / S H§ D Health Check
Exec ^ € (ExecAction)	Container ? É: ÜÝf ^ € QD Health Check

Manager' Health Check * \$. ¸ A URL <è . ¸ L ` @* ¼, Readiness2 Liveness Probe' \@. 9. %! 3OA 9RS T9.

1. Readiness Check

```
[ httpGet : path /lena, port 7700
[ initialDelaySeconds : 5
[ periodSeconds : 5
```

2. Liveness Check

```
[ httpGet : path /lena, port 7700
[ initialDelaySeconds : 20
[ periodSeconds : 5
```

2.5. Server QRE * A 3% Ð Session Server

2.5.1. \]

Session Server: xU\$ Container ' \$ VM/Host xU ŒW r =* N, æ · , L \@* % Ä. Eß` aA 9RS T9.

1. NO Domain ' \$ IP Î 1 ~'
Session Server \$ 2Ä: Container 5 Cluster D mno9. u Session Server\$ ' 6j Session Server : Domain / IP' Mirror Server OgD e , * – Session Og' »%Û * áD, sÐ\ e #{ | ' Ä7# ĚÉG/Ě° n ö5C NOo Î 1D #{ | r Gf ô V.
2. Instance) Ðn gÇ
Session: Instance\$ #{ | `` Ðn EFL Ä7 Instance) ÐnL gÇÁWô . 9. Û& VM /Host\$ %! \QD) ÐnL gÇ*sµ, Container] ^5#\$ Kubernetes: StatefulSetZ\$) ÐnL gÇ* \$ · , QD xUGf ô V

\] ST	+ ^(_#) 3%
Container xU	¥ NO C² e ' \$ NO IP ~' ¥ Container) Ðn gÇ
VM/Host 34	¥ NO C² e ' \$ NO IP ~'

2.5.2. 3`

Session Server' () * % Ä7# , - . ` æA 9RS T9.

Memory

Session Server: Heap Memory Size\$ å1 1024Mbyte' , - D * N Image5\$ 9RS T† %! 3O† Gf t 9.

¥ Heap Memory : 1024 Mbyte

†' İ ^* NH * • 9R] ^İ • ' 3O* – ¢O . 9.

¥ LENA_JVM_HEAP_SIZE

!

Ä] ^ İ • : çA MByte&Ä†¼ &§¾ YH+îmîc " : UV (K : 1024m) c , QD sOGf ô . 9. UV† ZÛ4 * • \@Gs ½\$9.

Disk

LENA Image %PQD ` @G\$ Image è%\$ ß 800 MbyteD † \$ OS + JDK
LENA + Library: [I QD Image: ' Ä Layer @\] s UV. @\ †9.

– %5 –r \QD N_7ô ~ Disk@\A Session Server Log ØÛ †9.

' 6

abcd

1. " ñ#è Î 1
Session Server\$ &§¾ NO Domain ' \$ IP Î 1' ~' * – ô . 9. (! " # xU· , M¢) WAS

> Secondary Session Server5# NOo Î 1 D Session Ogr k¿ o9.

2. #{ | Uñ
Session Server: #{ | Uñ\$ 9RS T† NOGf t9.

[Http (TCP) Port 5180*: Session ¢E > hi Uñ

Ä Uñ\$ LENA Image5 NOGf tN, Ĩ ^L *NH *\$ ^ý LENA Image Ĩ ^g9\$
Container: %! 3O ` ' 5 x y Port MappingL Ĩ ^ ~ êL ±N. 9.

!

Session Server: Service Uñ Ĩ ^A P Server2: `` » Port Ĩ ^L : î *¼,
Ĩ ^¾45\$ `` » Gf t \$ Æ8 Server: 3O Ĩ ^ / Ê¾±L , - D . 9.

<=ef

Session Container5 \@ r =. Î -] ^Ĩ • \$ 9RS T9.

<=ef	' (	. / g	e = hi
LENA_JVM_HEAP_SIZE	¥ Heap Memory è% sO	1024m	^
LENA_MANAGER_ADDRESS	¥ ÃÉD 45G\$ (Serverû† e_ * \$) Manager Î 1 ¥ c_ : IP / DomainÎ 1 : #{ | Uñ K) Kubernetes: ^ý : Service Domain		^
LENA_CONFIG_TEMPLATE_ID	¥ Service Cluster Ü : Revision No		^
JAVA_DOMAIN_CACHE_TTL	¥ Domain Î 1 Cache ¾4% (Ã)	0	^
LENA_SESSION_0_ADDRESS	¥ Primary Session #O Î 1, StatefulSet3OS Ü4Gf ô V		^
LENA_SESSION_1_ADDRESS	¥ Secondary Session #O Î 1, StatefulSet3OS Ü4Gf ô V		^
LENA_SECONDARY_SESSION_NO	¥ LENA_SESSION_0_ADDRESS / LENA_SESSION_1_ADDRESS ù mirror #OD ` @~ Og , f (0,1 µ k i r =)		^
LENA_SESSION_EXPIRE_SEC	¥ Session µI ¾4% (Ã)	1800	^
LENA_CONFIG_SHARE_SESSION	¥ Application %o Session F b – É ¥ 0Y0' \$ 0N0 Ç X@	N	^
LENA_SERVER_TYPE	¥ Server bc	session	—

< = e f	' (	. / g	e = hi
LENA_HOME	¥ LENA 3 4 Ä 4 ¥ %! Ç : /usr/local/lena	(3 ÜMÇ)	–
LENA_SERVER_HOME	¥ Session Server 3 4 Ä 4 ¥ %! Ç : /usr/local/lena/server/sessionServer	(3 ÜMÇ)	X
LOG_OUTPUT_TYPE	¥ Dœ 5j . _ (file/console)	console	^
LENA_AGENT_RUN	¥ LENA Agent %» – É	N	^
LENA_USER	¥ Manager %» 5 ` @ ~ OS ` @H©O	root	^
LENA_USER_GROUP	¥ Manager %» 5 ` @ ~ OS ` @Hœ•	root	^



JAVA_DOMAIN_CACHE_TTL † 3OG` L ¾
\${JAVA_HOME}/jre/lib/security/java.security ØÛ: networkaddress.cache.ttl Ç L
İ ^ . 9.

Directory ! j

LENA Image %P %! 3 4 Ä 4\$ Øusr/local/lenaØ † N, œ * Ä mÇ\$ 9RS T 9.

k l mn (\${LENA_HOME} o p)	' () *
bin	Session Server: Start/Stop scripts	î ` @
depot	3 4' Ä. Local Repository	î ` @
etc	%P ² P Og > 3O ØÛ	
license	License' hi * \$ a b c i	
modules	LENA E F ÆÈ: ÚÇ1 Home	
servers/sessionServer dlib dlogs	Session Server 3 4 Ä 4 (\${LENA_SERVER_HOME}) Session Server Library ÚÇ1 Log ØÛ ÚÇ1	
tmp	I ¾a b c i	

Log

Session Server\$ File Log 5j µ EF. 9. 5j Ä 4\$ \${LENA_SERVER_HOME}/logs a b c i † ¼
ØÛÜ c _ A lena-sessionServer-YYYYMMDD.log QD I Û Log ØÛ† ° n o 9

Health Check

Health Check: %! ?@A ! " # [Manger Health Check](#) É Ê L MΦ. 9.

Kubernetes %P Session Server' Health Check * \$. A Command Exec (ExecAction) . † ¼, \${LENA_SERVER_HOME}/ health.sh' p5. 9.

1. Readiness Check

```
[ exec : ${LENA_SERVER_HOME}/ health.sh
[ initialDelaySeconds : 20
```

2. Liveness Check

```
[ exec : ${LENA_SERVER_HOME}/ health.sh
[ initialDelaySeconds : 30
[ periodSeconds : 5
```

2.6. Server QRE * A 3% Ð WAS

2.6.1. \]

WAS\$ Container5 × UG¼, 3O5 × y Container ¥ÕÖ (Kubernetes, ECS—)5 &Û ' \$ + • Å: Instancer » ¾5 × Uo9.

1. Service ©m

WAS \$ &Û/+• Å: ContainerD × UGN, †' ÅÉÍ Front-End5 Service* % Ä7#\$ + &5 L/B} ~L • €* \$ Service' ×4* \$ ê† Û&\e . † 9. Kubernetes: ^ý5\$ 34o Node: pO PortD #{ | * \$ NodePort, ÅÉ L/B' Å@* \$ LoadBalancer, ?É NO IP' sO* \$ ClusterIp: #{ | bc† EFGN tQ¼, ECS: ^ý5\$ ALB' sO* \$. † t9. ` ; 5 ApplicationL fn. . QD Service~s ` ; /O† , - *9.

2. Instance • (Replica)

&Û Service' * \$ + • Å: WAS: • \$ É* 5 × y rĭ \†Í , Ã% %» 7ô ~ Instance Å• ' ` ; 5 O: *- , ×U 3O5 &) *-ô . 9.

3. Service Mapping

ECS: ^ý5\$ Service5# ÑÒ L/B' sO~ • t sµ, Kubernetes: ^ý5\$ Key-ValueD O: o labelL %PQD Mapping oL O: *- Service2 I ³. 9. ; < ¾| æ ' 5# ù+* N, () 5 j i . Mapping %PL • p*- ×U 3O5 &) *-ô . 9.

2.6.2. 3`

WAS' () * % Ä7# , - . ` æA 9RS T9.

Memory

WAS: Heap Memory Size\$ å1 512Mbyte' , - D * N Image5\$ 9RS T† %! 3O† Gf t9.

¥ Heap Memory : 1024 Mbyte

¥ Metaspace Memory : 128 Mbyte

†' ĩ ^* NH * • 9R] ^ĭ • ' 3O*- ΦO . 9.

¥ LENA_JVM_HEAP_SIZE

¥ LENA_JVM_METASPACE_SIZE

!

Ä] ^ Ĩ • : ¸ A MByte&Ä†¼ &§¾ YH+ĭmĭc" : UV (K : 1024m) c , QD s OGf ô . 9. UV† Z Û4 * • \ @Gs ½\$9.

Disk

LENA Image %PQD ` @G\$ Image è%\$ ß 900 MbyteD † \$ OS + JDK + LENA + Library:
[I QD Image: ' Ä Layer @\] s UV. @\ † 9.
() 5 , - . -r \ e Disk\$ Log' ØÛ . , QD ÚÇ~) Log@\S Application 1 | ØÛ
(Artifact): @\ L N_ * – ü O. 9.

2.6.3. ' 6

abcd

1. " ñ#è Î 1
WAS: " ñ#è Î 1\$ ÞB. Eß† * 9. N/W' 5# Manager2 Session Server' \ s D * \$
&· ú k ç r = * CŽ x 4 7 ô . 9.
2. #{ | Uñ
WAS: #{ | Uñ\$ 9RS T† NOGf t 9.

[HTTP #{ | Port : 8180
Ä Uñ\$ LENA Image5 NOGf t N, ÂÉ #{ | Ĩ ^ L * NH * \$ ^ý LENA Image Ĩ ^ g 9\$
Container: %! ` ' 5 xy Port qer 3OL k 7 Ĩ ^ ~ ê L ± N. 9.

<=ef

WAS Container5 \ @ r =. Î -] ^ Ĩ • \$ 9RS T 9.

<=ef	' (	. / g	e=hi
LENA_SERVICE_PORT	¥ WAS #{ | Port	8180	^
LENA_JVM_HEAP_SIZE	¥ Heap Memory è% s O	1024m	^
LENA_JVM_METASPACE_SIZE	¥ Metaspace Memoryè%	128m	^
LENA_JVM_OPTIONS	¥ ` @H O: JVM OPTION		^
LENA_MANAGER_ADDRESS	¥ Manager Î 1 ¥ c , : IP / DomainÎ 1 : #{ | Uñ		^
LENA_MANAGER_MONITORING_PORT	¥ Manager Ĳ • Ž • Port Og	16100	^
LENA_MANAGER_KEY	¥ Manager Open API ÒĐ c s		^

< = e f	' (	. / g	e = hi
LENA_CONFIG_TEMPL ATE_DOWNLOAD	¥ ManagerDÉ Ž 3O ØÙ 9(D\$ – É ¥ X@Ç : Y' \$ N		^
LENA_CONFIG_TEMPL ATE_ID	¥ 3O ØÙ ID ¥ c , : Service Cluster Ü:Revision t p		^
LENA_LICENSE_DOWN LOAD_URL	¥ License 9(D\$ URL ¥ k i Ç : manager ' \$ Nu` gbLicense9(D\$ URI	manager	^
LENA_CONTRACT_CO DE	¥ License - S h(o ©ß H\$D v p Û o Ç I .		^
JAVA_DOMAIN_CACHE _TTL	¥ Domain Î 1 Cache ¾% (Ã)	3	^
LOG_OUTPUT_TYPE	¥ LOG 5j b c ¥ X@ Ç : console ' \$ file	console	^
LENA_LOG_OUTPUT_DI R	¥ Log ØÙ ° n Ä4	/usr/local/l ena/server s/appServ er/logs	^
LENA_DUMP_OUTPUT_ DIR	¥ Dump ØÙ ° n Ä4		^
LENA_SERVER_TYPE	¥ Server b c	WAS	—
LENA_HOME	¥ LENA 34 Home ¥ Ç : /usr/local/lena	(3ÜMΦ)	—
LENA_SERVER_HOME	¥ LENA #O 34 Ä4 ¥ Ç : /usr/local/lena/servers/appServer	(3ÜMΦ)	—
LENA_SERVICE_ENDP OINT	¥ WAS r Ð. #{ | : Î 1		^
LENA_AGENT_RUN	¥ LENA Agent %» – É	N	^
LENA_USER	¥ Manager %» 5 ` @~ OS ` @H©O	root	^
LENA_USER_GROUP	¥ Manager %» 5 ` @~ OS ` @Hœ•	root	^

<=ef	' (	. / g	e = hi
LENA_HEALTH_CHECK	¥ Health Check • €– É	N	^
LENA_HEALTH_CHECK_WAS_URL	¥ Health Check @ J † s Og	/tie/lenaHealthCheck.jsp	^
LENA_HEALTH_CHECK_INITIAL_DELAY_MILLI SEC	¥ LENA Agent %» † Ö Health Check ¾± ; 6%¾%, Server %» ¾%L dg * % ÄV	60000 (milliseconds)	^
LENA_HEALTH_CHECK_TIMEOUT_MILLI SEC	¥ Health Check - w Timeout	5000 (milliseconds)	^
LENA_HEALTH_CHECK_FAILURE_THRESHOLD	¥ Health Check ^ Q I ©4	5	^
LENA_HEALTH_CHECK_TERM_EXECUTION	¥ Health Check ^ Q I ©4 ÄS¾, öÐ± ´ • €– É	true	^
LENA_HEALTH_CHECK_TERM_EXECUTION_SCRIPT	¥ Health Check ^ Q I ©4 ÄS¾, öÐ± ´ script Og	stop-container	^
LENA_HEALTH_CHECK_TERM_EXECUTION_INTERVAL	¥ Health Check ^ Q I ©4 ÄS¾, öÐ± ´ • € Î %	300 (seconds)	^

!

- ¥ LENA_CONFIG_TEMPLATE_ID: Revision t p\$ ° wr = * ¼, ° w¾ Default Revision 9(D\$ o9.
- ¥ LENA_CONTRACT_CODE: License b x n <è5 ` @GN, † ç † b x * s ½L ^ý y †, | 9(D\$ r • 1 o9.
- ¥ JAVA_DOMAIN_CACHE_TTL: † ç † 30G` L ¾ \${JAVA_HOME}/jre/lib/security/java.security ØÙ: networkaddress.cache.ttl ç L İ ^ . 9.
- ¥ LOG_OUTPUT_TYPE: Server 30ØÙ 9(D\$ \ @¾ 9(D\$. 30 ØÙ: Log30† \ @o9.

Directory ! j

LENA Image %P %! 3 4 Ä4\$ Øusr/local/lena† N, œ * Ä m¢\$ 9RS T 9.

k l m n (\$ {LENA_HOME} op)	' () *
bin	Node Agent: Start/Stop scripts	î ` @
depot	3 4' Ä. Local Repository	î ` @
etc	%P º P Og > 30 ØÙ	

klmn (\${LENA_HOME} op)	' () *
license	License Og' hi * \$ abci	
logs	LENA hi @ Dœ ØÙ ÚÇ1	
modules	LENA EF ÆÈ: ÚÇ1 Home	
clena-agent	Node Agent ^ €5, -. ÆÈ† Ä4* \$ ^D	î ` @
servers/webServer	Server 34 Home, \${LENA_SERVER_HOME}	
dbin	Server Start / Stop / hi @ ^ € Script ÚÇ1	
dconf	Server 30Og ÚÇ1	
ddumps	Dump ØÙ ÚÇ1	
dhook	Life-Cycle Hook Shell ØÙ ÚÇ1	
dlib	Server ^ € Library ÚÇ1	
dlogs	Log ØÙ ÚÇ1	
dtemp	‡ ´ @ l ¾ abci	
dwebapps	%! Application Deployment abci	
dwork	JSP Servlet Ĩ] 1 | > yØÙ / S ÚÇ1	
tmp	LENA hi @ l ¾ abci	

Log & Dump q r

Log\$ Standard Out / ErrorD 5j * \$ {console} . S FileD 5j * \$ {file} . ‡ s^a GN,] ^İ •
LOG_OUTPUT_TYPE0: Ç L {console} ' \$ {file}D 3O VQD# 5j . L ;] ~ • t9.

1. Console 5j

Ù&\QD Container] ^5# h† Å@G\$. ‡ t9. Server: Application Log, Access Log, GC Log' ÆW Standard OutQD 5j . 9. Docker5 3Oo Log Driver5 : 7 Node(Host): sOÄ4 (Docker: %! Log ØÙ Ä4 : /var/lib/docker/containers/[container-id]/[container-id]-json.log)5 ÚÇG- Í FluentD2 TA Log Aggregator5 : 7 • 1 / ÚÇ* – kl hi ' ~ • t9.

2. ØÙ 5j

ØÙ 5j 3O ¾ LogØÙ > Dump ØÙA \${LENA_HOME}/servers/appServer/logs abci * Ä5 ØÙD ÚÇGN, u Log ØÙA logrotate3O5 : 7 Daily rolling o9.
5j G\$ Log ØÙ: bcS 5j ØÙÜA Wv ~ 2 T9.

Log QR	qr ps
Access Log	access_appServer_\${HOSTNAME}.log
GC Log	gc_appServer_\${HOSTNAME}.log
Application Log	appServer_lena-\${HOSTNAME}.out.log

† LogØÙÜA Guest OS5 34o logrotate5 : 7 l Ù Rolling o9.

ØÙ %& Log' 5j ~ ^ý, BC: Log Aggregator' k 7 Log' • 1 / Ç£* \$ Loghi Stack (ELK, EFK Stack—)L mn * \$ ê† Ù&\†9. ‡' Ä7# \$ Fluent-BitS T ASide-car Container' →r * –

Log' • 1 * \$ · ¸ † Û&\† 9.

DumpØÛA 9R Ä45 ° n o 9.

¥ Dump Home : \${LENA_HOME}/servers/appServer/dumps/ \${HOSTNAME}
\${HOSTNAME} a b c i \$ ÄÉ VolumeQD DumpØÛL ÚÇ~) ContainerB mÊL Ä. ê† 9.
Dump b c B ÚÇ Ä4\$ 9RS T 9.
¥ Heap Dump : \${DUMP_HOME}/hdump
¥ Thread Dump : \${DUMP_HOME}/tdump
¥ Service Dump : \${DUMP_HOME}/sdump

Health Check

Health Check: %! ?@A ! " # [Manager Health Check](#) ÉÊL M¢. 9.
Û&\QD WAS\$ Http Get· ¸ QD Health Check * sµ, LENA WAS: %! Health Check· ¸ A TCP
Port <è· ¸ QD 3OGf † 9. †\$ %! LENA Image5 Business Applicationr z ĚGs ½{ %
) " †N, Biz Application† z ĚG`L ^ý5\$ 7' Application: \ō. Http Get Health Check
3OL ´" †ñ * %' ±N. 9. EF Kubernetes Manifest ØÛ %P %! 3OA 9RS T 9.

1. Readiness Check
- [TCPSocketAction : port 8180
[initialDelaySeconds : xx (Application Þn5 xë gO , -)
[timeoutSeconds : xx (Application Þn5 xë gO , -)
2. Liveness Check
- [TCPSocketAction : port 8180
[initialDelaySeconds : xx (Application Þn5 xë gO , -)
[periodSeconds : xx (Application Þn5 xë gO , -)

!

¥ LENA WAS: ^ý Server: O' %» ö5 Service Portr Listen ' " D Ĭ ^o 9.
¥ Health Check' Ä. Page\$ Checkr nF * • O' \QD #{ | r EFG\$
êQD i &*j GáD, #{ | : Back-end (K : Database)] s O' \es'
i &~ • t \$ Page' , O* – \@* %' ±N. 9.

Server Configuration t n

Container2 WASr %» G\$ õ¹ \$ 9RS T 9.
Û&\QDServer 3OA WASr %» G% ; 5 \@Gf ô * ¼, 3OL \@* \$ ¾° A 1) Base Image5
UV* - Í 2) Container%» ¾° 5 &) * \$ · 6 3) Application Artifact5 UV* \$ · ¸ † t 9.

' 6 ZX ST	' (	LENA . i LM
Base Image5 UV	Base Image ° n¾5 3OOg' COPY* – Image5 UV	^

' 6 Z X S T	' (	LENA . i L M
%» ¾° 5 &)	Container %» ¾, ÂÉ Repository5# 3O Og' COPY	^
Application Artifact5 UV	Spring Boot: ^ý2 T† Application Artifact5 Server3O Ogr %1Û Gf UVGf Application Artifact: xU2 V| \@	^ WAS(Embedded) ' k 7 E F

LENA5# \$ Manager' k 7 î i mn. Server 3OOg' Image Build¾° †Í , Container%» ¾° 5 &) ~ • t N , †' Ä7#\$ Application / WEB Server Container mn†; 5 Manager' 34* N, Server 3OOg' mn* – ô . 9.†' C, Û * • 9RS T9.



Figure 14. Service Cluster 3Ohi > Container 3O \@

LENA: Server Cluster %=L †@* – Server: 3OL î i mn* N, †' Image ' \$ %» ¾° 5 &) * – ô . 9.

Server 3O5 6. ' Š r †\$ \$ B C D E F G \$ () H I J K L M ¢. 9.

Container Image Build

LENAr Base Image' EF* sµ Project / Nu` O} ' \$ Architecture ~ P5 : 7 Base Image' ' Ð ' \$ ¿ ~D Build7ô * \$ ^ýr ° ~ • t 9. Architecture : ` / OSO5# LENA Image: Ĩ ^9Ä' de* N, Image hi O} / %P • p † , - * 9.

9RA ¿ ~D Base Image' Build7ô * \$ ª e † 9.

¥ OSr LENA %! EF Image2 Z Û4

¥ LENA 34 Ä4: Ĩ ^ (%! : /usr/local/lena)

¥ %P \@ ¾| ¨: Architecture ~ PS LENA EF %! Image: Z Û4 «¹ r] ^3O • O* \$ êµQD\$ Zr =

Ä ^ý5\$ LENA%8sª L k 7 Base Image' Ê° n * – ô . 9.

Wv K¾2 T† &• Ĩ ^† , - . ^ý, LENA Image' ' Ð* – Base Image' ° n (Build). 9.

¥ Application Artifact: × 4

¥ , - Library 3 4

¥ JDK Ĩ ^ (%¶ Image5:) ú†] ^Ĭ • • O • P † * Û ^ý)

¥ ^ € Command Script • O

¥ %P \ @ ¾ | ¨: Architecture ~ PS LENA EF %! Image: ZÛ4 «¹ r] ^ 3O • OµQD
r =. ^ý

' Š ^ € r † § \$! " # Base Image ° n É Ê L M ¢. 9.

Application \]

Container h° S Server h° 5#: Application Artifact ×U5 6. · ¸ L ŒW N_* – ô . 9.
Project5# ×U õ¹ r / OG• , Kubernetes Deployment ManifestĬ ECS: TaskO: ' / Oo · ¸ 5
xy 3O* – ô . 9.

WAS h° 5# ApplicationL Deployment* \$ · ¸ 5\$ 9R W r s r t 9.

Server t u \] ST	' (
%! Deployment a b c i 5 × U	\${LENA_SERVER_HOME}/webapps5 WAR ' \$ Directory' +`
ÄB Application 3O5 x ë × U	Manager' k 7 ÄB Application 3O Application3O ù (DocBase) Ä45 WAR ' \$ Directory' +`

Container h° 5#: Deployment · ¸ A 9R W r s t 9.

Container \] ST	' (
Î Container Image5 ` ; × U · ¸	Base Image5 Application Artifact' ÑÒ +` / UV
Init Container Å@ %» ¾° × U · ¸	Init Container5# ? É 5 UVo Artifact ' \$ ÂÉ ÚÇ1 (Volume)5 t \$ Artifact' %» ¾° 5 Î Container5 +`

2.7. Server QRE * A 3% Ð Embedded WAS

2.7.1. \]

Embedded WAS\$ Container5 ×UG¼, 3O5 xy Container ¥ÕÕ (Kubernetes, ECS—)5 &Û
' \$ +• Ä: Instancer »¾5 ×Uo9.

1. Service ©m

Embedded WAS \$ &Û/+• Ä: ContainerD ×UGN, †' ÂÉÍ Front-End5 Service* %
Ä7#\$ + &5 L/B} ~L • €* \$ Service' ×4* \$ ê† Û&\e · ¸ †9. Kubernetes:
^ý5\$ 34o Node: ÞO PortD #{ | * \$ NodePort, ÂÉ L/B' Å@* \$ LoadBalancer, ? É
NO IP' sO* \$ ClusterIp: #{ | b c † EFGN t Q¼, ECS: ^ý5\$ ALB' sO* \$
· ¸ † t 9.` ; 5 ApplicationL f n. · ¸ QD Service~s ` ; /O† , - * 9.

2. Instance • (Replica)

&Û Service' * \$ + • Ä: Embedded WAS: • \$ É* 5 xy r ĩ \ t Í , Ã% %» 7ô ~ Instance Ä• ' ` ; 5 O: * – , x U 3 O 5 &) * – ô . 9.

3. Service Mapping

ECS: ^ ý 5 \$ Service 5 # Ñ Ò L / B ' s O ~ • t s μ , Kubernetes: ^ ý 5 \$ Key-Value D O: o label L % P Q D Mapping o L O: * – Service 2 I ³ . 9. ; < ¾ | ¤ ' 5 # ù + * N , () 5 j i . Mapping % P L • p * – x U 3 O 5 &) * – ô . 9.

2.7.2. 3`

Embedded WAS' () * % Ä 7 # , - . ` æ A 9 R S T 9.

Memory

Embedded WAS: Heap Memory Size \$ å 1 512 Mbyte' , - D * N Image 5 \$ 9 R S T † % ! 3 O † G f t 9.

¥ Heap Memory : 1024 Mbyte

¥ Metaspace Memory : 128 Mbyte

† ' ĩ ^ * N H * • 9 R] ^ ĩ • ' 3 O * – ¢ O . 9.

¥ LENA_JVM_HEAP_SIZE

¥ LENA_JVM_METASPACE_SIZE

!

Ä] ^ ĩ • : ç A MByte & Ä † ¼ & § ¾ Y H + ĩ m ĩ c " : UV (K : 1024 m) c , Q D s O G f ô . 9. UV † Z Û 4 * • \ @ G s ½ \$ 9.

Disk

LENA Image % P Q D ` @ G \$ Image è % \$ B 700 Mbyte D † \$ O S + J D K + L E N A + L i b r a r y : [I Q D Image: ' Ä Layer @ \] s U V . @ \ † 9.

() 5 , - . - r \ e Disk \$ Log' Ø Û . , Q D Ú Ç ~) Log @ \ S Application 1 | Ø Û (Artifact): @ \ L N _ * – ü O . 9.

2.7.3. ' 6

abcd

1. " ñ # è Î 1

Embedded WAS: " ñ # è Î 1 \$ Þ B. E B † * 9. N / W ' 5 # Manager 2 Session Server' \ s D * \$ & • ú k ç r = * C Ž x 4 7 ô . 9.

2. #{ | Uñ

Embedded WAS: #{ | Uñ \$ 9 R S T † N O G f t 9.

[HTTP #{ | Port : 8180

Ä Uñ \$ LENA Image 5 N O G f t N , Ä É # { | ĩ ^ L * N H * \$ ^ ý LENA Image ĩ ^ g 9 \$ Container: % ! ` ' 5 xy Port q e r 3 O L k 7 ĩ ^ ~ ê L ± N . 9.

< = e f

Embedded WAS Container 5 \ @ r = . Î -] ^ ĩ • \$ 9 R S T 9.

< = e f	' (	. / g	e = hi
LENA_SERVICE_PORT	¥ WAS # { | Port	8180	^
LENA_JVM_HEAP_SIZE	¥ Heap Memory è % s O	1024m	^
LENA_JVM_METASPACE_SIZE	¥ Metaspace Memory è %	128m	^
LENA_JVM_OPTIONS	¥ ` @H O: JVM OPTION		^
LENA_MANAGER_ADDRESS	¥ Manager Î 1 ¥ c _ : IP / DomainÎ 1 : # { | Uñ		^
LENA_MANAGER_MONITORING_PORT	¥ Manager Œ • Ž • Port Og	16100	^
LENA_CONFIG_TEMPLATE_ID	¥ 3 O Ø Û ID ¥ c _ : Service Cluster Ü		^
LENA_SPRING_PROFILES_ACTIVE	¥ SPRING PROFILE (PROFILE 3 O ý , • Ä r r Ç € R . & § ¾ † Ç L • O 7 ô V)	default	^
LOG_OUTPUT_TYPE	¥ LOG 5 j b c ¥ X @ Ç : console ' \$ file	console	^
LENA_LOG_OUTPUT_DIR	¥ Log Ø Û ° n Ä 4	/usr/local/l ena/logs	^
LENA_SERVER_TYPE	¥ Server b c	embedded	_
LENA_HOME	¥ LENA 3 4 Home ¥ Ç : /usr/local/lena	(3 Ü M Ç)	_
LENA_SERVICE_ENDPOINT	¥ WAS r Ð . # { | : Î 1		^
LENA_APP_FILE	¥ Application Jar Ø Û Ü		^
LENA_APP_DIR	¥ Application Jar a b c i Ü	/usr/local/l ena	^
LENA_EXCEPTION_ALERT_ENABLE	¥ Exception ¯ ° ¾ Og • 1 – É	false	^

< = e f	' (	. / g	e = hi
LENA_EXCEPTION_CLASSES_PATTERNS	¥ • 1 6' Exception Class Og ' ; D – • Å Class ' .. / * – 3 O		^
LENA_EXCEPTION_EXCLUDE_CLASS_PATTERNS	¥ E Å 6' Exception Class Og ' ; D – • Å Class ' .. / * – 3 O		^
LENA_FULLSTACK_HOOKED_EXCEPTION_ENABLE	¥ Exception - ° ¾ Full Stack Trace • 1 – É	true	^
LENA_STUCKTHREAD_ALERT_ENABLE	¥ Thread Stuck - ° ¾ Og • 1 – É	false	^
LENA_OOM_ALERT_ENABLE	¥ Out Of Memory - ° ¾ Og • 1 – É	true	^
LENA_FULLGC_ALERT_ENABLE	¥ Full GC - ° ¾ Og • 1 – É	false	^
LENA_REVERSE_TCP_CONNECTION_ENABLE	¥ Reverse TCP Connection L k . Manager .. / ` @ – É	true	^
LENA_CONFIG_SERVER_URI	¥ Spring Cloud Config %=L ` @* – Git Repository5# properties ØÙL r , f • t \$ Config Server URI Î 1 . ¥ † ç L Š G* • bootstrap.properties ØÙ5 URI Î 1 2 server.lena.config.enabled ç † trueD Š G, .		^

Directory ! j

LENA Image %P %! 3 4 Ä 4 \$ Øusr/local/lenaØ † N, œ * Ä m¢ \$ 9RS T 9.

k l m n (\${LENA_HOME} op)	' () *
logs	LENA hi @ Dœ ØÙ ÚÇ1	
etc/info	Image Build Og ØÙ ÚÇ1	

Log & Dump q r

Log\$ Standard Out / ErrorD 5j * \$ ØconsoleØ . , S FileD 5j * \$ ØfileØ . , † sª GN,] ^İ •
ØLOG_OUTPUT_TYPEØ: ç L ØconsoleØ ' \$ ØfileØD 3 O VQD# 5j . , L ;] ~ • t 9.

1. Console 5j

Ù&\QD Container] ^5# h† Å@G\$. , † 9. Server: Application Log, Access Log, GC
Log' ØEW Standard OutQD 5j . 9. Docker5 3 Oo Log Driver5 : 7 Node(Host): s OÄ4
(Docker: %! Log ØÙ Ä4 : /var/lib/docker/containers/[container-id]/[container-id]-json.log)5
ÚÇG- Í FluentD2 T A Log Aggregator5 : 7 • 1 / ÚÇ* – k l h i ' ~ • t 9.

2. ØÙ 5_i
ØÙ 5_i 3O ¾ LogØÙ > Dump ØÙA \${LENA_HOME}/servers/appServer/logs a b c i * Ä5
ØÙD ÚÇGN, u Log ØÙA logrotate3O5 : 7 Daily rolling o9.
5_i G\$ Log ØÙ: b c S 5_i ØÙÙA Wv ~ 2 T 9.

Log QR	qr ps
Access Log	access_appServer_\${HOSTNAME}.log
GC Log	gc_appServer_\${HOSTNAME}.log
Application Log	appServer_lena-\${HOSTNAME}.out.log

† LogØÙÙA Guest OS5 34o logrotate5 : 7 I Ù Rolling o9.
ØÙ %& Log' 5_i ~ ^ý, BC: Log Aggregator' k 7 Log' • 1 / £\$ * \$ Loghi Stack (ELK, EFK Stack→)L mn * \$ ê† Ù&\†9. †' Ä7# \$ Fluent-BitS T ASide-car Container' →r * – Log' • 1 * \$. † Ù&\†9.

DumpØÙA 9R Ä45 ° n o 9.

¥ Dump Home : \${LENA_HOME}/servers/appServer/dumps/ \${HOSTNAME}
\${HOSTNAME} a b c i \$ ÄÉ VolumeQD DumpØÙL ÚÇ~) ContainerB mÊ L Ä. ê†9.
Dump b c B ÚÇ Ä4\$ 9RS T 9.

¥ Heap Dump : \${DUMP_HOME}/hdump
¥ Thread Dump : \${DUMP_HOME}/tdump
¥ Service Dump : \${DUMP_HOME}/sdump

Health Check

Health Check: %! ?@A ! " # [Manager Health Check](#) ÉÊ L M£. 9.
Ù&\QD WAS\$ Http Get· QD Health Check * sµ, LENA WAS: %! Health Check· A TCP Port <è· QD 3OGf t9. †\$ %! LENA Image5 Business Applicationr z ÈGs ½{ %) " †N, Biz Application† z ÈG` L ^ý5\$ 7' Application: \õ. Http Get Health Check 3OL ´ " †ñ * %' ±N. 9. EF Kubernetes Manifest ØÙ %P %! 3OA 9RS T 9.

1. Readiness Check

- [TCPSocketAction : port 8180
- [initialDelaySeconds : xx (Application Pn5 xë gO , -)
- [timeoutSeconds : xx (Application Pn5 xë gO , -)

2. Liveness Check

- [TCPSocketAction : port 8180
- [initialDelaySeconds : xx (Application Pn5 xë gO , -)
- [periodSeconds : xx (Application Pn5 xë gO , -)

!

¥ LENA WAS: ^ý Server: O' %» ö5 Service Portr Listen ' " Dİ ^o9.
¥ Health Check' Ä. Page\$ Checkr nF * • O' \QD #{ |r EFG\$ êQD i &*j GáD, #{ | : Back-end (K : Database)] s O' \es' i &~ • t \$ Page' , O* – \@* %' ±N. 9.

Container Image Build

LENAr Base Image' EF * sµ Project / Nu` O} ' \$ Architecture ~ P5 : 7 Base Image'
' Ð ' \$ ¿ ~D Build7ô * \$ ^ýr ~° ~ • t 9. Architecture : ` /OSO5# LENA Image:
İ ^9Ä' de * N, Image hi O} / %P • p† , - * 9.

9RA ¿ ~D Base Image' Build7ô * \$ ª e† 9.

¥ OSr LENA %! EF Image2 ZÛ4

¥ LENA 34 Ä4: İ ^ (%! : /usr/local/lena)

¥ %P \ @ ¾ | ¢: Architecture ~ PS LENA EF %! Image: ZÛ4 « ¹ r] ^3O • O* \$
êµQD\$ Zr =

Ä ^ý5\$ LENA%8sª L k 7 Base Image' Ê° n * – ô . 9.

Wv K¾2 T† &• İ ^† , - . ^ý, LENA Image' ' Ð* – Base Image' ° n (Build). 9.

¥ Application Artifact: × 4

¥ , - Library 34

¥ JDK İ ^ (%¶ Image5:) ú†] ^İ • • O • P † * Û ^ý)

¥ ^ € Command Script • O

¥ %P \ @ ¾ | ¢: Architecture ~ PS LENA EF %! Image: ZÛ4 « ¹ r] ^3O • OµQD
r =. ^ý

' Š ^ € r † § \$! " # Base Image ° n ÉÊL M¢. 9.

Application \]

Container h° S Server h° 5#: Application Artifact ×U5 6. · ¸ L ŒW N_* – ô . 9.
Project5# ×U õ¹ r /OG• , Kubernetes Deployment ManifestĪ ECS: TaskO: ' /Oo · ¸ 5
xy 3O* – ô . 9.

WAS h° 5# ApplicationL Deployment* \$ · ¸ 5\$ 9R Wr sr t 9.

Server t u \] ST	' (
%! Deployment a b c i 5 ×U	\${LENA_APP_FILE} 3O \${LENA_HOME}5 Jar ' +`
ÄB Application 3O5 xë ×U	\${LENA_APP_FILE} S \${LENA_APP_DIR} 3O \${LENA_APP_DIR}5 Jar ' +`

Container h° 5#: Deployment · ¸ A 9R Wr s t 9.

Container \] ST	' (
Î Container Image5 ` ; ×U · ¸	Base Image5 Application Artifact' ÑÒ +` / UV
Init Container Å@ %» ¾° ×U · ¸	Init Container5# ? É5 UVo Artifact ' \$ ÂÉ ÚÇ1 (Volume)5 t \$ Artifact' %» ¾° 5 Î Container5 +`

2.8. Server QRE * A 3% Đ Web Server

2.8.1. \]

! " # òWAS ×Uó ÉÊ: 3ÜL M¢. 9.

2.8.2. 3`

Web Server' () * % Ä7# , - . ` æA 9RS T 9.

Memory

Web Server: Heap Memory Size\$ å 1 512Mbyte' , - D * N, Agent: Heap Memory Size\$ 64~256MB' , - D . 9.

Disk

LENA Image %PQD ` @G\$ Image è%\$ ß 900 MbyteD † \$ OS + JDK
LENA + Library: [I QD Image: ' Ä Layer @\] s UV. @\ † 9.

() 5 , - . -r \ e Disk\$ Log' ØÛ · , QD ÚÇ~) Log@\ S Web i 1 | ØÛ (Artifact):
@\ L N_ * - üO. 9.

2.8.3. ' 6

abcd

1. " ñ#è Î 1
Web Server: " ñ#è Î 1 \$ ÞB. EB† * 9. N/W' 5# Manager2 WAS ' \$ WAS: Service
Endpoint' \ s D * \$ &· ú k ¿ r = * Cž 3O7ô . 9.

2. #{ | Uñ
Web Server: #{ | Uñ\$ 9RS T† NOGf t 9.
[HTTP #{ | Port : 7180
[HTTPS #{ | Port : 7543

Ä Uñ\$ LENA Image5 NOGf t N, ÄÉ #{ | İ ^L * NH * \$ ^ý LENA Image İ ^g 9\$
Container: %! ` ' 5 x y Port qer 3OL k 7 İ ^~ êL ±N. 9.

<=ef

WEB Server Container5 \ @ r =. Î -] ^İ • \$ 9RS T 9.

<=ef	' (	. / g	e= hi
LENA_MANAGER_ADD RESS	¥ Manager Î 1 ¥ c , : IP / DomainÎ 1 : #{ | Uñ		^
LENA_MANAGER_KEY	¥ Manager Open API ÒĐ c s		^

< = e f	' (	. / g	e = hi
LENA_SERVICE_PORT	¥ WAS # { | Port	7180	^
LENA_CONFIG_TEMPL ATE_DOWNLOAD	¥ Manager D É Ž 3 O Ø Û 9 (D \$ – É ¥ X @ Ç : Y ' \$ N		^
LENA_CONFIG_TEMPL ATE_ID	¥ 3 O Ø Û ID ¥ c _ : Service Cluster Ü : Revision t p		^
LENA_LICENSE_DOWN LOAD_URL	¥ License 9 (D \$ URL ¥ k j Ç : manager ' \$ Nu` gbLicense 9 (D \$ URI	manager	^
LENA_CONTRACT_CO DE	¥ License - S h (o © ß H \$ D v p Û o Ç I .		^
LOG_OUTPUT_TYPE	¥ LOG 5 j b c ¥ X @ Ç : console ' \$ file	console	^
LENA_LOG_OUTPUT_DI R	¥ Log Ø Û ° n Ä 4	/usr/local/I enaw/serv ers/webSe rver/logs	^
LENA_AGENT_RUN	¥ Node Agent % » – É	Y	^
LENA_SERVER_TYPE	¥ Server b c	web	–
LENA_HOME	¥ LENA 3 4 Home ¥ Ç : /usr/local/lena	(3 Ü M Ç)	–
LENA_SERVER_HOME	¥ LENA # O 3 4 Ä 4 [Ç : /usr/local/lenaw/servers/webServer	(3 Ü M Ç)	–
LENA_USER	¥ Manager % » 5 ` @ ~ OS ` @ H © O	root	^
LENA_USER_GROUP	¥ Manager % » 5 ` @ ~ OS ` @ H œ •	root	^
LENA_HEALTH_CHECK	¥ Health Check • € – É	N	^
LENA_HEALTH_CHECK _FAILURE_THRESHOLD	¥ Health Check ^ Q I © 4	5	^

< = e f	' (	. / g	e = hi
LENA_HEALTH_CHECK_TERM_EXECUTION	¥ Health Check ^ Q I ©4 ÃS¾, öÐ± ´ • €– É	true	^
LENA_HEALTH_CHECK_TERM_EXECUTION_SCRIPT	¥ Health Check ^ Q I ©4 ÃS¾, öÐ± ´ script Og	stop-container	^
LENA_HEALTH_CHECK_TERM_EXECUTION_INTERVAL	¥ Health Check ^ Q I ©4 ÃS¾, öÐ± ´ • € î %	300 (seconds)	^

!

¥ LENA_CONFIG_TEMPLATE_ID: Revision t p\$ ° wr = * ¼, ° w¾ Default Revision 9(D\$ o9.

¥ LENA_CONTRACT_CODE: License b x n < è 5 ` @GN, t ç t b x * s ½L ^ ý y t, | 9(D\$ r • 1 o9.

¥ LOG_OUTPUT_TYPE: Server 3 O Ø Û 9(D\$ \ @¾ 9(D\$. 3 O Ø Û: Log 3 O t \ @ o9.

¥ LENA_AGENT_RUN: Web Server\$ Agent r % » G f ô Manager 5 – ž > Æ • ž • t r = * 9.

Directory ! j

LENA Image %P %! 3 4 Ä 4 \$ Ø /usr/local/lenaw Ø t N, œ * Ä m ¢ \$ 9 R S T 9.

k l m n (\${LENA_HOME} o p)	' () *
bin	Node Agent: Start/Stop scripts	
depot	3 4' Ä. Local Repository	î ` @
etc	%P ² P Og > 3 O Ø Û	
license	License Og' hi * \$ a b c i	
logs	LENA hi @ Dœ Ø Û Ú Ç 1	
modules d lena-agent d lena-web-pe	LENA E F Æ È: Ú Ç 1 Home Node Agent ^ € 5, - . Æ È t Ä 4 * \$ ^ D WEB Server Library	
servers/webServer d bin d cache d conf d hook d ht docs d logs d temp	Server 3 4 Home, \${LENA_SERVER_HOME} Server Start / Stop / hi @ ^ € Script Ú Ç 1 Cache Og Ú Ç 1 Server 3 O Og Ú Ç 1 Life-Cycle Hook Shell Ø Û Ú Ç 1 %! Web i 1 | Ú Ç a b c i Log Ø Û Ú Ç 1 ± ´ @ I ¾ a b c i	
tmp	LENA hi @ I ¾ a b c i	

Log

Log\$ Standard Out / ErrorD 5j * \$ {console} . S FileD 5j * \$ {file} . † s^ GN,] ^| •
LOG_OUTPUT_TYPE: 5 L {console} ' \$ {file}D 3O VQD# 5j . L ;] ~ • t 9.

1. Console 5j
! " # 0Log & Dump 5j 0L MΦ. 9.
2. ØÙ 5j
ØÙ 5j 3O ¾ LogØÙ > Dump ØÙA \${LENA_HOME}/servers/webServer/logs a b c i * Ä5
ØÙD ÚÇGN, u Log ØÙA logrotate3O5 : 7 Daily rolling o9.

5j G\$ Log ØÙ: b c S 5j ØÙÜA Wv ~ 2 T 9.

Log QR	qr vw(' (
Error Log	error_webServer.log	Web # O < q Dœ
Access Log	access_webServer.log	Access Dœ
Trace Log	trace_webServer.log	# { | ¬ \ @ Dœ, Containerc # O5\$ ` @* s ½R
NTrace Log	ntrace_webServer.log	
LSC Log	lsc_webServer.log	

Health Check

Ù&\QD WAS\$ Http Get. QD Health Check * sµ, LENA Web Server: %! Health
Check. A TCP Port <è. QD 3OGf t 9. † \$ %! LENA Image5 Business Applicationr
z ÈGs ½{ %) " † N, Biz Application† z ÈG` L ^ý5\$ 7' Application: \ Õ. Http Get
Health Check 3OL ´ " † ñ * %' ±N. 9. EF Kubernetes Manifest ØÙ %P %! 3OA 9RS
T 9.

1. Readiness Check
[TCPSocketAction : port 7180
[initialDelaySeconds : xx (Application Þn5 xë gO , -)
[timeoutSeconds : xx (Application Þn5 xë gO , -)
2. Liveness Check
[TCPSocketAction : port 7180
[initialDelaySeconds : xx (Application Þn5 xë gO , -)
[periodSeconds : xx (Application Þn5 xë gO , -)

Server Configuration t n

! " # 0Server Configuration h i 0' MΦ. 9.

Container Image Build

! " # 0Container Image Build0' MΦ. 9.

Chapter 3. ' s , J 3%

3.1. ' s x)

¥ <Container ()] ^ ° L>

34' Ä7#\$ Kubernetes, ECS— Container (@â • t\$] ^† ý, mnGf tfô . 9. œi N, CLI] ^5# 7'] ^5 Ö...~ • t\$ \ö. ±. S Profile (K : Kubernetes Config) 3O† , - * ¼, Manager ' \$ Session Server' VM5 34~ ^ý 34 6' VM† P{ Gf tfô . 9.

¥ <Network] ^ ° L>

¾| α mn Server% k¿† r=. s ° L* -ô . 9. Container N/W ? É5 ÆW 34G\$ ^ý\$ Û&\QD k¿ Eß† *sµ, VM ãl . ¾ QD mnG\$ ^ý Manager Server, Web Server, WAS, Session Server% k¿† r=. s ` ; de† , - * 9. 9RA LENA Image %POD Service ' \$ ' þ k¿ L Ä7 , - . N/W Port † 9.

Source	Target	Port	XY
WEB/WAS/Session Server	Manager	TCP 7700 TCP 16100 UDP 16100	Manager #{ | EF Æ• Ž• , —ž
Bastion, hi H PC	Manager	TCP 7700	Manager #{ | EF
L/B , Front End	WEB Server	TCP 7180	#{ | EF
L/B , Front End	WAS	TCP 8180	#{ | EF
WAS	Session Server	TCP 5180	#{ | EF

¥ <Image Ö...] ^ ° L>

LENA FÄ Image' Å@*% Ä7#\$ Container ¥ÖÖ5# Docker Hub5 ÖÐ† r = 7ô . 9. µß Ö...† Zr = * 9• , Ö... r =.] ^5# LENA Image' Pull ÁN (docker pull), †' ØÛD ÛÇ* - (docker save) 7' ¥ÖÖ5# Ö... r =.] ^5 \Ë (docker load) * - ô . 9. Wv\$ †' Zi * \$ K¾ † 9.

```
$ sudo docker pull l enacloud/lena-cluster: {TAG_NAME}
... <5j ° w>
$ sudo docker save -o lena-cluster.tar l enacloud/lena-cluster: {TAG_NAME}
... <5j ° w>
$ sudo docker load -i lena-cluster.tar
... <5j ° w>
```

3.2. Base Image y "

WAS Í WEB Server: ^ý Base Image' È° n7ô , - r ° ~ • t 9. 9R5#\$ LENA Image' ' Ð* - Base Image' ° n(Build) 5 67 3Ü. 9. Base Image° nA LENA Image' Å@* \$ DockerfileL ‡ n* N, † ØÛD Docker Image' ° n* N F b Repository5 —ž * \$; < SO† 9.

K' G\$ Base Image: Î - Ĩ ^ ` aA 9RS TA Caser t 9.

1. , • Library -r

OSB 34 ÜÝf (yum, apt-get —)' †@* - Í , ÑÒ 34. 9.

2. JDK: İ ^

LENA Base Image: JDK' İ ^ * NH ~) , 34 ÜÝf ' \$ ÑÒ UE 7E · , QD 34. 9.

3. Application Deployment

Application Deployment%! Ä4\$ /usr/local/lena/server/appServer/webapps/ † 9.

—%5 ÑÒ WAR ØÜ ' \$ Explodedo Directory' + ` * — Deployment ~ • † 9. † ^ ý 5\$ WAR ØÜÜ ' \$ DirectoryÜ† Context PathD s Oo 9.

9ë · , QD\$ ÄB Application 3OL k7 s Oo Ä4(DocBase)5 WAR ' \$ Directory' + ` * \$ · , QDC Deploy ~ • † 9. † ^ ý 5\$ 3O5# s O. Context PathD Application† # { | o 9.

' Š 3OA BCD EFG\$ l() HI J Kl: Application 3O ÉÊ L Mç. 9.

4. ^ € Command Script: • O

LENA: %! Container ^ € Command\$ \${LENA_HOME}/docker-entrypoint.sh † 9. Ä%] ^ İ • 5 xë] ^ 3O > Server 3OØÜ 9(D\$, License 9(D\$, Server: ^ € —† ^ € G\$ Shell ScriptD#, Project] ^ 5 RCž İ ^ † , - . ^ ý † ' • O* — \@. 9.

3.2.1. Base Image y" 89

Base Image: ° n õ¹ \$ 9RS T 9.

1. Dockerfile ‡ n

2. Docker Image O\$

3. Docker Image —ž

Dockerfile z "

9R H\$ \$ Base Image' ° n * % Ä. Dockerfile K¾† ¼, CentOS %&: Application Server ' %PQD ‡ n * † 9.

Dockerfile ± ¥

```

# This is a sample of Dockerfile to build project's Base Image with LENA
template.
# LENA image provides just basic environment to run LENA WAS.
# The project and the customer are responsible for optimization or change the
environments.
# Before building it, you need to check the proper LENA image repository &
tag.
FROM docker.io/lenacloud/lena-cluster: {TAG_NAME}

# Change or add JDK & packages as your own policy.
# RUN yum update -y
# RUN yum install -y java-1.8.0-openjdk-devel.x86_64

# The service address of LENA manager.
ENV LENA_MANAGER_ADDRESS lena-manager.namespace.svc.cluster.local:7700

# The key to access LENA manager.
ENV LENA_MANAGER_KEY you_manager_key_from_manager_user_admin_menu

# Id of template. Format is <Service Container Name>:<Version>.
ENV LENA_CONFIG_TEMPLATE_ID was-cluster_01:1

# To download and validate your license, LENA_CONTRACT_CODE is required.
# You can acquired it via LENA supplier.
# ENV LENA_CONTRACT_CODE your_own_lena_contract_code

# Download & change template files from manager.
RUN ${LENA_HOME}/docker-entrypoint.sh download_template

# If you have your own license file, copy it.
#COPY license.xml ${LENA_HOME}/license/

# Or If you uploaded your own container license file to manager, you can
download it from manager
# Caution!. After downloading you need to validate the file with like
'xmllint' command.
# RUN ${LENA_HOME}/docker-entrypoint.sh download_license

# Copy your application source to deployment path.
# COPY application.war /usr/local/lena/servers/appServer/webapps/

```

Ä ± ¥ Dockerfile: m¢\$ 9RS T9.

Table 1. ± ¥ Dockerfile: a B 3Ü

! " {	' (
' Ä Layer Image s O	<pre><m" >FROM \${' Ä Image} ' Ä ImageD LENA Image ' \$ LENA Image' ' ÐÁA Image ^ Project5# , f. Base Image: Repository/Tag' k i . 9.</pre>
Library -r 34	<pre><m" > RUN yum install \${-r Library} OS BD QXs 34 ÜÝf' Ä@* - , - Library' -r * N, QXs B BC: 34 · 6† , - ~ ^ý 7' QXs: r †§5 xy Library' -r 34. 9. <JDK Ê 34> JDKC Library -r 2 » Û. . , QD 34~ · t 9. 9µ, LENA: ServerÛ † JDK' MÇ * N t Qá D, 9R: 300gC Ĩ ^* - ô . 9. * Symbolic Link /usr/lib/jvm/java0L 34o JDK Ä45 RCž Ê 30 * - ô . 9. Ä Og\$ 9R ÉÊ 5# ` @* N t 9. ¥] ^ĭ • \${JAVA_HOME} ¥ JDK 34Ä 4 : \${LENA_HOME}/etc/info/ java-home.info Ç ¥ Server] ^ 3O : \${LENA_HOME}/env.sh: JAVA_HOME Ç ¥ docker-entrpoint.sh5# domain cacheÇ TTL 3O</pre>
] ^ĭ • 3O	<pre><m" > ENV \${key} \${value} * Ä: 300g ' \$ y† , | ' 9(D\$ Á% Ä.] ^ĭ • ' 3O. 9. - %5 3Oo Ç A Container %» ¾° 5C ` @â • t 9. ¥ LENA_MANAGER_ADDRESS : 34o Manager: Service Î 1 ¥ LENA_MANAGER_KEY : Open APID Manager Ò...¾ , - . e%cs (Manager: Admin > Users ² J 5# der =) ¥ LENA_CONFIG_TEMPLATE_ID : 9(D\$ ~ 300g , BH, (Service Cluster † @ + 0:0 + Revision t p) ¥ ENV LENA_CONTRACT_CODE : y† , | 9(D\$' Ä. ©ß H\$</pre>
300g 9(D\$	<pre><m" > RUN \${LENA_HOME}/docker-entrpoint.sh download_template ManagerD Éž 300g' Download . 9. curl / wget —: ÜÝQD Open API' p5. 9. Manager9(D\$¾ ö, UEØÛ 7E, Mod/Owner/Group • OL ^ €. 9.</pre>
y† , | + ` ' \$ 9(D\$	<pre><m" > RUN curl -o \\${LENA_HOME}/license/license.xml É<† * ° w> ManagerDÉž License' 9(D\$ Á\$9. 9(D\$ ö XML Validation > Owner/Group • OL . 9. COPY license.xml \${LENA_HOME}/license/ BCD ^ - ÄA Licenser t L ^ý Container ? ÉD + ` . 9.</pre>

! " {	' (
Application Artifact +`	<pre><m" > COPY application.war \${LENA_SERVER_HOME}/webapps/ Application Artifact (KE5#\$ application.war) ØÛL DeployÄ45 +` . 9. %! Ä4\$ Wv 2 T 9. ¥ WAS : \${LENA_SERVER_HOME}/webapps/ ¥ WEB Server : \${LENA_SERVER_HOME}/webapps/htdocs Ä Ä4\$ ÄB Server > Application 3O5 : 7 Ĩ ^r = * 9.</pre>

Šno DockerfileL %&QD Image' Build~ • t Q¼ (docker build), Build ö Docker Hub Í ECRS
T A Registry5 —ž (docker register)* – Container Platform5# Ä@~ • t Cž . 9.

Dockerfile z " (w} ~6)

```
root ©O† W< Û&©OL ` @*Æ a * $ ^ý Base Image ° n¾ ñr \e ‡ ´ † , - * 9. Wv
‡ ¥A Centos7 L ` @* ¼ 'lena' Û&©OL ` @* $ 3† | 9. ©O° n / sudo 34• #D í €o9.
Container %» ¾ entrypoint script 5# root ±. ÜÝL • €~ • t Cž , ! SO5# sudo ±. L
É – * N, password 3O * † sudo ÜÝ† r = * Cž 3O. 9. entrypoint script r pl ä) sudo
` @¾ password k j * Cž Ĩ ^* – Û&©O: sudo ÜÝL E. . 9.
```

Dockerfile ‡ ¥

```
FROM docker.io/lenacloud/lena-cluster: {TAG_NAME}

# create account
ENV LENA_USER lena
RUN adduser ${LENA_USER}
RUN chown -R ${LENA_USER}:${LENA_USER} ${LENA_HOME}

# sudo auth setting
RUN yum install -y sudo && yum clean all
RUN usermod -aG wheel ${LENA_USER}
## nopasswd sudo on - off this option in docker entry point
RUN sed -i 's/# %wheel/%wheel/g' /etc/sudoers

USER ${LENA_USER}
```

Docker Image • €

9RA DockerfileD Image' Build* \$ ÜÝf † 9. ` ; 5 Image: Repository > Tag RuleL O: * – ô
* ¼, • sž eHç5 Dockerfile: Ä4' sO* \$ ê5 b: . 9. (* % K¾\$ Current Path5
Dockerfile† t L ^ý5 bx * 9.)

Docker Image OS ^ € ÜÝf (K¾)

```
$ docker build --no-cache --rm --tag [REPOSITORY[:TAG]] .
```

' %o ÜÝf 5 ` @o • < A 9RS T9. • < A Project] ^5 RCž , B* – ` @. 9.

¥ --no-cache: †; O\$5# ° no • ¾' ` @* s ½R

¥ --rm: †î s ° n5 nFÓL) I ¾ BC†D' ŸE

Docker Image • ,

9RA Image Registry5 Image' —ž * \$ ÜÝf †9. ` ; 5 Registry5 —ž r =. ±. L r í
 ` @H2 v p —] ^3OL , - D . 9.

Docker Image —ž ^ € ÜÝf (K¾)

```
$ docker push [OPTIONS] [REPOSITORY[:TAG]]
```

%P ' Š Docker hi ÜÝf \$ 9RF , Site' M¢. 9.

<https://docs.docker.com/engine/reference/commandline/docker/>

docker commitA ™Ě () ùe Docker Container' ImageD —ž * \$ ÜÝf †9.

() ùe Container' ImageD —ž (K¾)

```
$ docker commit [OPTIONS] CONTAINER [REPOSITORY[:TAG]]
```

Chapter 4. Kubernetes . } \]

4.1. \] , J 3%

4.1.1. \] ×)

LENA 34 ` ; 5 Kubernetes ^ €] ^† mnGf tfô . 9. 9R u a û† P{ Gfô ~ ` a†9.

1. LENA' m» ~ Kubernetes Cluster2 Namespace: mn
2. kubectlt† 34GN CLlr r =.] ^ • (
3. Kubernetes Cluster5 Ò...† r =* Cž Kubernetes 3O (~/.kube/config): mn
4. Ò... r =. Docker Repository (K : ECR, Docker Hub, ? É Docker Repository —)
5. (• <) Kubernetes Config ØÛ : LENA Manager5# Log > Terminal ÒÐL Ä7 Manager5 ´ D\$, -
6. LENA Container License > ©BHS

4.1.2. \] VW

Kubernetes\$ <3| ñ...†< CmBD 9æ. ×U . , † ¶Ë*sµ, ! " #5#\$ %! Cme
kubectIL Ä@* \$ êL %PQD 3Ü. 9.

Kubernetes\$ Resource: ×U . ,] ^3OOg, | ' —L %8. YAMlc , : ÜŠ ØÛL Ä@* –
×U/ÿE/' " †ñ' •€. 9. *%5 3ÜG\$ \${manifest-file.yaml}A † ÜŠ#' s' . 9. !
" #5#\$ ×U5 , - . å1. : ÜÝf > •< µL %8* áD, ' Š. ?@A FÀo Kubernetes
3Ü#' M€. 9.

zf namespaceU ' 6

*%: Æ8 ×Uh(‡´A namespace &ÄD †7fs áD, ×U' *% +# ‡´ 6' † G\$
namespace' 3O*–ô . 9.

```
$ kubectl config set-context --current --namespace=${namespace}
```

Ä: . , QD 3O*s ½L ¾ *%: Æ8 ^ € ÜÝf " 5 ð--namespace=\${namespace}ð m" L
–r *–ô . 9. 9RA æ K¾†9.

```
$ kubectl apply -f ${manifest-file.yaml} --namespace=${namespace}
```

Kubernetes Resource\] , f...†b

ðkubectl applyð ÜÝf ' k7 ×U' ^ €* N, æc , A 9RS T9.

```
$ kubectl apply -f ${manifest-file.yaml}
```

Ä ÜÝf \$ ×U àW• y, » Û namespace: » Û nameL r í Objectr ¶Ë ~ ^ý 7' Resource:

ÜŠ' ´ " † ñ . 9.

Kubernetes ResourceU ‡ +

ðkubectl deleteð ÜÝf D × Uo Resource' ÝE. 9.

```
$ kubectl delete ðf ${manifest-file.yaml}
```

Workload f...† b „ ^ %

Application, Web Server: ^ý Application Artifact: Ĩ ^ —5 : 7 × Uo Workload ´ " † ñ r , - ~ • † 9. Kubernetes5# \$ † ' Rolling· ¸ QD ´ " † ñ * \$ · 6L EF. 9.

9RA × Uo Workload' Rolling· ¸ QD ´ " † ñ * \$ ÜÝf † 9.

```
$ kubectl rollout restart ${workloadType}/${workloadName}
```

Ä ÜÝf' k 7 Workloadr " ¿ G¼ • 1 \e ÄO(Revision)† ° n o 9. Revision ž L ¢ E * \$ ÜÝf \$ 9RS T 9.

```
$ kubectl rollout history ${workloadType}/${workloadName}
```

9RA Ñ; ´ " D • e * \$ ÜÝf † 9.

```
$ kubectl rollout undo ${workloadType}/${workloadName}
```

9RA k j o RevisionQD • e * \$ ÜÝf † 9.

```
$ kubectl rollout undo ${workloadType}/${workloadName}
--to-revision=${revisionNo}
```

Ä ÜÝf 5# eHÇ \${workloadType}A Workload: b c QD æ Ç A (statefulset) (deployment) (daemonset) ù * Í † 9. \${workloadName}A Workload: † @† N, \${revisionNo}\$ ÄO(Revision) Ç † 9.

\] Š ResourceU < Æ

f Uo Workload, Service—: Kubernetes Object' d e * \$ ÜÝf kubectl get † 9.

```
$ kubectl get ${resourceType}
```

Ä ÜÝf 5# \${resourceType}A (statefulsets) (deployments) (daemonsets) (services) (configMaps) 2 T A Kubernetes Resource b c ù * Í † 9.

4.2. Manager \]

4.2.1. ' 6 %&

. / ' 6 %&

Manager Container\$ 9RS TA ±N 3OL %PQD ×UGf ô . 9.

' 6 t • %&	' 6 g / ' () *
Workload p q	StatefulSet	-
ReplicaÄ •	1	-
Container Port	TCP : 7700 UDP : 16100 TCP : 16100	-
Volume Mount	a b c i /usr/local/lena/repository' ÄÉ Volume5 I ³ (Wv KE 5# \$ persistentVolumeClaim · ³ QD I ³)	-
Probe (Health Check)	HttpGetAction, /lena J t s p 5	-

ZXOu 76 %& Ð Workload t •

\@ ¾° Project] ^5 x y / O7# \@7ô ~ 3O - 12 † ö 3ÜG\$ Manifest ØÜ5 \@o
Sample ÇA 9RS T9.

' 6 t • %&	' (	Sample g
Container Image	ProjectB Architecture / O5 x y , Bo OS > JDK O; 5 R\$ LENA Manager Image	lenacloud/le na- manager.{TA G_NAME}
namespace	Kubernetes? > i \ œ• Ü	default
name	Workload: † @, † ÇA Pod † @ / Hostname: PrefixD ` @o9.	lena- manager
label	Service2: `` / , LM5 ` @G\$ LabelD Key: Value– QD O: o9.	type: sample- lena- manager
imagePullPolicy	† î s Pull O} QD 9R ù * Í ' , f. 9. ¥ Always : RepositoryDÉ Ž a' PullÁR ¥ IfNotPresent : Local5 Imager * L ^ý 5µ Pull ÁR ¥ Never : Pull Ás ½R	Always
%P] ^İ •	] ^İ • : 3OA ENV ' \$ Config MapQD 3O r =	(configMap · ³)

3O r =.] ^İ • \$ 9RS T9.u] ^İ • 5 6. ' Š. 3ÜA ! " # Manager] ^İ • ÉÊL MΦ. 9.

< = e f	' (	Sample g
LENA_JVM_HEAP_SIZE	Heap Memory è % s O	1024m (%!)
LENA_JVM_METASPACE_SIZE	Metaspace Memory è %	256m (%!)
LENA_MANAGER_DOMAIN_ENABLED	Domain Name ÅnÛ – É	Y
LENA_MANAGER_ADDRESS	Service: Domain Î 1 : Uñ	lena-manager.default.svc.cluster.local:7700
JAVA_DOMAIN_CACHE_TTL	Domain Î 1 Cache ¾% (Ã)	3 (%!)

ZXOu 76 %& Ð Servicet •

' 6 t • %&	' (	Sample g
namespace	Kubernetes? > i \ œ • Ü	default
name	Service' , B* \$ †@QD, namespace? 5# bÛ. ç † f ô . 9. † ç A Service DomainÎ 1 5 \ @o9.	lena-manager
type	ÃÉD Service' 45* \$. , QD, 9R ù * Í † 9. ¥ NodePort : k8sr 34o Æ8 Node: sO PortD #{ | ¥ LoadBalancer : ÃÉ Loadbalancer' k. #{ | ¥ ClusterIp : k8s Cluster? ; @QD, NOo IPD #{ |	NodePort

4.2.2. Manifest . } \]

Workload

Kubernetes5#: Container\$ Pod &ÄD 34G¼, Kubernetes Object' %8. YAML ØÛc , : Manifest ØÛL ‡ n* – 34* \$ è † Ü&\e . , † 9.

9RA Manager' 34* % Ä. Manifest ØÛ ‡ ¥ † N, ' Š ?@A + # 3Üo 3O a : /O5 x y Project] ^5 RCž İ ^* – ` @~ • † 9.

LENA Manager WorkloadÛŠ (Manifest) ØÛ

```
---
---
api Version: apps/v1
kind: Stateful Set
metadata:
  É name: l ena-manager
```

```

spec:
  selector:
    matchLabels:
      type: lina-manager
  serviceName: lina-manager
  replicas: 1
  template:
    metadata:
      labels:
        type: lina-manager
    spec:
      containers:
      - name: lina-manager
        image: docker.io/linacloud/lina-manager: {TAG_NAME}
        imagePullPolicy: Always
        ports:
        - containerPort: 7700
        envFrom:
        - configMapRef:
            name: configmap-lina-manager
        volumeMounts:
        - name: wsy-lina-manager-repository
          mountPath: /usr/local/lina/repository
        readinessProbe:
          httpGet:
            path: /lina
            port: 7700
            initialDelaySeconds: 20
            timeoutSeconds: 1
          livenessProbe:
            httpGet:
              path: /lina
              port: 7700
              initialDelaySeconds: 30
              periodSeconds: 5
        volumes:
        - name: wsy-lina-manager-repository
          persistentVolumeClaim:
            claimName: lina-manager-repository
      terminationGracePeriodSeconds: 0

---
apiVersion: v1
kind: ConfigMap
metadata:
  name: configmap-lina-manager
data:
  LINA_MANAGER_DOMAIN_ENABLED: "Y"

```

```
Ê LENA_MANAGER_ADDRESS: "lena-manager.default.svc.cluster.local:7700"
```

¥ × U ^ €

× U \$ kubectl apply -f lena-manager-deployment-sample.yaml

```
$ kubectl apply -f lena-manager-deployment-sample.yaml
```

¥ × U / S de

× U o Workload \$ kubectl get -f lena-manager-deployment-sample.yaml

```
$ kubectl get statefulsets
```

NAME	READY	AGE
lena-manager	1/1	10s

Service

9RA Manager Service' × U * % Ä. Manifest ØÙA 9RS T 9.

LENA Manager ServiceÜŠ (Manifest) ØÙ

```
---
apiVersion: v1
kind: Service
metadata:
  name: lena-manager
spec:
  selector:
    type: lena-manager
  ports:
    - name: manager-tcp
      port: 7700
      targetPort: 7700
      nodePort: 31848
      protocol: TCP
    - name: monitoring-tcp
      port: 16100
      targetPort: 16100
      protocol: TCP
    - name: monitoring-udp
      port: 16100
      targetPort: 16100
      protocol: UDP
  type: NodePort
```

¥ × U ^ €

×U\$ kubectl apply ÜÝQD ^ € . 9. ØÜÜ† lena-manager-service-sample.yaml† y • ×U ÜÝA 9RS T 9.

```
$ kubectl apply y ðf lena-manager-servi ce-sampl e. yaml
```

¥ ×U/S de
×Uo Workload\$ kubectl get ÜÝf ^ €L k 7 de ~ • t 9.

```
$ kubectl get services
NNAME TYPE CLUSTER-IP EXTERNAL-IP PORT(S) AGE
...
lena-manager NodePort 10.43.xx.xx <none> 7700: 30770/TCP, 16100: 31610/UDP
10s
```

4.2.3. Manager Ž N

Service bcL NodePortD 3O* † 9 • http://[Node IP]: [Node Port] / 5 ÒÐ* – Manager5 ÒÐ. 9.

4.3. Session Server \]

4.3.1. \] ×)

×U ; 5 Manager5 Session Server' —ž * % Ä 7 # \$ Manager5# ðService Clusterð' —ž * – Ò . 9. Manager: ðCluster > Session Clusterð² J Ä 4 5 # Session Server bc : ¿ ~ Service Cluster' ° n . 9.

Service Cluster° n > hi h(' Š. ?@A B C E F " # e ð() H I J K ðL M ¢. 9.

4.3.2. ' 6 %&

. / ' 6 %&

Session Server Container\$ 9RS TA ±N 3OL %PQD ×UGf ô . 9.

' 6 t • %&	' 6 g / ' () *
Workload pq	StatefulSet	-
ReplicaÄ •	2 (Primary, Secondary Server 2Ä)	-
Container Port	TCP : 5180	-
Probe	ExecAction, \${LENA_SERVER_HOME}/health.sh p 5	-

ZXOu 7 6 %& Ð Workload t •

\@ ¾° Project] ^ 5 xy / O 7 # \@ 7 ô ~ 3 O - 1 2 † ö 3ÜG\$ Manifest ØÜ5 \@o Sample ¸A 9RS T 9.

' 6 t • %&	' (	Sample g
Container Image	ProjectB Architecture / O5 x y , B o OS > JDK O; 5 R\$ LENA Manager Image	lenacloud/lena-session:{TAG_NAME}
namespace	Kubernetes? > i \ œ• Ü	default
name	Workload: † @, † ç A Pod † @ / Hostname: PrefixD ` @ o 9.	lena- session
label	Service2: `` / , L M5 ` @G\$ LabelD Key: Value– QD O: o 9.	type: lena-session
imagePullPolicy	† î s Pull O}	Always
%P] ^İ •	] ^İ • : 3OA ENV ' \$ Config MapQD 3O r =	(configMap · ,)

3O r =.] ^İ • \$ 9RS T 9. u] ^İ • 5 6. ' Š. 3ÜA ! " # [Session \] ^İ • ÉÊL MÇ. 9.](#)

< = e f	' (	Sample g
LENA_JVM_HEAP_SIZE	¥ Heap Memory è% s O	1024m (%!)
LENA_CONFIG_TEMPLATE_ID	¥ Service Cluster Ü : Revision No	SESSION-001
LENA_MANAGER_ADDRESS	¥ Service: Domain Î 1 : Uñ	sample-lena-manager.default.svc.cluster.local:7700
JAVA_DOMAIN_CACHE_TTL	¥ Domain Î 1 Cache ¾% (Ã)	0 (%!)
LENA_SESSION_0_ADDRESS	¥ Primary Session # O Î 1 , StatefulSet3OS Ù4Gf ô V	lena-session-0.default.svc.cluster.local
LENA_SESSION_1_ADDRESS	¥ Secondary Session # O Î 1 , StatefulSet3OS Ù4Gf ô V	lena-session-1.default.svc.cluster.local
LENA_SESSION_EXPIRE_SEC	¥ Session µl ¾% (Ã)	1800 (%!)
LENA_CONFIG_SHARE_SESSION	¥ Application % Session F b– É	N

Z X Ou 76 %& Ð Servicet •

' 6 t • %&	' (	Sample g
namespace	Kubernetes? > i \ œ• Ü	default

' 6 t • %&	' (	Sample g
name	Service' B* \$ †@QD, namespace? 5# bÛ. ç † f ô . 9. † ç A Service DomainÎ 1 5 \ @o9.	lena-session
type	ÂÉ D Service' 4 5* \$ · QD, Session Server5\$ s O* s ½\$9.	

4.3.3. Manifest . } \]

Workload

Kubernetes5#: Container\$ Pod &ÄD 34G¼, Kubernetes Object' %8. YAML ØÛc , :
Manifest ØÛL ‡ n* – 34* \$ è† Û&\e · , †9.

9RA Manager' 34* % Ä. Manifest ØÛ ‡ ¥† N, ' Š ?@A + # 3Ûo 3O a : /O5
x y Project] ^5 RCž Ĩ ^* – ` @~ • t9.

LENA Session WorkloadÛŠ (Manifest) ØÛ K¾

```

---
api Version: apps/v1
kind: Stateful Set
metadata:
  Ê name: l ena-sessi on
spec:
  Ê selector:
  Ê   matchLabel s:
  Ê     type: l ena-sessi on
  Ê serviceName: l ena-sessi on
  Ê repl i cas: 2
  Ê templ ate:
  Ê   metadata:
  Ê     label s:
  Ê       type: l ena-sessi on
  Ê   spec:
  Ê     contai ners:
  Ê     - name: l ena-sessi on
  Ê       image: docker. i o/ l enacloud/ l ena-sessi on: {TAG_NAME}
  Ê       imagePul l Pol i cy: Al ways
  Ê       ports:
  Ê       - containerPort: 5180
  Ê       envFrom:
  Ê       - confi gMapRef:
  Ê         name: confi gmap-l ena-sessi on
  Ê       tty: true
  Ê       readi nessProbe:
  Ê       exec:
  Ê       command:
  Ê       - /usr/ l ocal / l ena/servers/sessi onServer/heal th. sh

```

```

    Ê      i n i t i a l D e l a y S e c o n d s : 20
    Ê      p e r i o d S e c o n d s : 5
    Ê      l i v e n e s s P r o b e :
    Ê      e x e c :
    Ê      c o m m a n d :
    Ê      - / u s r / l o c a l / l e n a / s e r v e r s / s e s s i o n S e r v e r / h e a l t h . s h
    Ê      i n i t i a l D e l a y S e c o n d s : 30
    Ê      p e r i o d S e c o n d s : 5
    Ê      t e r m i n a t i o n G r a c e P e r i o d S e c o n d s : 0
    ---
    a p i V e r s i o n : v1
    k i n d : C o n f i g M a p
    m e t a d a t a :
    Ê n a m e : c o n f i g m a p - l e n a - s e s s i o n
    d a t a :
    Ê L E N A _ S E S S I O N _ 0 _ A D D R E S S : " l e n a - s e s s i o n - 0 . l e n a -
    s e s s i o n . d e f a u l t . s v c . c l u s t e r . l o c a l : 5180 "
    Ê L E N A _ S E S S I O N _ 1 _ A D D R E S S : " l e n a - s e s s i o n - 1 . l e n a -
    s e s s i o n . d e f a u l t . s v c . c l u s t e r . l o c a l : 5180 "
    Ê L E N A _ M A N A G E R _ A D D R E S S : " l e n a - m a n a g e r . d e f a u l t . s v c . c l u s t e r . l o c a l : 7700 "
    Ê L E N A _ S E S S I O N _ E X P I R E _ S E C : "1800"
    Ê L E N A _ C O N F I G _ T E M P L A T E _ I D : " S E S S I O N - 001 "
    Ê L E N A _ C O N F I G _ S H A R E _ S E S S I O N : " N "

```

¥ × U ^ €

× U \$ k u b e c t l a p p l y -f l e n a - s e s s i o n - d e p l o y m e n t - s a m p l e . y a m l

```
$ kubectl apply -f lena-session-deployment-sample.yaml
```

¥ × U / S d e >

× U o W o r k l o a d \$ k u b e c t l g e t -f l e n a - s e s s i o n - d e p l o y m e n t - s a m p l e . y a m l

```

$ kubectl get statefulsets
NAME READY AGE
lena-manager 1/1 30m
lena-session 2/2 10s

```

Service

9 R A S e s s i o n S e r v i c e ' × U * % Ä . M a n i f e s t Ø Û A 9 R S T 9 .

LENA Session ServiceÜŠ (Manifest) ØÜ K¾*

```
---
apiVersion: v1
kind: Service
metadata:
  name: lena-session
spec:
  selector:
    type: lena-session
  clusterIP: None
```

¥ xU^ €
xU\$ kubectl apply ÜÝQD ^ €. 9. ØÜÜ† lena-session-service-sample.yaml† y • xU
ÜÝA 9RS T9.

```
$ kubectl apply -f lena-session-service-sample.yaml
```

¥ xU/S de
xUo Workload\$ kubectl get ÜÝf ^ €L k7 de ~ • t9.

```
$ kubectl get services
NAME TYPE CLUSTER-IP EXTERNAL-IP PORT(S) AGE
...
lena-session ClusterIP None <none> <none> 10s
...
```

4.3.4. Server • , < Œ

Manager5 ØÐ* – ØCluster > Service ClusterØ ² J 5# 7' Service Cluster' , f* – O'
—ž —É' de. 9. **ServerList** • • L —~ * • * &5 2Ä: Session Serverr ¢EG\$ êL de. 9.

! | Server\$ Manager: Scheduler5 : 7 —ž GáD, å 6 15Ã ö H» —ž o9.

4.4. WAS \]

4.4.1. \] x)

xU ; 5 Manager5 WAS Server' —ž * % Ä7#\$ Manager5# ØService ClusterØ —ž * – Ö
. 9. Manager: ØCluster > Server ClusterØ ² J Ä45# WAS(Enterprise/SE) bc: ¿ ~ Service
Cluster' ° n. 9.

Service Cluster' ° n. ö Overview ™5# Service Endpoint' 3O. 9. Kubernetes: ^ý
Øhttp://\${ServiceÜ}.\${namespaceÜ}.svc.cluster.localhost:\${Service Uñ}Ø c, † o9. † çA Web
Server: VirtualHost: Proxy3O5# Ä@o9.

° no Service Cluster: Template ™5# WAS: 3OL • €. 9. 300g ÚÇ ö Template5 6.
RevisionL ° n. 9. Service Cluster° n > hi h(' Š. ?@A BCEF " #e Ø() H I J KØL

MÇ. 9.

4.4.2. ' 6 %&

. / ' 6 %&

WAS Container\$ 9RS TA ±N 3OL %PQD ×U o9..

' 6 t • %&	' 6 g / ' () *
Workload pq	Deployment	
Container Port	TCP : 8180	

ZXOu 76 %& Ð Workload t •

\@ ¾° Project] ^5 xy / O7# \@7ô ~ 3O - 12 †ö 3ÜG\$ Manifest ØÛ5 \@o
Sample ÇA 9RS T9.

' 6 t • %&	' (	Sample g
Container Image	ProjectB Architecture / O5 xy , Bo OS > JDK O; 5 R\$ LENA Manager Image	lenacloud/lena-cluster:{TAG_NAME}
namespace	Kubernetes? > i \ œ• Ü	default
name	Workload: †@, † ÇA Pod †@ / Hostname: PrefixD ` @o9.	lena-was
label	Service2: `` / , LM5 ` @G\$ LabelD Key: Value– QD O: o9.	type: lena-was
strategy:type	Deployment Update O} , RollingUpdate, RecreateÛ , f. UpdateO} ÜL %8	RollingUpdate
imagePullPolic y	† î s Pull O}	Always
replica Å•	Container (Pod) Å•	2
Probe	HttpGetAction, <è Page, ¾± Delay ¾%, Î %\$ Application Pn5 RCŽ 3O , -	00 p 5
%P] ^İ •	] ^İ • : 3OA ENV ' \$ Config MapQD 3O r =	(configMap • ,)

3O r =.] ^İ • \$ 9RS T9. u] ^İ • 5 6. ' Š. 3ÜA ! " # WAS] ^İ • ÉÊL
MÇ. 9.

< = ef	' (	Sample g
LENA_CONFIG_TEMPLATE_ID	¥ Service Cluster Ü : Revision No	WAS-001:1

< = e f	' (	Sample g
LENA_MANAGER_ADDRESS	¥ Service: Domain Î 1 : Uñ (+ # 34o Manager: Service Î 1)	lena- manager.defau lt.svc.cluster.lo cal:7700
LENA_MANAGER_KEY	¥ LENA_MANAGER_KEY : Open APID Manager Ö...¾ , - . e %oCS ¥ Manager: Admin > Users ² J 5# de r =	(ÄB Manager5# de k i , -)
LENA_CONFIG_TEMPLATE_DO WNLOAD	¥ 3O Og 9(D\$ – É	Y
LENA_CONTRACT_CODE	¥ y t , | 9(D\$' Ä. ©B H\$ ¥ y t , | - - ¾ EFo H\$ ç	(ÄB H\$ de , -)
LENA_LICENSE_DOWNLOAD_U RL		manager
JAVA_DOMAIN_CACHE_TTL	¥ Domain Î 1 Cache ¾ %o (Ä)	3 (%!)

ZXOu 76 %& Ð Servicet •

' 6 t • %&	' (	Sample g
namespace	Kubernetes? > i \ œ• Ü	default
name	Service' , B* \$ †@QD, namespace? 5# bÜ. ç † f ô . 9. † çA Service DomainÎ 1 5 \ @o9.	lena-was
type	ÄÉD Service' 45* \$. , ÄÉD 45~ - š † * Q• BC 3O† Z, -	

4.4.3. Manifest . } \]

Workload

Kubernetes5#: Container\$ Pod &ÄD 34G¼, Kubernetes Object' %8. YAML ØÛc , :
Manifest ØÛL ‡n* – 34* \$ ê † Ü&\e . , †9.

9RA Manager' 34* % Ä. Manifest ØÛ ‡¥†N, ' Š ?@A + # 3Üo 3O a : /O5
x y Project] ^5 RCŽ Ĩ ^* – ` @~ • t9.

LENA Session WorkloadÛŠ (Manifest) ØÛ K¾*

```
---
api Versi on: apps/v1
ki nd: Depl oyment
metadata:
  Ê name: l ena-was
spec:
```

```

  selector:
    matchLabels:
      type: l ena-was
  replicas: 2
  strategy:
    type: RollingUpdate
  minReadySeconds: 10
  revisionHistoryLimit: 1
  template:
    metadata:
      labels:
        type: l ena-was
    spec:
      containers:
      - name: l ena-was
        image: docker.io/l enacl oud/l ena-cl uster: {TAG_NAME}
        imagePullPolicy: Always
        ports:
        - containerPort: 8180
        envFrom:
        - configMapRef:
            name: configmap-l ena-was
        readinessProbe:
          httpGet:
            path: /
            port: 8180
          initialDelaySeconds: 10
          periodSeconds: 5
        livenessProbe:
          httpGet:
            path: /
            port: 8180
          initialDelaySeconds: 15
          periodSeconds: 5
      volumes:
      terminationGracePeriodSeconds: 0

---
apiVersion: v1
kind: ConfigMap
metadata:
  name: configmap-l ena-was
data:
  LENA_CONFIG_TEMPLATE_DOWNLOAD: "Y"
  LENA_CONFIG_TEMPLATE_ID: "WAS-001"
  LENA_MANAGER_ADDRESS: "l ena-manager.default.svc.cluster.local: 7700"
  LENA_MANAGER_KEY:
    "aSw7RMPSw15LeN%2FMZnrxzjgV0BzZe18i VHZbJ8CkdLI ea2Ecd8AI eK9oPCLXuW%3D%3D"

```

```

Ê LENA_LICENSE_DOWNLOAD_URL: "manager"
Ê LENA_CONTRACT_CODE: "pghzJJqTdzaGtTuASr8yfw=="
JAVA_DOMAIN_CACHE_TTL: "3"

```

¥ xU^ €>

xU\$ kubectl apply ÜÝQD ^ €. 9. ØÜÜ† lena-was-deployment-sample.yaml† y • xU ÜÝA 9RS T 9.

```
$ kubectl apply -f lena-was-deployment-sample.yaml
```

¥ xU/S de>

xUo Workload\$ kubectl get ÜÝf ^ €L k 7 de ~ • t 9.

```

$ kubectl get deployments
NAME READY AGE
lena-was 2/2 10s

```

Service

9RA Application Service' xU* % Ä. Manifest ØÜA 9RS T 9.

LENA Session ServiceÜŠ (Manifest) ØÜ K¾

```

---
apiVersion: v1
kind: Service
metadata:
  Ê name: lena-was
spec:
  Ê selector:
  Ê   type: lena-was
ports:
  Ê - port: 8180
  Ê   targetPort: 8180

```

¥ xU^ €

xU\$ kubectl apply ÜÝQD ^ €. 9. ØÜÜ† lena-was-service-sample.yaml† y • xU ÜÝA 9RS T 9.

```
$ kubectl apply -f lena-was-service-sample.yaml
```

¥ xU/S de

xUo Workload\$ kubectl get ÜÝf ^ €L k 7 de ~ • t 9.

```
$ kubectl get services
NAME TYPE CLUSTER-IP EXTERNAL-IP PORT(S) AGE
...
lena-was ClusterIP 10.43.xx.xx <none> 8180/TCP 20s
```

4.4.4. Server • , < Ⓔ

Manager5 ÒÐ* – ðCluster > Service Clusterð ²J 5# 7' Service Cluster' , f* – O' –ž –É' de. 9. Server List • • L –~ * • * &5 2Ä: WASr ¢EG\$ êL de. 9.

! | Server\$ Manager: Scheduler5 : 7 –ž GáD, å 6 15Ã ö H» –ž o9.

4.5. Embedded WAS \]

4.5.1. \] ×)

×U ; 5 Manager5 Embedded WAS Server' –ž * % Ä7# \$ Manager5# ðService Clusterð' –ž * – Ö . 9. Manager: ðCluster > Server Clusterð ²J Ä45# WAS(Embedded) bc: ¿ ~ Service Cluster' ° n. 9.

4.5.2. ' 6 %&

. / ' 6 %&

WAS Container\$ 9RS TA ±N 3OL %PQD ×U o9..

' 6 t • %&	' 6 g / ' () *
Workload pq	Deployment	
Container Port	TCP : 8180	

ZXOu 76 %& Ð Workload t •

\@ ¾° Project] ^5 xy /O7# \@7ô ~ 3O - 12 †ö 3ÜG\$ Manifest ØÛ5 \@o Sample çA 9RS T9.

' 6 t • %&	' (	Sample g
Container Image	ProjectB Architecture / O5 xy , Bo OS > JDK O; 5 R\$ LENA Manager Image	lenacloud/lena-embedded:{TAG_NAME}
namespace	Kubernetes? > i \ œ• Ü	default
name	Workload: †@, † çA Pod †@ / Hostname: PrefixD ` @o9.	lena-was
label	Service2: `` / , LM5 ` @G\$ LabelD Key: Value– QD O: o9.	type: lena-was

' 6 t • %&	' (	Sample g
strategy:type	Deployment Update O} , RollingUpdate, RecreateÜ , f. UpdateO} ÜL %8	RollingUpdate
imagePullPolic y	† î s Pull O}	Always
replica Å •	Container (Pod) Å •	2
Probe	HttpGetAction, < è Page, ¾± Delay ¾%, Î %\$ Application Pn5 RCž 3O , -	00p5
%P] ^İ •	] ^İ • : 3OA ENV ' \$ Config MapQD 3O r =	(configMap • .)

3O r =.] ^İ • \$ 9RS T9.u] ^İ • 5 6. ' Š. 3ÜA ! " # Embedded WAS] ^İ • ÉÊL M¢. 9.

< =ef	' (	Sample g
LENA_CONFIG_TEMPLATE_ID	¥ Service Cluster Ü : Revision No	WAS-001:1
LENA_MANAGER_ADDRESS	¥ Service: Domain Î 1 : Uñ (+ # 34o Manager: Service Î 1)	lena-manager.defau lt.svc.cluster.lo cal:7700
LENA_MANAGER_MONITORIN G_PORT	¥ Manager Ć• Ž• Port Og	16100
LENA_APP_FILE	¥ Application Jar ØÜ Ü	sample-app.jar
LENA_APP_DIR	¥ Application Jar a b c i Ü	/usr/local/lena

Z XOu 76 %& Ð Servicet •

' 6 t • %&	' (	Sample g
namespace	Kubernetes? > i \ œ• Ü	default
name	Service' . B* \$ †@QD, namespace? 5# bÜ. ç † f ô . 9. † ç A Service DomainÎ 15 \ @o9.	lena-was
type	ÃÉD Service' 45* \$. , ÃÉD 45~ - š † * Q• BC 3O† Z, -	

4.5.3. Manifest . } \]

Workload

Kubernetes5#: Container\$ Pod &ÄD 34G¼, Kubernetes Object' %8. YAML ØÜc , : Manifest ØÜL ‡ n* – 34* \$ ê † Ü&\e • . † 9.

9RA Manager' 34*% Ä. Manifest ØÛ ‡¥†N, ' Š ?@A +# 3Üo 3O a : /O5
x y Project] ^5 RCž Ĩ ^* – ` @~ • t 9.

LENA Embedded WAS WorkloadÜŠ (Manifest) ØÛ K¾*

```

---
apiVersion: apps/v1
kind: Deployment
metadata:
  name: lena-was
spec:
  selector:
    matchLabels:
      type: lena-was
  replicas: 2
  strategy:
    type: RollingUpdate
  minReadySeconds: 10
  revisionHistoryLimit: 1
  template:
    metadata:
      labels:
        type: lena-was
    spec:
      containers:
        - name: lena-was
          image: docker.io/lenacloud/lena-embedded: {TAG_NAME}
          imagePullPolicy: Always
          ports:
            - containerPort: 8180
          envFrom:
            - configMapRef:
                name: configmap-lena-was
          readinessProbe:
            httpGet:
              path: /
              port: 8180
            initialDelaySeconds: 10
            periodSeconds: 5
          livenessProbe:
            httpGet:
              path: /
              port: 8180
            initialDelaySeconds: 15
            periodSeconds: 5
      volumes:
        terminationGracePeriodSeconds: 0

```

```
apiVersion: v1
kind: ConfigMap
metadata:
  name: configmap-lena-was
data:
  LENA_CONFIG_TEMPLATE_ID: "WAS-001"
  LENA_MANAGER_ADDRESS: "lena-manager.default.svc.cluster.local:7700"
  LENA_APP_FILE: "sample-app.jar"
```

¥ × U ^ € >

× U \$ kubectl apply -f lena-was-deployment-sample.yaml -n lena-was

```
$ kubectl apply -f lena-was-deployment-sample.yaml
```

¥ × U / S de >

× U o Workload \$ kubectl get deployments -n lena-was

```
$ kubectl get deployments
NAME READY AGE
lena-was 2/2 10s
```

Service

9RA Application Service' × U * % Ä. Manifest ØÙA 9RS T 9.

LENA Session ServiceÜŠ (Manifest) ØÙ K ¾

```
---
apiVersion: v1
kind: Service
metadata:
  name: lena-was
spec:
  selector:
    type: lena-was
  ports:
    - port: 8180
      targetPort: 8180
```

¥ × U ^ €

× U \$ kubectl apply -f lena-was-service-sample.yaml -n lena-was

```
$ kubectl apply -f lena-was-service-sample.yaml
```



```
¥ × U / S de
× U o Workload$ kubectl get ÜÝf ^ € L k 7 de ~ • t 9.
```

```
$ kubectl get services
NAME TYPE CLUSTER-IP EXTERNAL-IP PORT(S) AGE
...
lena-was ClusterIP 10.43.xx.xx <none> 8180/TCP 20s
```

4.5.4. Server • , < €

Manager5 ÒÐ* – ðCluster > Service Clusterŀ ² J 5# 7' Service Cluster' , f* – O' –ž –É' de. 9. Server List • • L –~ * • * & 5 2À: WASr €EG\$ êL de. 9.

!

Server\$ Manager: Scheduler5 : 7 –ž G á D, á 6 15Ã ö H» –ž o 9.

4.6. Web Server \]

4.6.1. \] ×)

× U ; 5 Manager5 Web Server' –ž * % Ä 7# \$ Manager5# ðService Clusterŀ' –ž * – ô . 9. Manager: ðCluster > Server Clusterŀ ² J Ä 4 5# WEB server bc: ¿ ~ Service Cluster' ° n. 9.

° n o Service Cluster: Template ™ 5# Web Server3OL . 9. 3O ? @ ù + # ° n o WAS2 Web Server " ©' Ä 7# \$ Virtual Host ™ 5# Proxy 3O† , - * 9.

3OL ÚÇ öTemplate5 6. RevisionL ° n. 9. Revision† ° nGf ô ÚÇo 3O: Downloadr r = 7í 9.

Service Cluster° n > hi h(' Š. ?@A B C E F " # e ŀ() H I J K ŀL M € . 9.

4.6.2. ' 6 %&

. / ' 6 %&

Web Server Container\$ 9RS TA ±N 3OL %PQD ×UGf ô . 9.

' 6 t • %&	' 6 g / ' () *
Workload pq	Deployment	
Container Port	TCP : 5180	ï ^ Z r

ZXOu 76 %& Ð Workload t •

\@ ¾° Project] ^ 5 x y / O 7# \ @ 7 ô ~ 3O - 1 2 † ö 3ÜG\$ Manifest ØÛ5 \ @ o Sample Ç A 9RS T 9.

' 6 t • %&	' (	Sample g
Container Image	ProjectB Architecture / O 5 x y , B o OS > JDK O; 5 R\$ LENA Manager Image	lenacloud/lena-web:{TAG_NAME}

' 6 t • %&	' (	Sample g
namespace	Kubernetes? > i \ œ• Ü	default
name	Workload: †@, † çA Pod †@ / Hostname: PrefixD ` @o9.	lena-web
label	Service2: `` / , LM5 ` @G\$ LabelD Key: Value– QD O: o9.	type: lena-web
strategy:type	Deployment Update O}	RollingUpdate
imagePullPolicy	† î s Pull O}	Always
replica Å•	Container (Pod) Å•	2
Probe (Health Check)	HttpGetAction · ¸ , < è Page, ¾ ‡ Delay¾%, Î %\$ Application Pn5 Rj 3O , -	0 p5, 5Ã Î %, 15Ã/20Ã Delay
%P] ^İ •	] ^İ • : 3OA ENV ' \$ Config MapQD 3O r =	(configMap · ¸)

3O r =.] ^İ • \$ 9RS T9. u] ^İ • 5 6. ' Š. 3ÜA ! " # [Web Server \] ^İ •](#)
ÉÊL Mç. 9.

< = e f	' (	Sample g
LENA_CONFIG_TE MPLATE_ID	¥ Service Cluster Ü : Revision No	WEB-001:1
LENA_MANAGER _ADDRESS	¥ Service: Domain Î 1 : Uñ (+ # 34o Manager: Service Î 1)	lena- manager.default.s vc.cluster.local:77 00
LENA_MANAGER _KEY	¥ LENA_MANAGER_KEY : Open APID Manager Ö...¾ , - . e%oCS ¥ Manager: Admin > Users ² J 5# der =	(ÀB Manager5# de k j , -)
LENA_CONFIG_TE MPLATE_DOWNL OAD	¥ 3O Og 9(D\$ – É	Y
LENA_CONTRACT _CODE	¥ y †, | 9(D\$' Ä. ©B H\$ ¥ y †, | ¯ - ¾ EFo H\$ ç	(ÀB H\$ de , -)
LENA_LICENSE_D OWNLOAD_URL	¥ y †, | 9(D\$ Ä4	manager
LENA_RUN_AGEN T	¥ Agent ^ €– É	Y

Z XOu 76 %& Ð Servicet •

' 6 t • %&	' (	Sample g
namespace	Kubernetes? > i \ œ• Ü	default
name	Service' ı B* \$ †@QD, namespace? 5# bÛ. ç † f ô . 9. † ç A Service DomainÎ 1 5 \ @o 9.	lena-web
type	ÃÉ D Service' 4 5* \$ · ı , ÃÉ D 4 5 ~ - š † * Q• BC 3 O† Z, -	NodePort (port 31180)

4.6.3. Manifest . } \]

Workload

Kubernetes5#: Container\$ Pod &ÄD 3 4G¼, Kubernetes Object' %8. YAML ØÛc ı : Manifest ØÛL ‡ n* – 3 4* \$ ê † Û&\ e · ı † 9.

9RA Manager' 3 4* % Ä. Manifest ØÛ ‡ ¥† N, ' Š ?@A + # 3 Üo 3 O a : / O 5 x y Project] ^ 5 RCž Ĩ ^* – ` @~ • t 9.

LENA Web WorkloadÛŠ (Manifest) ØÛ K¾

```

---
api Version: apps/v1
kind: Deployment
metadata:
  Ê name: lena-web
spec:
  Ê selector:
  Ê   matchLabels:
  Ê     type: lena-web
  Ê replicas: 1
  Ê strategy:
  Ê   type: RollingUpdate
  Ê minReadySeconds: 10
  Ê revisionHistoryLimit: 1
  Ê template:
  Ê   metadata:
  Ê     labels:
  Ê       type: lena-web
  Ê   spec:
  Ê     containers:
  Ê       - name: lena-web
  Ê         image: docker.io/lenacloud/lena-web: {TAG_NAME}
  Ê         imagePullPolicy: Always
  Ê         ports:
  Ê       - containerPort: 7180
  Ê     readinessProbe:
  Ê       httpGet:
  Ê         path: /

```

```

    port: 7180
    initialDelaySeconds: 5
    periodSeconds: 5
    livenessProbe:
      httpGet:
        path: /
        port: 7180
    initialDelaySeconds: 10
    periodSeconds: 10
    envFrom:
    - configMapRef:
        name: configmap-lena-web
    terminationGracePeriodSeconds: 0

---
apiVersion: v1
kind: ConfigMap
metadata:
  name: configmap-lena-web
data:
  LENA_MANAGER_ADDRESS: "lena-manager.default.svc.cluster.local:7700"
  LENA_AGENT_RUN: "Y"
  LENA_CONFIG_TEMPLATE_ID: "WEB-001:1"
  LENA_CONFIG_TEMPLATE_DOWNLOAD: "Y"
  LENA_MANAGER_KEY:
    "aSw7RMPSw15LeN%2FMZnrxzjgV0BzZe18iVHZbJ8CkdLIea2Ecd8Al eK9oPCLXuW%3D%3D"
  LENA_LICENSE_DOWNLOAD_URL: "manager"
  LENA_CONTRACT_CODE: "dX89RRxPk6/PBPqbUuYm7w=="

```

¥ × U ^ €
 × U \$ kubectl apply -f lena-web-deployment-sample.yaml † y • × U
 ÜÝA 9RS T 9.

```
$ kubectl apply -f lena-web-deployment-sample.yaml
```

¥ × U / S de
 × U o Workload\$ kubectl get -f lena-web-deployment-sample.yaml

```

$ kubectl get deployments
NAME READY AGE
lena-web 2/2 10m
lena-was 2/2 10s

```

Service

9RA Application Service' × U * % Ä. Manifest ØÙA 9RS T 9.

LENA Session ServiceÜŠ (Manifest) ØÜ K¾

```
---
apiVersion: v1
kind: Service
metadata:
  name: lena-web
spec:
  selector:
    type: lena-web
  ports:
    - nodePort: 31180
      port: 7180
      targetPort: 7180
      type: NodePort
```

¥ ×U^ €
 ×U\$ kubectl apply ÜÝQD ^ €. 9. ØÜÜ† lena-web-service-sample.yaml† y • ×U ÜÝA
 9RS T9.

```
$ kubectl apply -f lena-web-service-sample.yaml
```

¥ ×U/S de
 ×Uo Workload\$ kubectl get ÜÝf ^ €L k 7 de ~ • t9.

```
$ kubectl get services
NAME TYPE CLUSTER-IP EXTERNAL-IP PORT(S) AGE
...
lena-web NodePort 10.43.xx.xx <none> 7180:31180/TCP 13h
...
```

4.6.4. Server • , < Æ

Manager5 ØÐ* – @Cluster > Service Cluster0 ²J5# 7' Service Cluster' , f* – O'
 –ž –É' de. 9. **Server List** • • L –~ * • * &5 2Ä: Web Serverr ¢EG\$ êL de. 9.

!

Server\$ Manager: Scheduler5 : 7 –ž GáD, å6 15Ã ö H» –ž o9

Chapter 5. ECS . } ' s

! Ç5#\$ ECS] ^5# LENA #O ' \$ LENA †î s %&: 2¥i 3†< L ContainerD ×U* \$. 6L 3Ü. 9. AWS ConsoleL k 7# 34* \$. 6L 3Ü. 9. ' . , Ü&\e ECS 3O5 6. ÉÊA EÂ* N, ECS] ^5# LENA' m» *% Ä7 , - . ?@µ 9> 9.

5.1. ECS '

ECS\$ AWS5# EF* \$ Container #{ | ¥ÖÖQD, Docker' †@* – EC2 e| ä| ' 5# Container' ×U/() * N, » Û Service' EF* \$ Container' Task &ÄD œf # Replica, Service Discovery, L/B, Auto-scale O} —L hi ~ • t \$ %=L EF. 9.

5.2. ' s x)

9RS TA ECS] ^††î i P{ Gf tf ô . 9.

¥ ECS Cluster > ECS ‡ ´ ±.

¥ ECS] ^5# Ö... r =. Docker Registry (K : ECR, Docker Hub)

–r \QD Container %& Manager' 34* % Ä7#\$ ÂÉ ÚÇ1r , - * N, †êA Manager Container: ° n/1î ¾5C %¶ " †Ž > ØÛL sÐ\QD bs* % Ä7 ` @o9.

¥ EFS — ÂÉ ÚÇ1 r =] ^ de

Container %& Manager > Session Server' 34* % Ä7#\$ Service Discovery %=† \@G\$] ^ (awsvpc %& EC2, Fargate > s^a Region)es ` ; de† , - * 9.

¥ ECS Service Discovery \@ r =] ^

5.3. Manager \]

ECS] ^5#C Manager Instance:) Ðn gÇL *% Ä7# 1) NOÎ 1 2) ÂÉ Volume W r s r , - * 9. NOÎ 1 \$ ECS: Service DiscoveryÍ ELB ¨ /L k 7# r =* ¼, ÂÉ VolumeA EFS ¨ /' k 7 EF r =* 9. * %5#\$ Service Discovery2 EFS' Å@. Manager ×U5 67 3Ü. 9.

5.3.1. ' 6 %&

. / ' 6 %&

Manager Container\$ 9RS TA ±N 3OL %PQD ×UGf ô . 9.

Table 2. ECS%& Manager 3 4 - ×U %P

' 6 t • %&	' 6 g / ' () *
Service bc	Replica	-
ReplicaÂ •	1	-
Service Discovery	Service Discovery ` @	-
Volume Mount	a b c i /usr/local/lena/repository' EFS5 ¨ /	-

ZXOu 76 %&

\@ ¾° Project] ^5 xy /O7# \@7ô ~ 3O - 12 †ö 3ÜG\$ 34SO5# ` @G\$ Sample çA 9RS T9.

Table 3. ECS%& Manager 3 4 - \@¾° /O a

' 6 t • %&	' (	Sample g
Container Image	ProjectB Architecture / O5 xy , B o OS > JDK O; 5 R\$ LENA Manager Image	lenacloud/lena-manager:{TAG_NAME}
Probe (Health Check)	HttpGetAction, Ø/lenaØ J † s p5	
Task > Service name	Task > Service : † @	lena-manager
Service Namespace	ServiceL M¾ Domain Î 1 : SuffixD ` @	local
Service Discovery Name	ServiceL M¾ Domain Î 1 : PrefixD ` @	lena-manager

3O r =.] ^İ • \$ 9RS T9. u] ^İ • 5 6. ' Š. 3ÜA ! " #: Manager] ^İ • ÉÊ Mç. 9.

Table 4. ECS%& Manager 3 4 -] ^İ •

< = e f	' (	Sample g
LENA_JVM_HEAP_SIZE	¥ Heap Memory è % s O	1024m (%!)
LENA_JVM_METASPACE_SIZE	¥ Metaspace Memoryè %	256m (%!)
LENA_MANAGER_DOMAIN_ENABLED	¥ Domain Name Å n Û – É	Y
LENA_MANAGER_ADDRESS	¥ Service: Domain Î 1 : Uñ	lena-manager.local:7700
JAVA_DOMAIN_CACHE_TTL	¥ Domain Î 1 Cache ¾ % (Ã)	3 (%!)

5.3.2. Task ' 6

Task: † @, ±. —A Project: ~ P5 xy k j * Æ ± N * ¼, * %5# \$ Container O: ù LENA () L Ä7 , - . ÉÊ µ 3Ü. 9. * %5 3ÜG\$ 3O: %PA 3O a ÉÊ: 3ÜL Mç. 9.

Task 6U

Container Og' UV* \$ Task' O: . 9.



Figure 15. ECS%& Manager 3 4 - Task O:

Volume ' h

Task O: 5# Manager Repository' ÚÇ~ EFS2 ÚÇÄ4' Og' ¬r . 9.

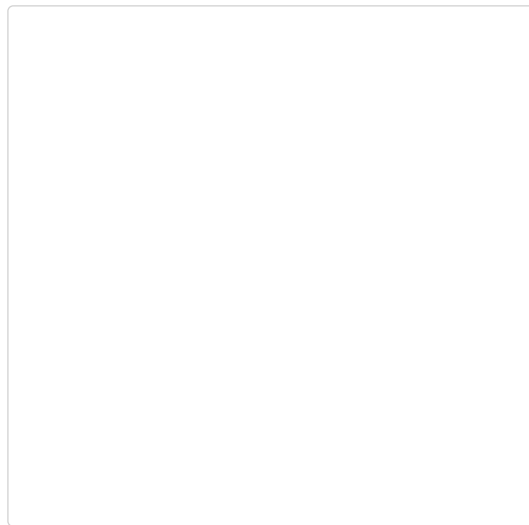


Figure 16. ECS%& Manager 3 4 - Volume ¬r

Container ' h

†@,†† s—: %! ContainerOg' kᵢ . 9.



Figure 17. ECS%& Manager 3 4 - Container ¬r

<=ef ' 6

Container 3Où] ^İ • ' ¬r . 9. Manager ?É5# Manager: Service Discovery Î 1' e , * s
• * áD †'] ^İ • LENA_MANAGER_ADDRESSED kᵢ L . 9.



Figure 18. ECS%& Manager 3 4 -] ^İ • 3O

Health Check ' 6

<http://localhost:7700/lena/> J † s' p5* \$ Health Check Og' k i . 9.

Volume " "

+ # ¬r . VolumeL Container? É Directory2 I ³ . 9.

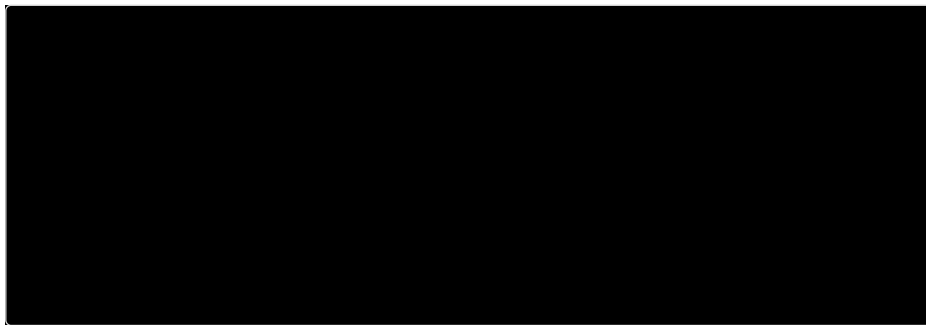


Figure 19. ECS%& Manager 3 4 - Volume I ³

5.3.3. Service ' 6

|) 1 6U

+ # O: . Task' ^ E %» /() * % Ä. Service' O: . 9.

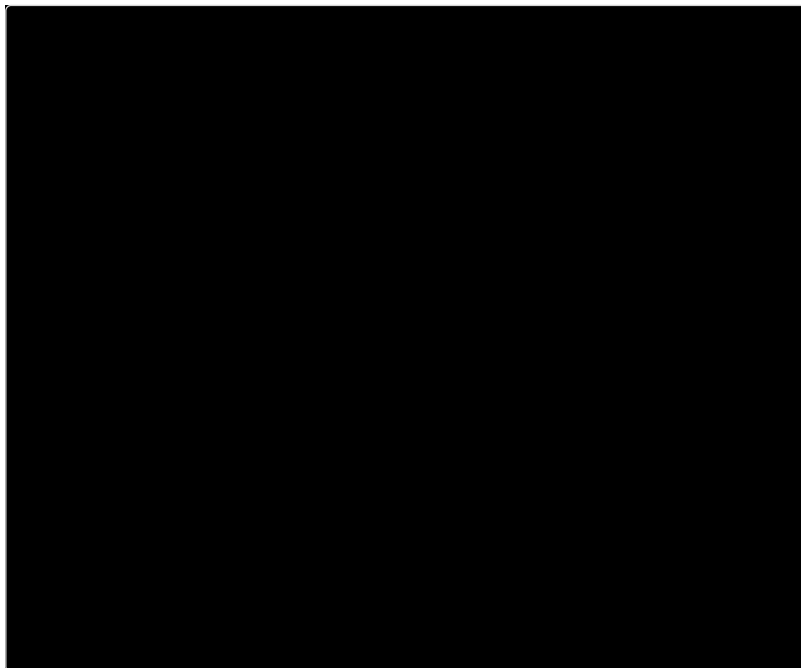


Figure 20. ECS%& Manager 3 4 - Service O:

|) 1 • – (Service Discovery) ' 6

AWS\$ ECS% # { | û L " / * – ` @ ~ • t C ž # { | L M (Service Discovery) %=L s^a . 9.
 Manager\$ Service Discovery %=L † @ * – N O o Î 1' dg* –, P Server: 3 O h i > Æ • Ž •
 %=L E F . 9.



Figure 21. ECS%& Manager 3 4 - Service Discovery 3 O

5.3.4. Service . — „ < Æ

Service %» A Service O: ' Ú Ç * • %» † ¾ † o 9. ECS Cluster: Û • 5 # # { | > ‡ ´ ™ 5 #
 () ù e Service 2 Task: ' " ' d e . 9.

Service ~ ™ < Æ

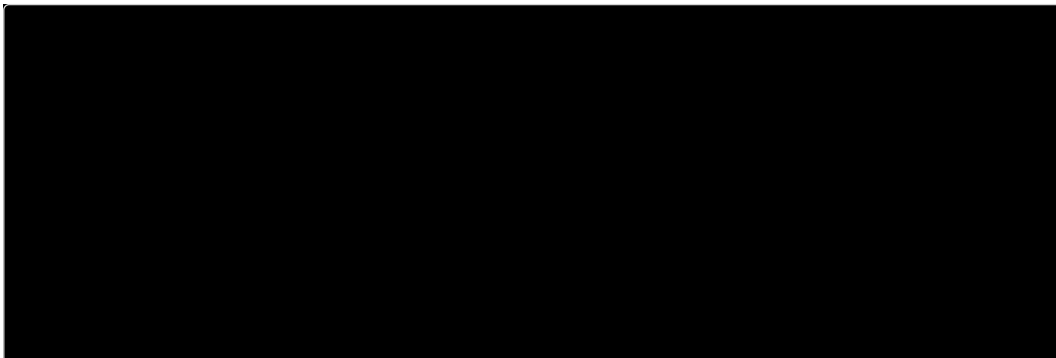


Figure 22. ECS%& Manager 3 4 - Service ' " d e

Task ~ ™ < Æ

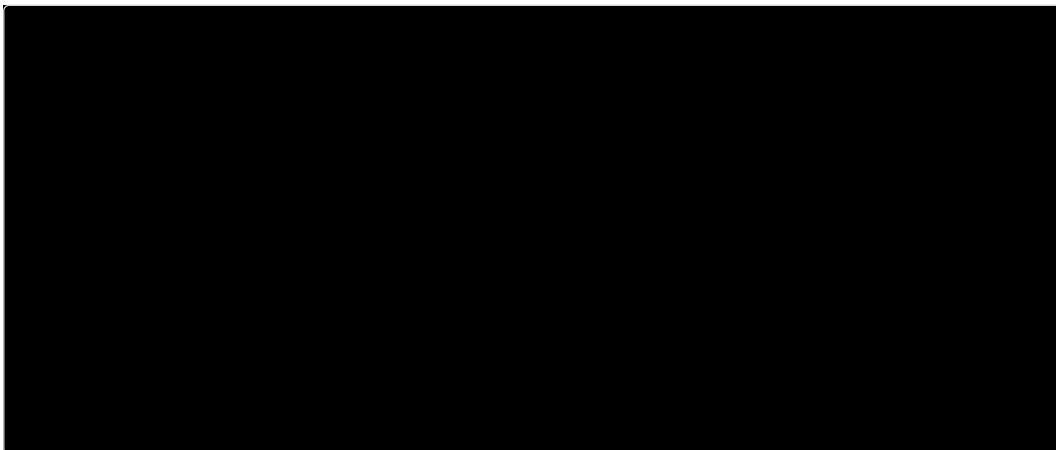


Figure 23. ECS%& Manager 3 4 - Task ' " d e

5.4. Session Server \]

ECS5#] ^5#C Session Server: # { | ' Ä 7 NOÎ 1r , - * 9. NO Î 1\$ ECS: Service DiscoveryÍ ELB ¨ / L k 7# r = * 9. 9R5#\$ Service Discovery ' Å@. Session Server xU5 6 7 3Ü. 9.

5.4.1. \] x)

! " # [Session Server xU P{](#) É Ê 3ÜL M¢. 9.

5.4.2. ' 6 %&

. / ' 6 %&

Session Server Container\$ 9RS TA ±N 3OL %PQD xUGf ô . 9.

Table 5. ECS %& Session Server xU %P

' 6 t • %&	' 6 g / ' () *
Service p q	Replica	-
Service / ReplicaÅ •	Service 2Å, u Service B Replica 1Å	-
Container Port	TCP : 5180	-
Probe	\${LENA_SERVER_HOME}/healt h.sh p 5	-

ZXOu 7 6 %&

\ @ ¾° Project] ^5 x y / O7# \ @7ô ~ 3O - 1 2 † ö 3ÜG\$ Task > Service 3O5
\ @o Sample ç A 9RS T 9.

Table 6. ECS%& Session Server 3 4 - \ @¾° / O a

' 6 t • %&	' (	Sample g
Container Image	ProjectB Architecture / O5 x y , B o OS > JDK O; 5 R\$ LENA Manager Image	lenacloud/lena- session:{TAG_NAME}
Task > Service name	Task > Service : † @	lena-session
Service Namespace	ServiceL M¾ Domain Î 1 : SuffixD ` @	local
Service Discovery Name	ServiceL M¾ Domain Î 1 : PrefixD ` @	lena-session

3O r =.] ^İ • \$ 9RS T 9. u] ^İ • 5 6. ' Š. 3ÜA " # [Session Server \] ^İ •](#) É Ê
M¢

Table 7. ECS%& Session Server 3 4 -] ^İ •

< = e f	' (	Sample g
LENA_JVM_HEAP_SIZE	¥ Heap Memory è % s O	1024m (%!)

< = e f	' (	Sample g
LENA_CONFIG_TEMPL ATE_ID	¥ Service Cluster Ü : Revision No	SESSION-001
LENA_MANAGER_ADD RESS	¥ Service: Domain Î 1 : Uñ	lena- manager.local:7700
JAVA_DOMAIN_CACHE _TTL	¥ Domain Î 1 Cache ¾% (Ã)	0 (%!)
LENA_SESSION_0_AD DRESS	¥ Primary Session # O: # { | Î 1, Service Ü > Service Discovery 3 O 5 x ë C² e Î 1 2 Ü 4 G f ô V	lena-session- 0.local:5180
LENA_SESSION_1_AD DRESS	¥ Secondary Session # O: # { | Î 1, Service Ü > Service Discovery 3 O 5 x ë C² e Î 1 2 Ü 4 G f ô V	lena-session- 1.local:5180
LENA_SESSION_EXPIR E_SEC	¥ Session µ l ¾% (Ã)	1800 (%!)
LENA_CONFIG_SHARE _SESSION	¥ Application % Session F b – É	N

5.4.3. Task ' 6

Task: † @, ±. —A Project: ~ P5 x y k j * %' ± N* ¼, 9 R 5 # \$ Container O: ù LENA
() L Ä 7 , - . É Ê µ 3 Ü. 9. * % 5 3 Ü G \$ 3 O: % P A 3 O a É Ê: 3 Ü L M ¢. 9.

Task 6U

Container Og' UV * \$ Task' O: . 9.

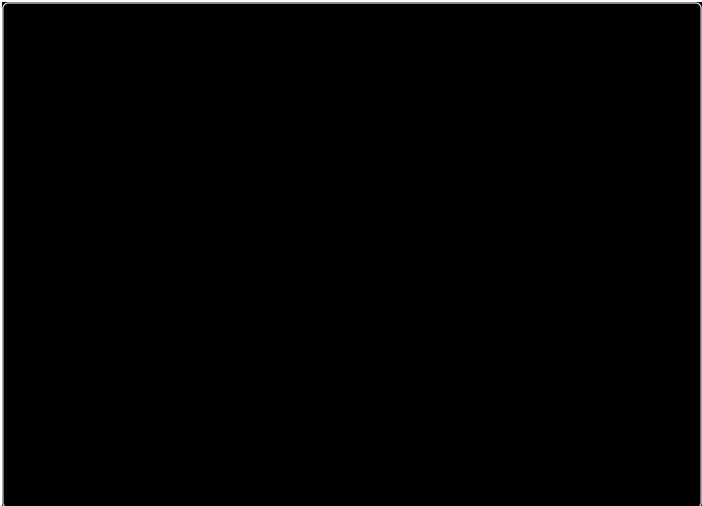


Figure 24. ECS%& Session Server 3 4 - Task O:

Container ' h

† @, † î s —: %! ContainerOg' k j . 9.



Figure 25. ECS%& Session Server 3 4 - Container -r

<=ef ' 6

Container 3O ù] ^İ • ' -r . 9.



Figure 26. ECS%& Session Server 3 4 -] ^İ • 3O

■

LENA_SESSION_1_ADDRESS] ^İ • 5 &§¾ Secondary Session Service: Service
Discovery Î 1' k j . 9.

5.4.4. Service ' 6

|) 1 6U

+ # O: . Task' ^ E %» /() * % Ä. Service' O: . 9.



Figure 27. ECS%& Session Server 3 4 - Service O:

|) 1 • – (Service Discovery) ' 6

AWS\$ ECS% # { | û L ' / * – ` @ ~ • t C Ž # { | L M (Service Discovery) %=L s^a . 9.
 Manager\$ Service Discovery %=L † @ * – N O o î 1' dg * – , P Server: 3 O h i > æ • Ž •
 %=L E F . 9.

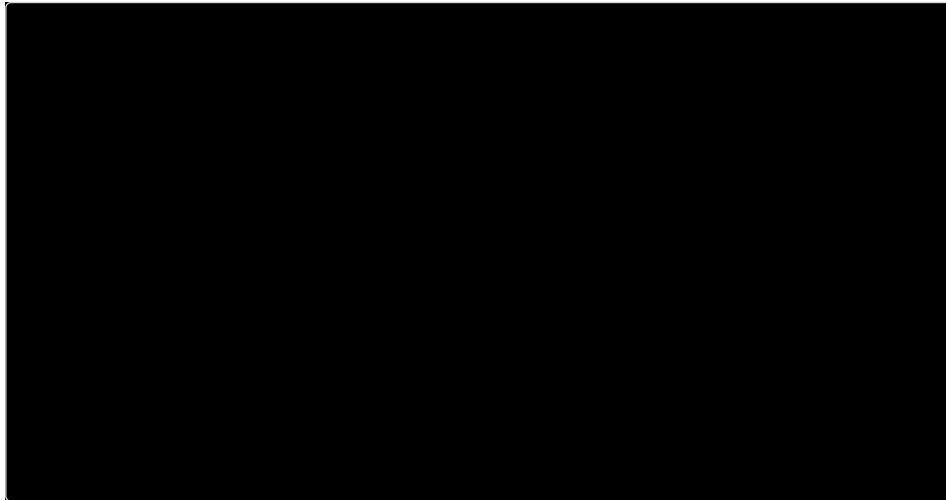


Figure 28. ECS%& Session Server 3 4 - Service Discovery 3 O

5.4.5. Service . — „ < æ

Service %» A Service O: ' Ū Ç * • %» † ¾ † o 9. ECS Cluster: Ū • 5 # # { | > ‡ ´™ 5 #
 () ù e Service2 Task: ' " ' d e . 9

Service ~™ < æ



Figure 29. ECS%& Session Server 3 4 - Service ' " d e

Task ~ ™ < Œ

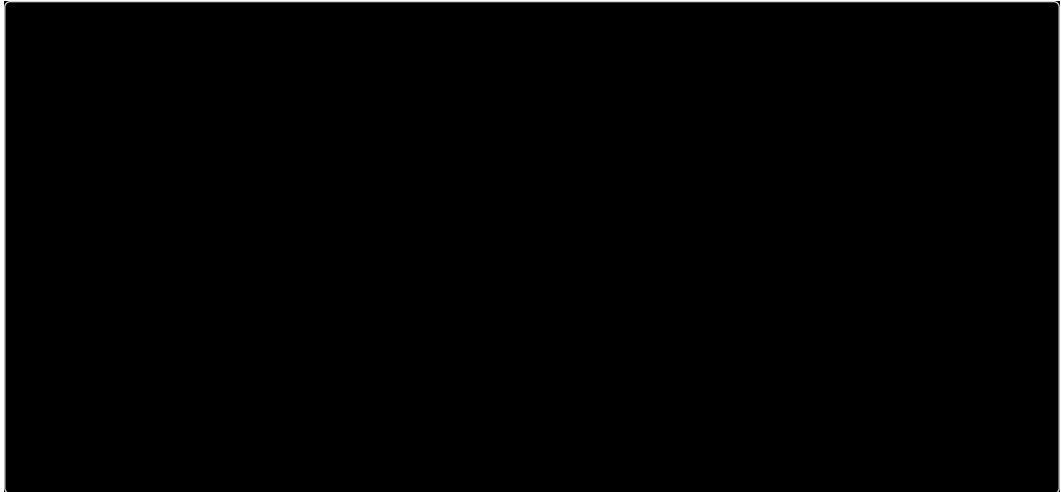


Figure 30. ECS%& Session Server 3 4 - Task ' " d e

5.5. WAS \]

5.5.1. \] x)

! " # WAS xUP{ ÉÊ 3ÜL M¢. 9.

5.5.2. ' 6 %&

. / ' 6 %&

WAS Container\$ 9RS TA ±N 3OL %PQD xU o9..

Table 8. ECS%& WAS 3 4 - xU %P

' 6 t • %&	' 6 g / ' () *
Service pq	Replica	
Container Port	TCP : 8180	-

ZXOu 76 %&

\@ ¾° Project] ^5 xy /O7# \@7ô ~ 3O - 12 †ö 3ÜG\$ Task > Service 3O5
\@o Sample çA 9RS T9.

Table 9. ECS%& WAS 3 4 - \ @¾° / O a

' 6 t • %&	' (	Sample g
Container Image	ProjectB Architecture / O5 x y , B o OS > JDK O; 5 R\$ LENA Manager Image	lenacloud/lena-cluster:{TAG_NAME}
Task > Service name	Task > Service : † @	lena-was
label	Service2: `` / , L M5 ` @G\$ LabelID Key: Value– QD O: o 9.	type: lena-was
Service Namespace	ServiceL M¾ Domain Î 1 : SuffixD ` @	local
Service Discovery Name	ServiceL M¾ Domain Î 1 : PrefixD ` @	lena-was
Probe (Health Check)	< è Page, ¾± Delay ¾%, Î %\$ Application P n5 RCž 3 O , -	0/0 p 5

3 O r = .] ^İ • \$ 9RS T 9. u] ^İ • 5 6. ' Š. 3ÜA ! " # WAS] ^İ • ÉÊL MΦ. 9.

Table 10. ECS%& WAS 3 4 -] ^İ •

< = e f	' (	Sample g
LENA_CONFIG_TEMPL ATE_ID	¥ Service Cluster Ü : Revision No	WAS-001:1
LENA_MANAGER_ADD RESS	¥ Service: Domain Î 1 : Uñ (+ # 3 4 o Manager: Service Î 1)	lena- manager.local:7700
LENA_MANAGER_KEY	¥ LENA_MANAGER_KEY : Open APID Manager Ö...¾ , - . e % c s ¥ Manager: Admin > Users ² J 5 # de r =	(À B Manager: Administration > IAM > Users ² J 5 # de > k j , -)
LENA_CONFIG_TEMPL ATE_DOWNLOAD	¥ 3 O Og 9 (D\$ – É	Y
LENA_CONTRACT_CO DE	¥ y † , | 9 (D\$ ' Ä. © B H\$ ¥ y † , | - - ¾ E F o H\$ ç	(À B H\$ de , -)
LENA_LICENSE_DOWN LOAD_URL		manager
JAVA_DOMAIN_CACHE _TTL	¥ Domain Î 1 Cache ¾% (Ä)	3 (%!)

5.5.3. Task ' 6

Task: † @, ±. —A Project: ~ P5 x y k j * %' ± N * ¼, * % 5 # \$ Container O: ù LENA
() L Ä 7 , - . ÉÊµ 3Ü. 9. * % 5 3ÜG\$ 3O: %PA ! " # 3 O a ÉÊ: 3ÜL
MΦ. 9.

Task 6U

ECS%& WAS 3 4 - TaskO:

Container Og' UV* \$ Task' O: . 9.



Container ' h

†@,†î s—: %! ContainerOg' k j . 9.



Figure 31. ECS%& WAS 3 4 - Container ¬r

<=ef ' 6

Container 3Où] ^ï • ' ¬r . 9.

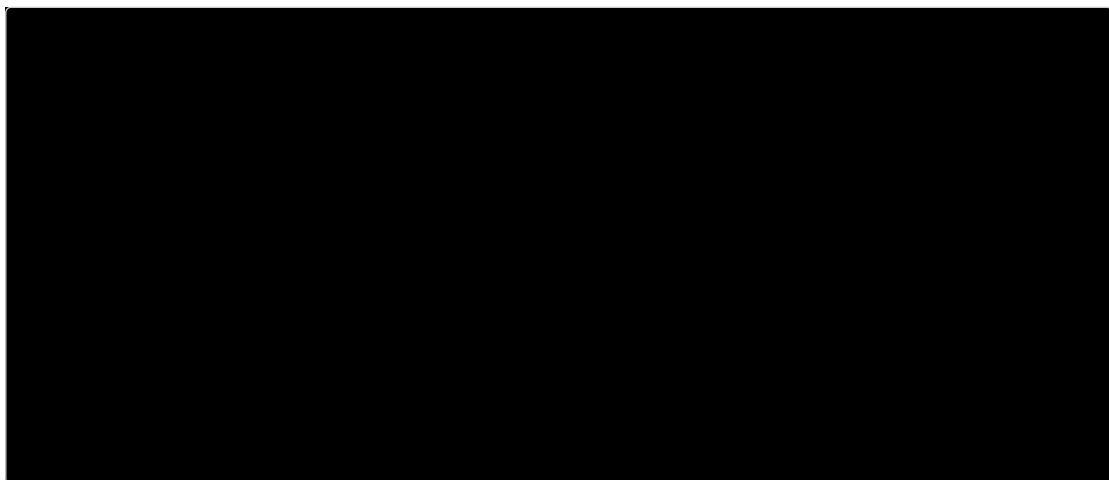


Figure 32. ECS%& WAS 3 4 -] ^ï • 3O

5.5.4. Service ' 6

|) 1 6U

+ # O: . Task' ^ E %» / () * % Ä. Service' O: . 9.

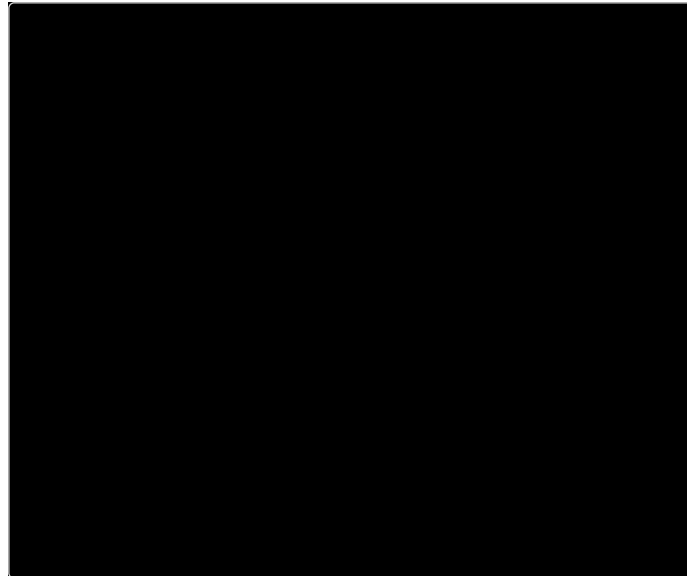


Figure 33. ECS%& WAS 3 4 - Service O:

|) 1 • – (Service Discovery) ' 6

AWS\$ ECS% # { | û L `` / * – ` @ ~ • t Cž # { | L M (Service Discovery) %=L s^a . 9.
Manager\$ Service Discovery %=L † @ * – NOo Î 1' dg* –, P Server: 3O hi > Æ• Ž•
%=L EF. 9.

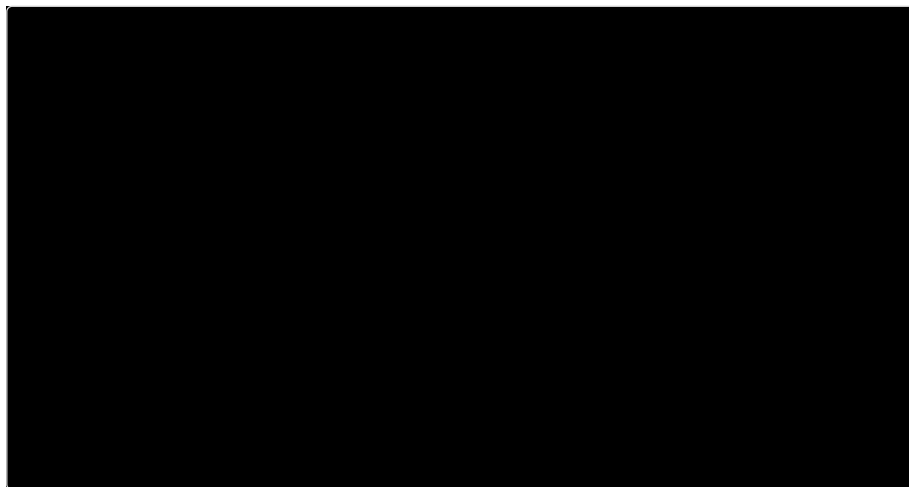


Figure 34. ECS%& WAS 3 4 - Service Discovery 3 O

5.5.5. Service . — „ < Æ

Service %» A Service O: ' ÚÇ* • %» † ¾ ‡ o 9. ECS Cluster: Û• 5# # { | > ‡ ´™ 5#
() ù e Service2 Task: ' " ' d e. 9.

Service ~™ < Æ



Figure 35. ECS%& WAS 3 4 - Service ' " d e

Task ~ ™ < Æ

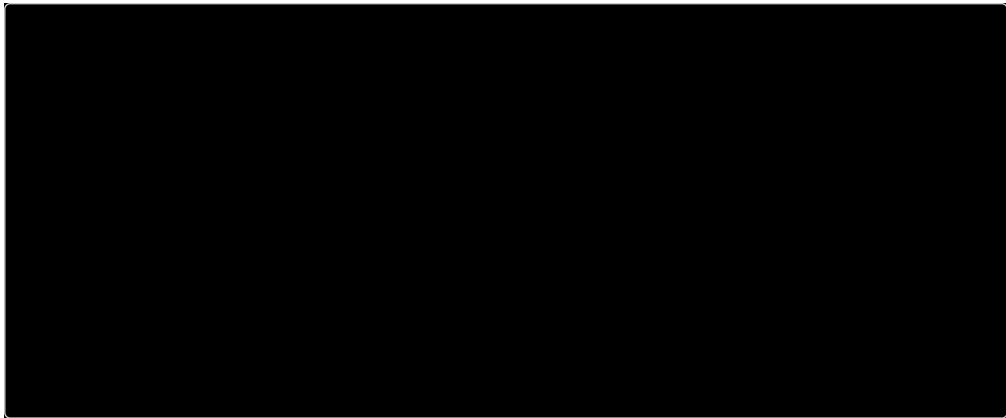


Figure 36. ECS%& WAS 3 4 - Task ' " d e

5.6. Embedded WAS \]

5.6.1. \] ×)

! " # [Embedded WAS ×UP{](#) É Ê 3ÜL M¢. 9.

5.6.2. ' 6 %&

. / ' 6 %&

Embedded WAS Container\$ 9RS TA ±N 3OL %PQD ×U o9..

Table 11. ECS%& Embedded WAS 3 4 - ×U %P

' 6 t • %&	' 6 g / ' () *
Service p q	Replica	
Container Port	TCP : 8180	-

ZXOu 76 %&

\@ ¾° Project] ^5 x y / O7# \@7ô ~ 3O - 12 †ö 3ÜG\$ Task > Service 3O5
\@o Sample çA 9RS T9.

Table 12. ECS%& WAS 3 4 - \@¾° / O a

' 6 t • %&	' (	Sample g
Container Image	ProjectB Architecture / O5 x y , B o OS > JDK O; 5 R\$ LENA Manager Image	lenacloud/lena-embedded:{TAG_NAME}
Task > Service name	Task > Service : † @	lena-was
label	Service2: `` / , L M5 ` @G\$ LabelD Key: Value– QD O: o 9.	type: lena-was
Service Namespace	ServiceL M¾ Domain Î 1 : SuffixD ` @	local
Service Discovery Name	ServiceL M¾ Domain Î 1 : PrefixD ` @	lena-was
Probe (Health Check)	< è Page, ¾± Delay ¾%, Î %\$ Application Pn5 RCž 3O , -	0/0 p 5

3O r =.] ^İ • \$ 9RS T9.u] ^İ • 5 6. ' Š. 3ÜA ! " # [Embedded WAS \] ^İ • ÉÊL MΦ. 9.](#)

< = e f	' (	Sample g
LENA_CONFIG_TEMPLATE_ID	¥ Service Cluster Ü : Revision No	WAS-001:1
LENA_MANAGER_ADDRESS	¥ Service: Domain Î 1 : Uñ (+ # 34o Manager: Service Î 1)	lena-manager.default.svc.cluster.local:7700
LENA_MANAGER_MONITORING_PORT	¥ Manager Ė • Ž • Port Og	16100
LENA_APP_FILE	¥ Application Jar ØÛ Ü	sample-app.jar
LENA_APP_DIR	¥ Application Jar a b c i Ü	/usr/local/lena

5.6.3. Task ' 6

Task: † @, ±. —A Project: ~ P5 x y k i * %' ±N* ¼, * %5# \$ Container O: ù LENA () L Ä7 , - . ÉÊµ 3Ü. 9. * %5 3ÜG\$ 3O: %PA ! " # [3O a ÉÊ: 3ÜL MΦ. 9.](#)

Task6U

ECS%& Embedded WAS 3 4 - TaskO:
Container Og' UV* \$ Task' O: . 9.



Container ' h

†@,†î s—: %! ContainerOg' k_j . 9.



Figure 37. ECS%& Embedded WAS 3 4 - Container ¬r

<=ef ' 6

Container 3Où] ^ï • ' ¬r . 9.

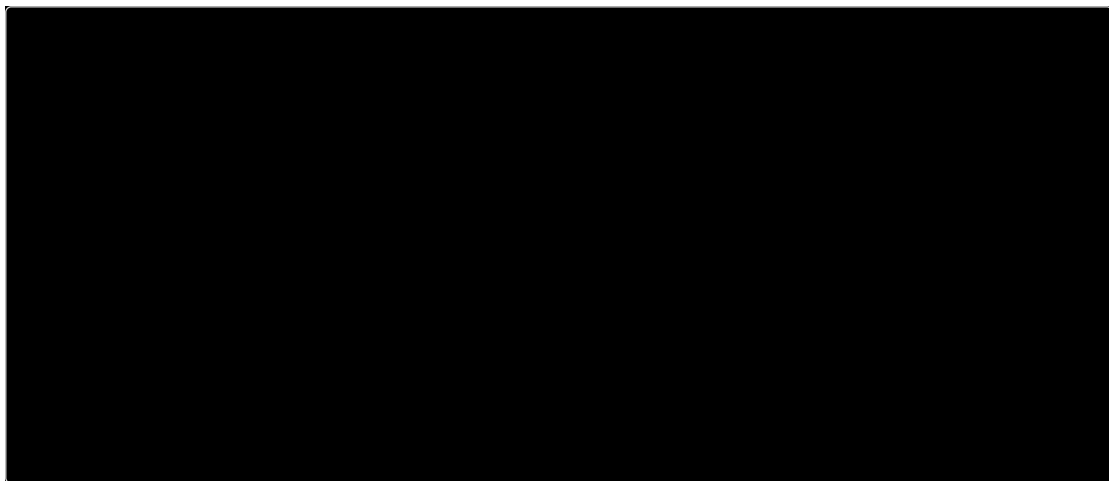


Figure 38. ECS%& Embedded WAS 3 4 -] ^ï • 3O

5.6.4. Service ' 6

|) 1 6U

+ # O: . Task' ^ E %» /() * % Ä. Service' O: . 9.

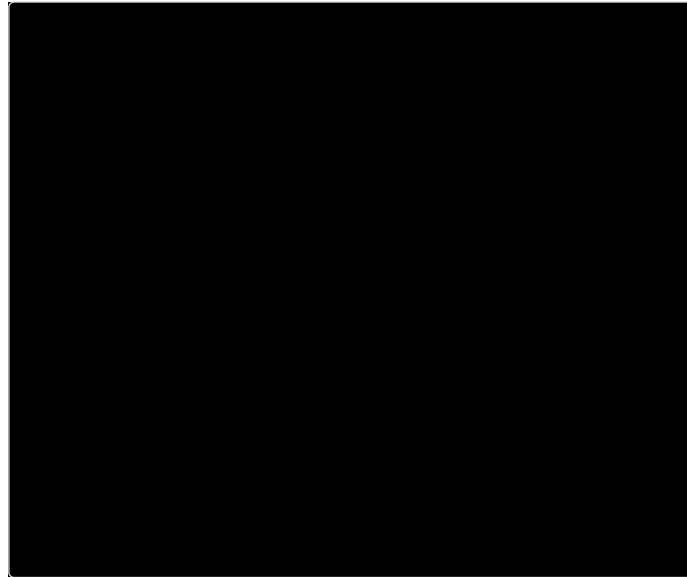


Figure 39. ECS%& WAS 3 4 - Service O:

|) 1 • – (Service Discovery) ' 6

AWS\$ ECS% # { | ū L ' / * – ` @ ~ • t C ž # { | L M (Service Discovery) %=L s^a . 9.
 Manager\$ Service Discovery %=L † @ * – N O o Î 1' d g * – , P Server: 3 O h i > Æ • Ž •
 %=L E F . 9.

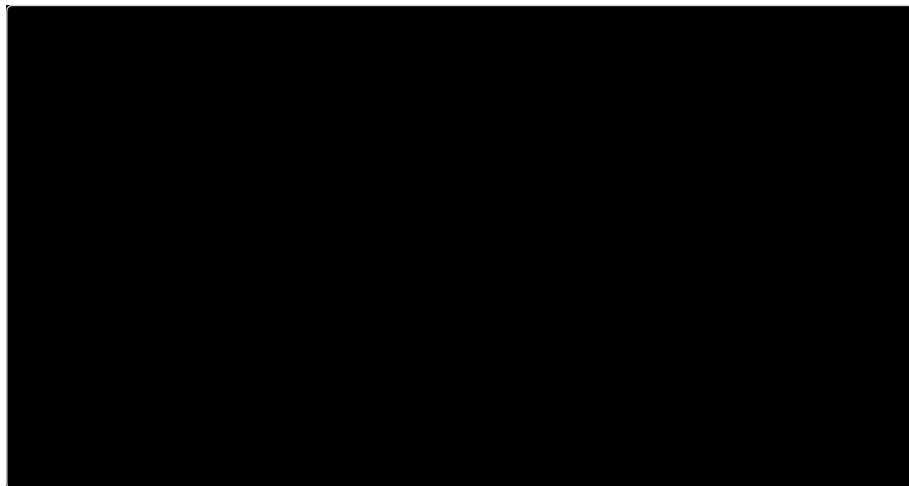


Figure 40. ECS%& Embedded WAS 3 4 - Service Discovery 3 O

5.6.5. Service . — „ < Æ

Service %» A Service O: ' Ū Ç * • %» † ¾ ‡ o 9. ECS Cluster: Ū • 5 # # { | > ‡ ´ ™ 5 #
 () ù e Service2 Task: ' " ' d e . 9.

Service ~ ™ < Æ



Figure 41. ECS%& WAS 3 4 - Service ' " de

Task ~ ™ < Æ



Figure 42. ECS%& WAS 3 4 - Task ' " de

5.7. Web Server \]

5.7.1. \] ×)

! " # [Web Server × U P{](#) É Ê: 3ÜL M¢. 9.

5.7.2. ' 6 %&

. / ' 6 %&

Web Server Container\$ 9RS TA ±N 3OL %PQD ×UGf ô . 9.

Table 13. ECS%& Web Server 3 4 - × U %P

' 6 t• %&	' 6 g / ' () *
Service pq	Replica	-
Container Port	TCP : 7180	-

ZXOu 76 %&

\@ ¾° Project] ^5 xy /O7# \@7ô ~ 3O - 12 †ö 3ÜG\$ ECS Task > Service 3O5 \@o Sample çA 9RS T9.

Table 14. ECS%& Web Server 3 4 - \@¾° /O a

' 6 t • %&	' (	Sample g
Container Image	ProjectB Architecture / O5 x y , B o OS > JDK O; 5 R\$ LENA Manager Image	lenacloud/lena-web:{TAG_NAME}
Task > Service name	Task: † @, † ç A Task † @ / Hostname: PrefixD ` @ o 9.	lena-web
replica Å •	Container (Task) Å •	2
Probe (Health Check)	¾ ‡ Delay¾%, Î %\$ Application Þ n 5 Rj 3 O , -	0/0 p 5
Service Namespace	ServiceL M¾ Domain Î 1 : SuffixD ` @	local
Service Discovery Name	ServiceL M¾ Domain Î 1 : PrefixD ` @	lena-web

3 O r = .] ^İ • \$ 9RS T 9. u] ^İ • 5 6. ' Š. 3ÜA ! " # [Web Server](#)] ^İ • É Ê L MΦ. 9.

Table 15. ECS%& Web Server 3 4 -] ^İ •

< = e f	' (	Sample g
LENA_CONFIG_TEMPLATE_ID	¥ Service Cluster Ü : Revision No ¥ Revision Nor ž ç e ^ý Default RevisionL 9(D\$ ÅR	WEB-001:1
LENA_MANAGER_ADDRESS	¥ Service: Domain Î 1 : Uñ (+ # 3 4 o Manager: Service Î 1)	lena-manager.local:7700
LENA_MANAGER_KEY	¥ LENA_MANAGER_KEY : Open APID Manager Ö...¾, - . e %oCS ¥ Manager: Admin > Users ² J 5# der =	(ÅB Manager5# de k j , -)
LENA_CONFIG_TEMPLATE_DOWNLOAD	¥ 3 O Og 9(D\$ – É	Y
LENA_CONTRACT_CODE	¥ y † , | 9(D\$' Ä. ©B H\$ ¥ y † , | - - ¾ EF o H\$ ç	(ÅB H\$ de , -)
LENA_LICENSE_DOWNLOAD_URL	¥ y † , | 9(D\$ Ä 4	manager
LENA_RUN_AGENT	¥ Agent ^ € – É	Y

5.7.3. Task ' 6

Task: † @, ±. —A Project: ~ P5 x y k j * N, Container O: ù LENA () L Ä 7 , - . É Ê μ 3Ü. 9. * %5 3ÜG\$ 3O: %PA ! " # [3Oa](#) É Ê: 3ÜL MΦ. 9.

Task 6U

Container Og' UV* \$ Task' O: . 9.

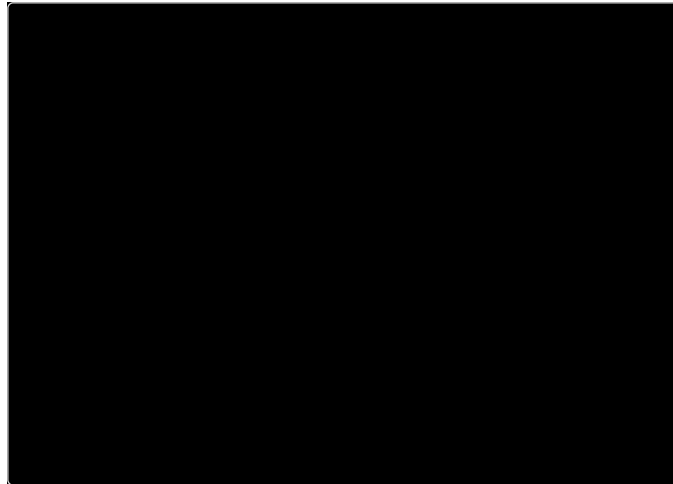


Figure 43. ECS%& Web Server 3 4 - Task O:

Container ' h

†@, †î s—: %! ContainerOg' k_i . 9

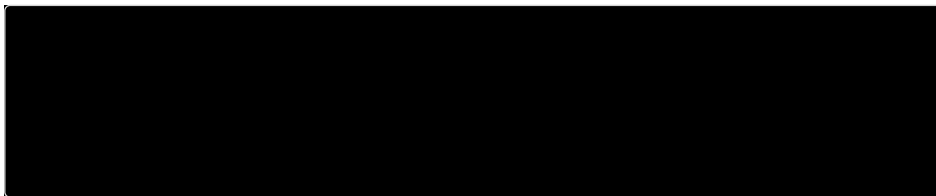


Figure 44. ECS%& Web Server 3 4 - Container ¬r

<=ef ' 6

Container 3Où] ^î • ' ¬r . 9.

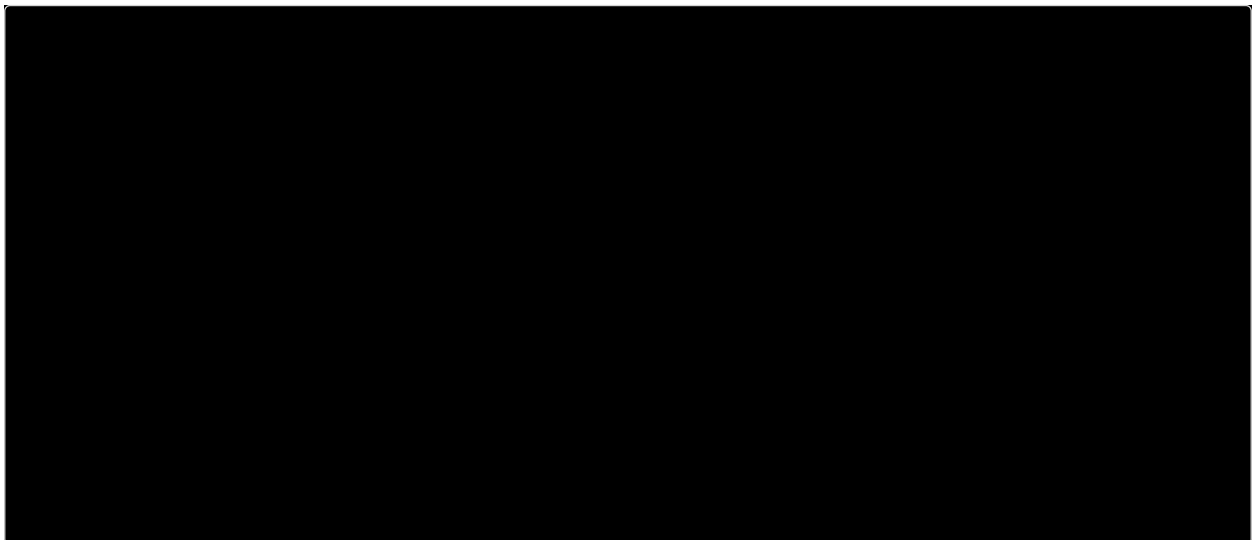


Figure 45. ECS%& Web Server 3 4 -] ^î • 3O

5.7.4. Service ' 6

|) 1 6U

+ # O: . Task' ^ E %» /() * % Ä. Service' O: . 9.

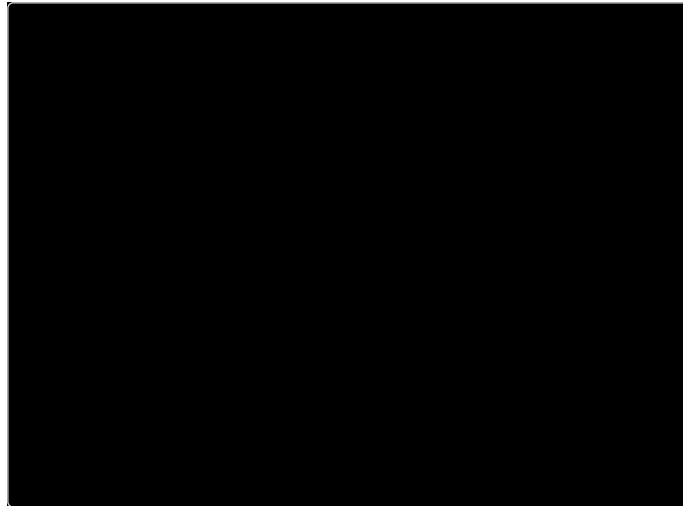


Figure 46. ECS%& Web Server 3 4 - Service O:

|) 1 • – (Service Discovery) ' 6

Web Server\$ ELB ' \$ Service Discovery %=L †@* – NOo Î 1' dg* – ÂÉ ' \$ P #{ | 5
Web #{ | ' EF ~ • t 9.

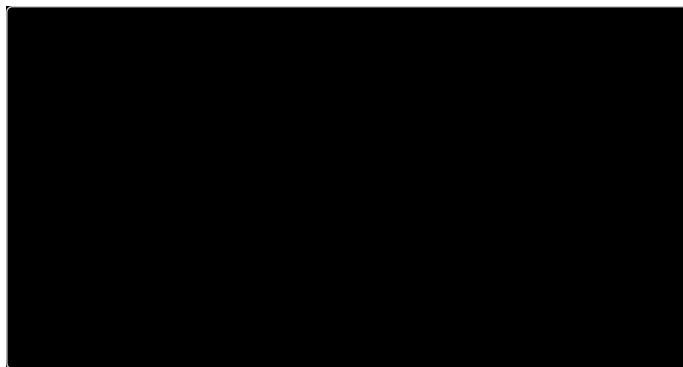


Figure 47. ECS%& Web Server 3 4 - Service Discovery 3 O

5.7.5. Service . — „ < Œ

Service %» A Service O: ' ÚÇ* • %» † ¾‡ o 9. ECS Cluster: Ũ• 5# #{ | > ‡ ´ ™5#
() ùe Service2 Task: ' " ' de. 9.

Service ~ ™ < Œ

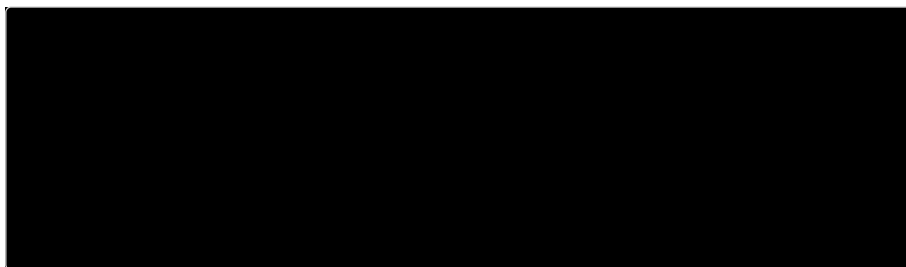


Figure 48. ECS%& Web Server 3 4 - Service ' " de

Task ~™ < Æ



Figure 49. ECS%& Web Server 3 4 - Task ' " de

Chapter 6. VM/Host . } ' s

6.1. ' s x)

34 P{ ‡ ´ QD 34ØÛL 6' #O5 ´ D\$ * N, Manager > Node Agent' 34 > ^ €. 9. † ö
34 ‡ ´ A Manager: Web UI' k 7# 34r r = * ¼, . ÛŸ —QD Web UI ÒÐ† Gs ½A ^ý,
ò § yeQDC » Û* j 34r r = * 9.

6.2. LENA ' s

LENA 34ØÛA gzipc , QD EFG¼, 34 6' #O5 ´ D\$ ö 34 j a b c i (\${LENA_HOME}
)5 UEL 7E. 9. %! 34 ^D\$ ð/engn001/lena/1.3/Ÿ ` @. 9.

LENA 34

```
[engn001]#  
[engn001]# tar -xzvf lena-1.3.x.tar.gz
```

34 ÆÈA @C5 xy 9RS T† EF† o9.

Table 16. LENA 34 ÆÈ ž

Scripts	' () *
lena-[O;].tar.gz	Web/Application k l 34 ØÛD Application Server, Web Server, Session Server 34 ÆÈ † ÆW UV	lena-1.3.x.tar.gz
lena-enterprise-[O;].tar.gz	Enterprise O; : WAS34 ÆÈ Enterprise O; 5\$ Session Serverr UV	lena-enterprise-1.3.x.tar.gz
lena-standard-[O;].tar.gz	Standard O; : WAS34 ÆÈ	lena-standard-1.3.x.tar.gz

6.3. k l mn ! "

LENA 34' Ä. ØÛL P{ . 9. LENA 34 ØÛA BCD EF o9.

\${LENA_HOME}: a b c i m¢\$ Wv2 T9.

Table 17. a b c i m¢

k l mn	' () *
bin	Node Agent2 Manager: Start/Stop scripts, install scripts E F	
conf	Node Agent, Manager —: 3OØÛ	

k l mn	' () *
database	Œ•Ž•5# ° n. ÛB " †Ž' ÚÇ* \$ abc i	
depot	3 4' Ä. Local Repository	
etc	%P ² P Og > 3 O ØÛ	
license	License Og' hi * \$ abc i	
logs	Node Agent / Manager DœØÛ	
modules	^ €5 , - . ŒË† Ä4* \$ ^ D (lena-node-agent, lena-installer, lena-manager —)	
servers	Serverr 3 4â %! ^ D	
tmp	l ¾abc i	

E F * \$ ^ € Scripts \$ Wv 2 T 9. (\${LENA_HOME}/bin 5 Ä 4)

Table 18. E F Script ž

Scripts	' () *
install.sh	#O' 3 4* % Ä. %! script	
web-compile.sh	Web Server' y ØÛ* % Ä. script	
web-package-install.sh	Web Server y ØÛ > m» 5 , - . QXs 3 4 script	Linux only, root ± . , -
crypt.sh	Datasource5 ` @* \$ Password • » v p Û ^ € (k i . " H¢L v p Û " H¢D Ĩ])	
env-manager.sh	Manager^ €L Ä.] ^ Ĩ •	Manager 3 4¾
start-manager.sh	Manager: ^ €	Manager 3 4¾
stop-manager.sh	Manager: p l	Manager 3 4¾
ps-manager.sh	Manager: ĩ DŠ | de	Manager 3 4¾
start-agent.sh	Node Agent: ^ €	
stop-agent.sh	Node Agent: p l	
ps-agent.sh	Node Agent: ĩ DŠ | de	

] ^ 3 O ØÛA Wv 2 T 9. (\${LENA_HOME}/conf 5 Ä 4)

Table 19.] ^ 3 O ØÛ ž

Config File	' () *
manager.conf	Manager h (30	
agent.conf	Node Agent h (30	

6.4. Manager ' s

EFG\$ LENA\$ Web Server, WAS2 Session Server, Node/Server5 34Gf Ef > Status'
de* \$ Agent2 hi H5j EFG\$ ManagerD mno9.

6.4.1. Manager ' s

Manager\$ install.shL †@* – Wv2 TA • #D 34. 9.

1. \${LENA_HOME}/bin/install.sh create lena-manager
2. Service Port Og' k j . 9. (default: 7700)
3. #O ' " Og' • ¿ ÁL port Og' k j . 9. %! 3OL ` @* ¼, Manager' -r D 34* \$
^ý5\$ port' İ ^ . 9. (default: 16100)
4. Manager' ^ € ~ OS©OL k j . 9. (default: | èpñ ^ € bÚ)

LENA Manager 34

```
[bin]$ ./install.sh create lena-manager
*****
* LENA Server Install !          *
*****

+-----+
+-----+
| 1. SERVICE_PORT is the port number used by Manager.
|    ex : 7700
| 2. MONITORING_PORT is the port number used by Manager for monitoring.
|    ex : 16100
| 3. RUN_USER is user running Argo Manager.
|    ex : tomat
+-----+
+-----+
Input SERVICE_PORT for installation. (q: quit)
Default value is '7700'

Input MONITORING_PORT for installation. (q: quit)
Default value is '16100'

Input RUN_USER for installation. (q: quit)
Default value is 'lena'

===== Execution Result =====
LENA_HOME : /engn001/lena/1.3
JAVA_HOME : /engn001/java/jdk1.8.0_191
SERVER_ID : lena-manager
SERVICE_PORT : 7700
MONITORING_PORT : 16100
INSTALL_PATH : /engn001/lena/1.3/modules/lena-manager
RESULT : Success
MESSAGE : create succeeded
=====

Execution is completed.!!
[bin]$
```

!

– • 6: Ç{ D #{ | ' * \$ ^ý, Manager\$. 6: Ç{ 5µ 34. 9.

6.4.2. Manager VW

Manager' %» * – O' \QD 34G` \$s de. 9.

1. start-manager.sh ØÛL ^ €. 9.

LENA Manager ^ €

```
[bi n]$ ./start-manager.sh
```

```
-----
Ê          LENA Manager
-----
```

```
Usi ng LENA_HOME :    /engn001/I ena/1.3
Usi ng JRE_HOME :    /engn001/j ava/j dk1.8.0_191
Usi ng SERVER_PID :   /engn001/I ena/1.3/modul es/I ena-manager/I ena-
manager_sol manager. pi d
Usi ng SERVER_HOME :  /engn001/I ena/1.3/modul es/I ena-manager
Usi ng SERVER_ID :    I ena-manager
Usi ng INSTANCE_NAME : I ena-manager_sol manager
LENA started.
[bi n]$
```

2. [http://\[Manager IP\]:7700](http://[Manager IP]:7700) 5 ÒÐ* – Wv J † s' de. 9.(Ã%Ç: admin/!admin1234)

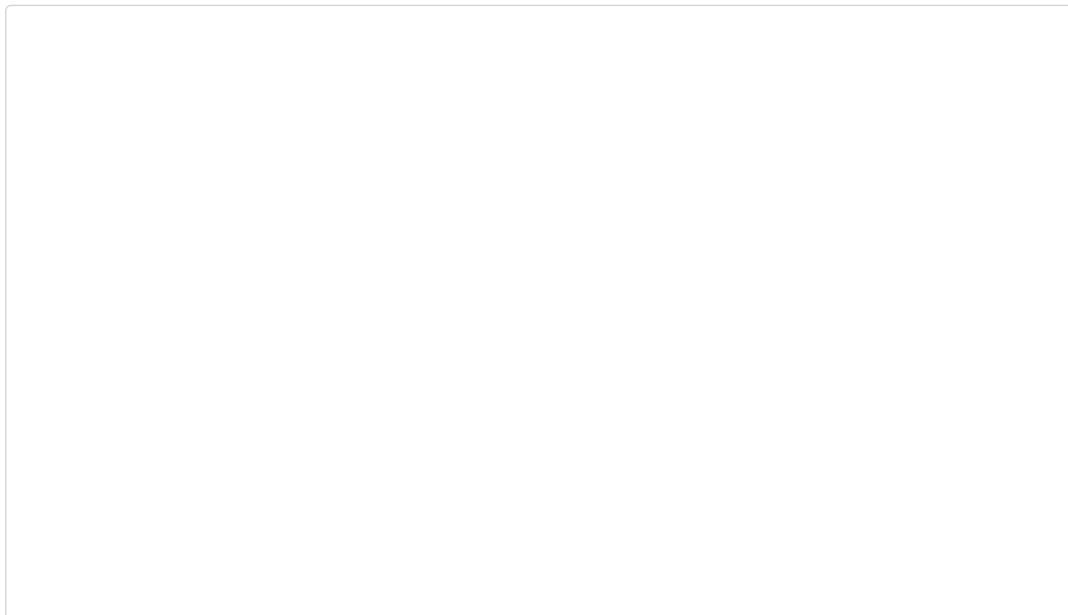


Figure 50. LENA Manager Døe

3. stop-manager.sh ØÛL ^ €* – pl ~ • t 9.

LENA Manager p1

```
[bi n]$ ./stop-manager.sh
-----
Ê          LENA Manager
-----
Usi ng LENA_HOME : /engn001/l ena/1.3
Usi ng JRE_HOME: /engn001/j ava/j dk1.8.0_191
Usi ng SERVER_PID: /engn001/l ena/1.3/modul es/l ena-manager/l ena-
manager_sol manager. pi d
Usi ng SERVER_HOME : /engn001/l ena/1.3/modul es/l ena-manager
Usi ng SERVER_ID : l ena-manager
Usi ng INSTANCE_NAME : l ena-manager_sol manager
LENA stopped.
##### l ena-manager_sol manager successfully shut down #####
[bi n]$
```

6.5. Node Agent VW

Node Agent\$ Node, Server: Ef > Œ• Ž• %=L • ' * \$ Agent † 9. Node Agent\$ LENA34¾
 %! \QD 34r G¼, Node5 6. Og' r, <% Ä. Agent' ^ €* – Ö . 9. Node Agent\$
 Web/Application/Session Server: ' " ŒŒ > ¾† S pl ' • € ~ • t 9.

6.5.1. Node Agent VW

\${LENA_HOME}/bin/start-agent.sh ØÛL ^ €. 9. JAVA_HOME† sOGs ½A ^ý, terminal5#
 JAVA_HOMEL k; * y\$ ²¾sr Í <j o9.†), JAVA_HOME: ^D' k; * • agentr ^ €o9.

```
[bin]# ./start-agent.sh
Input JAVA_HOME path for LENA. ( q: quit )
JAVA_HOME PATH :
/engn001/java/jdk1.8.0_191
Input Agent port for LENA Agent. ( q: quit )
Agent port (Default : 16800):
Input Agent user for LENA Agent. ( q: quit )
Agent user (Default : root):
root

-----
Ê          LENA Agent
-----

Using LENA_HOME : /engn001/lena/1.3
Using JAVA_HOME : /engn001/java/jdk1.8.0_191/jre
Using CONF_FILE : /engn001/lena/1.3/conf/agent.conf
Using LOG_HOME : /engn001/lena/1.3/logs/lena-agent
Using RUN_USER : root
Using PORT : 16800
Using UUID : d03ddd60-de12-35df-9ea1-a409a3085eeb
LENA Agent is started.
[bin]#
```

6.5.2. Node Agent —z [l < Œ

`${LENA_HOME}/bin/ps-agent.sh ØÛL ^ €* – Wv 2 T † Process: ' " ' de. 9.`

```
[bin]$ ./ps-agent.sh
lena      24208      1 62 14:00 ?      00:00:03
/engn001/java/jdk1.8.0_191/bin/java -Xms64m -Xmx256m
-Dlena.home=/engn001/lena/1.3 -Dlog.home=/engn001/lena/1.3/logs/lena-agent
-Dpatch.log.home=/engn001/lena/1.3/logs/lena-patcher
-Djava.library.path=/engn001/lena/1.3/modules/lena-agent/lib/sigar
-Djava.net.preferIPv4Stack=true -cp .:/engn001/lena/1.3/modules/lena-
agent/lib/bcprov-jdk15on-1.55.jar:/engn001/lena/1.3/modules/lena-
agent/lib/lena-agent-1.3.0.jar:/engn001/lena/1.3/modules/lena-
agent/lib:/engn001/java/jdk1.8.0_191/lib/tools.jar
argo.node.agent.server.NodeAgentServer -start
[bin]$
```

6.5.3. Node Agent GŠ

`stop-agent.sh' ^ €* – pl ~ • t 9.`

```
[bi n]$ ./stop-agent.sh
-----
Ê          LENA Agent
-----
Usi ng LENA_HOME : /engn001/l ena/1.3
Usi ng JAVA_HOME : /engn001/j ava/j dk1.8.0_191/j re
Usi ng CONF_FILE : /engn001/l ena/1.3/conf/agent.conf
Usi ng LOG_HOME : /engn001/l ena/1.3/logs/l ena-agent
Usi ng RUN_USER : l ena
Usi ng PORT : 16800
Usi ng UUID : 0d5f6a4a-1084-4bac-ad8c-70b67bf3e495
LENA Agent is stopped normally.
[bi n]$
```

6.6. Session Server ' s (WEB UI . })

Session Server' hi * % Ä. Û• L EF. 9. Node5 34. Session Server: —ž , • O, ŸEr
r = * ¼, ¾± S pl ShellL ^ € ~ • t 9.

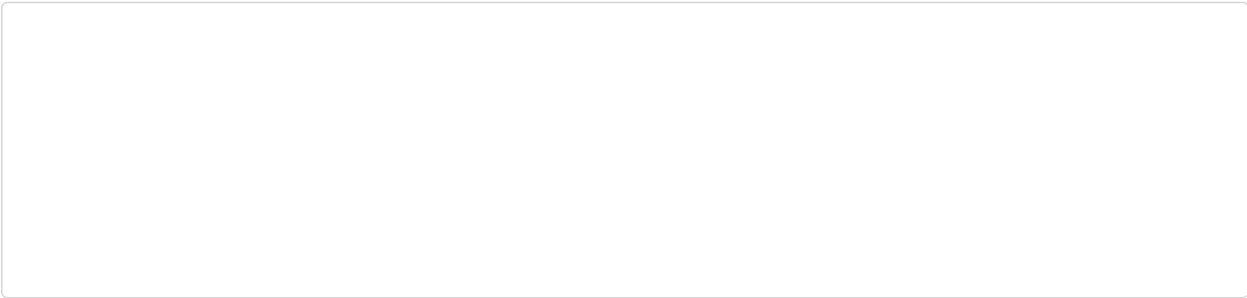


Figure 51. Session Server ž

Session Server: ÐnA Wv 2 T 9. (*) \$, • Ğ

Table 20. Session Server: Ðn

%&	' () *
Status	Session Server: ' "	
Name(*)	Session Server: † @	
IP(*)	Session Server: IPÎ 1	
Server ID	Session Server: Identifier	
Port	Service Uñ t p	
Server Type	Session Server: bc	
Start/Stop	Server: ¾± > p l	
+ > † œ	Register • • ' \$ f 6(P_) • • L — ~ * — , fo Server Ogr İ ^ ù l L ~ ¾	
- > † œ	‡ + (• LJ) • • L — ~ * — , fo ServerOgr ŸE „ L ~ ¾	

6.6.1. Session Server ' s

1. **Install** • • L —~ . 9.

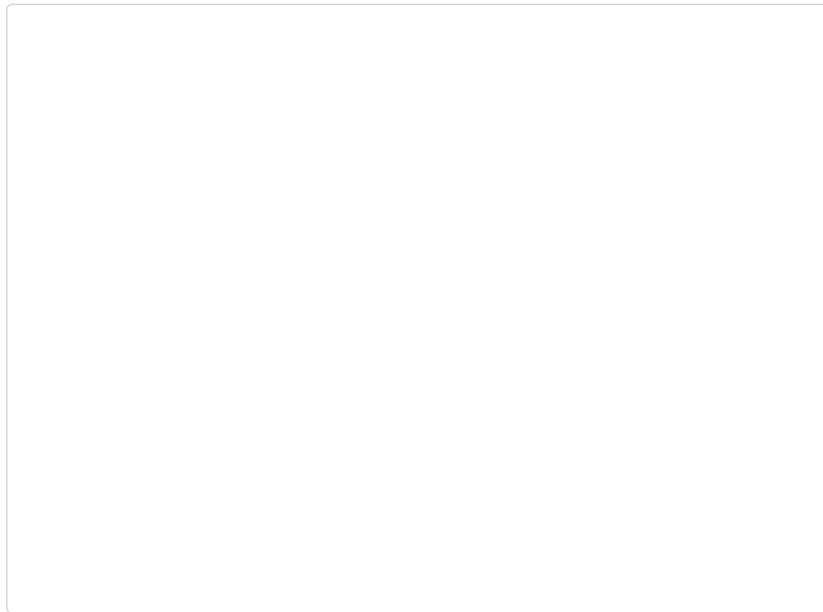


Figure 52. Session Server 34¾ k j Ũ•

2. Server ID2 Service Port, Secondary Server IP/Port' k j . 9.
3. 'Save' O£L —~ * — ÚÇ. 9.

!

```
¥ Node5 ^ E 34Gf t $ #O2 Manager5# hi * $ #O: Og5$ ' t r
t L • t 9. (console%& 34 ¾)
¥ #OIDù + <qr ~ ° * $ ^ý, Register%=L t @* — 34o #OOg'
de. 9.
¥ Manager IP$ Node: host IPD H» k j o 9. " ñ#è mn5 xy H» k j o
IPr ^ E " ñ#è IP2 9è ^ýr ~ ° ~ • t 9. t ) $ Manager IP' • O* —
k j 7ô . 9.
```

6.6.2. Server VW

1. **Stop** • • L —~ * — Server' p l . 9.
2. **Start** • • L —~ * — Server' ¾†. 9.

!

¾† r =. ' " Û ^ý5µ ¾†O£† ÅnÛ o 9.

6.6.3. Server ‡ +

1. **‡ + (• L J)** • • L —~ * — ServerOg' ÝE r =. ' " D Ĩ ^ . 9.
2. **Save** • • L —~ . 9.
3. OKO£L ÷ ì • Manager: DB" † Ž2 Oi \ #O' Š; ! ÝE * N, CancelO£L —~ * • Manager: DB " † Žµ ÝE. 9.

6.6.4. Server • ,

Console %&QD 34. #O' Manager' k 7# hi * _• , Server Og —ž † , - * 9.

1. **+Register** • • L —~ . 9.
2. —ž ~ #O' —~ . 9.

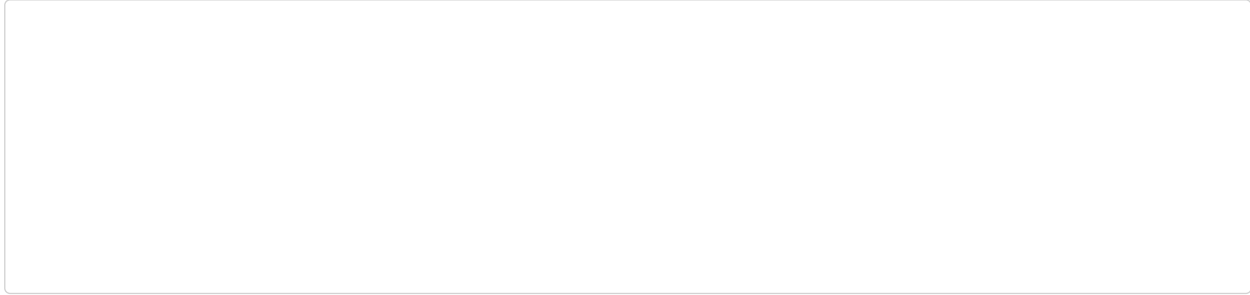


Figure 53. Session Server —ž ¾ Server , ƒ Ů•

3. **Save** • • L —~ * — ÚÇ. 9..

6.7. Session Server ' s (CLI . })

6.7.1. Session Server ' s

Session Server\$ Embedded2 StandaloneO; QD mÊo9. Embedded O; : ^ý Application #O
 ?5 UVGf tf BC 34r , - * Q¼, Standalone O; 34 ¾ install.shL †@* — Wv2 TA
 • #D 34. 9.

1. \${LENA_HOME}/bin/install.sh create lena-session

Session Server 3 4

```
[bin]$ ./install.sh create lena-session
*****
* LENA Server Install !                *
*****

+-----+
+-----+
| 1. SERVER_ID means business code of system and its number of letter is
| from 3 to 5.
|   ex : tom1, tc01, svr01
| 2. SERVICE_PORT is the port number used by Session Server.
|   ex : 8080
| 3. SECONDARY_SERVER_IP is the ip number communicate with Secondary Session
| Server
|   ex : 127.0.0.1
| 4. SECONDARY_SERVICE_PORT is the port number used by Secondary Session
| Server.
|   ex : 8080
| 5. RUN_USER is user running Session Server
|   ex : tomat, apache
| 6. INSTALL_ROOT_PATH is is server root directory in filesystem.
|   ex : /ssw, /sw/server, /ssw/was
+-----+
+-----+
```

2. k j a

[a BD defaultç† ~ ¼G¼,İ ^† , - . ^ý ` @Hr ÑÒ k j * – İ ^ ~ • t 9.

Session Server 34¾ k j a K¾

```
Input SERVER_ID for installation. (q: quit)
tm-session1
Input SERVICE_PORT for installation. (q: quit)
Default value is '5000'
5005
Input SECONDARY_SERVER_IP for installation. (q: quit)
127.0.0.1
Input SECONDARY_SERVICE_PORT for installation. (q: quit)
Default value is '5001'
5006
Input RUN_USER for installation. (q: quit)
Default value is 'lena'

Input INSTALL_ROOT_PATH for installation. (q: quit)
Default value is '/engn001/l ena-1.3.0/tmservers'

Ê===== Execution Result =====
LENA_HOME : /engn001/l ena/1.3
JAVA_HOME : /engn001/j ava/j dk1.8.0_191/j re
SERVER_ID : tm-sessi on1
SERVICE_PORT : 5005
SECONDARY_SERVER_IP : 127.0.01
SECONDARY_SERVICE_PORT : 5006
RUN_USER : l ena
INSTALL_PATH : /engn001/l ena/1.2/servers/sessi on1
RESULT : Success
MESSAGE : create succeeded
Ê=====

create is completed.!!
[bi n]$
```

Table 21. Session Server 34¾ k j a

%&	' () *
SERVER_ID	Session Server: ID	
SERVICE_PORT	Session Server: #{ | Uñ	Default: 050000
SECONDARY_SERVER_IP	Secondary Server: IPÎ 1	
SECONDARY_SERVICE_PORT	Secondary Server: #{ | Uñ	Default: 050010

%&	' () *
RUN_USER	Session Server' ^ €* \$ ^ € ©OÜ	Default: ò| èpñ ^ € ©OÜ
INSTALL_ROOT_PATH	Session Server' 34~ ' Ä a b c i	Default: 0\${LENA_HOME}/tmse rvers0

¥ \$INSTALL_ROOT_PATH/tmservers/0SERVICE_ID0 Directory° nL de. 9.

!

install.sh • € ¾ * Í : Session Serverr 34G¼, N Ä: #O 34 ¾ install.shL
NE • €7ô . 9.

6.7.2. Session Server VW

Session Server' %» * – O' \QD 34G` \$s de. 9.

1. Session Server 34 Ä45# start.sh ØÜL ^ €. 9.

Session Server %»

```
[tm-session1]$ ./start.sh
-----
Start Session Server
-----
Using LENA_HOME : /engn001/lena/1.3
Using SERVER_HOME : /engn001/lena/1.3/servers/tm-session1
Using SERVER_ID : tm-session1
Using JAVA_HOME : /engn001/java/jdk1.8.0_191

Session Server Started..
[tm-session1]$
```

2. ps.sh ØÜL ^ €* – ï DŠ | : ' " ' de. 9.

Session Server ï DŠ | ' " de

```
[tm-session1]$ ./ps.sh

lena 16232      1      1 09:56 pts/7 00:00:00
/engn001/java/jdk1.8.0_191/bin/java -Xmx1024m -Dzodiac.name=session_5105
-Dzodiac.logdir=/engn001/lena/1.3/logs/session-server -cp
.: /engn001/lena/leesyong/1.2/servers/tm-session1/lib/lena-session-common-
1.2.0.jar:/engn001/lena/leesyong/1.2/servers/tm-session1/lib/lena-session-
server-1.2.0.jar -Dzodiac.config=session.conf zodiac.server.Main

[tm-session1]$
```

Session Server pl

3. stop.sh ØÙL ^ €* – pl ~ • t 9.

```
[tm-sessi on1]$ ./stop.sh
-----
Stop Sessi on Server
-----
Usi ng LENA_HOME : /engn001/l ena/1.3
Usi ng SERVER_HOME : /engn001/l ena/1.3/servers/tm-sessi on1
Usi ng SERVER_ID : tm-sessi on1
Usi ng JAVA_HOME : /engn001/j ava/j dk1.8.0_191

Sessi on Server Stoped..
[tm-sessi on1]$
```

6.7.3. Session Server ‡ +

% 34o #O\$ | èpñ' †@* – Uninstall~ • t 9.

LENA5#\$ 34o #O: Og' BC: xmlØÙ5 ÚÇ* N t 9. xy#, directory' ÑÒ ÿE * s
½N, install.sh | èpñ' †@* – Uninstall 7Ô . 9.

1. install.sh | èpñ ^ €

- [Session Server : \${LENA_HOME}/bin/install.sh delete lena-session
- [Manager : \${LENA_HOME}/bin/install.sh delete lena-manager

Session Server ŸE

```
[Iena@RNDTOMCAT1V bin]$ ./install.sh delete tm-session
*****
* LENA Server Install ! *
*****

+-----+
+-----+
| 1. SERVER_ID : Server'id to delete
+-----+
+-----+

Input SERVER_ID for installation. (q:quit)
tm-session
===== Execution Result =====
LENA_HOME : /engn001/Iena/1.3
JAVA_HOME : /engn001/java/jdk1.8.0_191/jre
SERVER_ID : Ienawas2
DELETE_PATH : /engn001/Iena/1.3/servers/tm-session
RESULT : Success
MESSAGE : delete succeeded
=====

delete is completed.!!

[bin]$
```

2. k j a

Table 22. Session Server ŸE¾† j a

%&	' () *
SERVER_ID	Uninstall~ Server: ID	Manager: ^ý idr lena-managerD H» k j G¼, BCD Server ID' k j Ás ½\$9.



LENA5#\$ 34o #O: Og' BC: xmlØÙ5 ÚÇ* N t 9. xy#, directory'
ÑÒ ŸE * s ½N, install.sh | èpñ' †@* – Uninstall7ô . 9.

Chapter 7. E ž

7.1. LENA L M SpecE • Ÿ

Table 23. LENA s^a Spec

Specification	Version) *
Java Development Kit (JDK)	1.8~	
Java Servlet	3.1	
Java Server Pages (JSP)	2.3	
Expression Language (EL)	2.2	
JavaServer Pages Standard Tag Library (JSTL)	1.2	
Enterprise JavaBeans (EJB)	3.2	
Java Message Service (JMS)	1.1	
Java Transaction API (JTA)	1.2	
Java API for RESTful Services (JAX-RS)	2.0	
Java API for XML Web Services (JAX-WS)	2.2	

7.2. Manager DBv w %f

Manager: ?É" †Ž hi ' Ä. HSQL DB: ØÙA Î %\QD(1Ù) e´ØÙL ° n* N t 9.
° nÄ4\$ \${LENA_HOME}/repository/backup/lena-manager/script † 9.

%! \QD 30Ù †; e´Og\$ ŸE*Cž Gf t\$" gh%%L Ĩ ^* N ¨A ^ý,
\${LENA_HOME}/conf ¥F * Ä5 manager.conf ØÙL ¢N, dbbackup.size=gh%% L kĭ ö
Manager' È %» * • gh%%L Ĩ ^~ • t 9.

7.3. Manager U I † r ‡ +

Managerr ?É\QD † %\$ †ĭ A Î %\QD ŸE*Cž † 3\$• † Gf t 9. ŸE*\$ Og\$
Action Trace †ĭ S Server History †ĭ † 9.

%! \QD Action Trace†ĭ A 30Ù] sµ gh* N, Server History †ĭ A 90Ù] s gh* N t 9. †
gh%%L Ĩ ^* N ¨A ^ý \${LENA_HOME}/repository/conf ¥F * Ä5 manager.conf ØÙL ¢N,
actiontrace.size=gh%%, serverhistory.size=gh%%L kĭ ö Manager' È %» * • gh%%L
Ĩ ^~ • t 9.

7.4. Manager U admin ĭ 1 c€ ¢. £

Manager: admin` @H Q| #Š' È^* - Í { ``tp <q©•r ĄS*†L ^ý5\$ console'
k* – Q| #Š' Ą%Ů7ö . 9.

1. Managerr 34o Ç{ 5 console(telnet or ssh)D ØÐ. 9.
2. \$LENA_HOME/bin/reset_manager_pw.sh ØÙL ^ € . 9.

3. Q | # S' Å%Û ~ user adminL k j . 9.
4. Å%Û~ Q | # S' k j . 9. &, Q | # S \$ 8Hi t' , a Ø« /YH/P• " H: ¢I QD k j . 9.
Q | # S \$ g , L Ä7 console5 ~ ¾Gs ½\$9.

Manager: admin Q | # S Å%Û

```
[bin]$ ./reset-manager-pw.sh
*****
* LENA Server Install ! *
```

```
*****
+-----+
--
| 1. USER_ID is the user id to reset
| ex : admin
| 2. NEW_PASSWORD is the password to change
| - password rule #1 : more than 8 length
| - password rule #2 : inclusion of one or more alphabet characters
| - password rule #3 : inclusion of one or more numerical digits
| - password rule #4 : inclusion of one or more special characters
+-----+
--
Input USER_ID for installation. (q:quit)
administrator
Input NEW_PASSWORD for installation. (q:quit)

The password has been changed successfully.
Execution is completed.!!s
```

7.5. LENA ' s æ ¥ OSv | S '' (CentOS. x)

LENA 34 ¾ OSØyî Ž \$ max user processes ¢L 8192†' QD 3O* \$ êL ±Ç. 9.

Table 24. ±Ç OSØyî Ž (CentOS %P)

parameter	æ ¥g	. /g
max user processes	8192	1024
open files	8192	1024

CentOS%PQD max user processes 3OA 9RS T† ůlimit ÐaŮ ÜÝf' ^ €* – deL ~ • t 9.

OS Øyî Ž max user processes de (CentOS %P)

```
$ ulimit -a +
core file size (blocks, -c) 0 +
data seg size (kbytes, -d) unlimited +
scheduling priority (nice, -e) 0 +
file size (blocks, -f) 8192 +
pending signals (-i) 14891 +
max locked memory (kbytes, -l) 64 +
max memory size (kbytes, -m) unlimited +
open files (-n) 1024 +
pipe size (512 bytes, -p) 8 +
POSIX message queues (bytes, -q) 819200 +
real-time priority (-r) 0 +
stack size (kbytes, -s) 10240 +
cpu time (seconds, -t) unlimited +
max user processes (-u) 1024 +
virtual memory (kbytes, -v) unlimited +
file locks (-x) unlimited
```

```
CentOS' %PQD ÜÝf ùlimit ðu02 ùlimit ðn0D i DŠ | • 2 <=ØÛ À• ' 3O~ • t 9. Ä
ï ^` aL ) m\QD &) *% Ä7#$ u bÚ: profile (.profile, .bash_profile)5 ulimit ^ €ÜÝL
¬r* - Í , ¬E 3O~ • t 9 (CentOS %P).
```

OS Øyî Ž 3O -i DŠ | • > <=ØÙ À• (CentOS %P)

```
$ cat $HOME/.bash_profile*
.. (^w)*
ulimit -u 8192*
ulimit -n 8192*
```

```
' 9ë 30. 6QD$ /etc/security/limits.conf (CentOS %P) ØÙL ¢f # ï DŠ | å 6• (nproc)2
<=ØÙ å 6• (nofile)' 30. 9.
```

OS Øyî Ž 3O -ï DŠ | • > <=ØÙ À• (CentOS %P)

```
$ cat /etc/security/limits.conf*
.. (*)*
*      soft nproc 8192*
*      hard nproc 8192*
*      soft nofile 8192*
*      hard nofile 8192*
```

7.6. LENA O. Z^{©a} «ho¬vw

Table 25. $\hat{\Gamma} \in \mathbb{Q}^n \times \mathbb{Q}^n$ * \$ \emptyset \cup\$

%&	= ^a	‡ + O.	- ®~ « h ⁻) *
ManagerO%° L D-	LENA_HOME/repository/m onitoringDB	N/A	10MB ~ 120MB	®
ManagerŒ• Ž• , í &i Uñ	LENA_HOME/repository/m onitoringDB	7Û	N/A	H» Ý E
Managerí &k ©	LENA_HOME/repository/m onitoringDB	) m	1MB † *	®
Managere ´ ØÛ	LENA_HOME/repository/b ackup/lena-manager	) m	300MB † *	®
Manager Server ¤ ¥ |	LENA_HOME/repository/c ontainer	) m	10MB / Service Cluster	Service Cluster Å• 5 x y i &
ManagerDœ	LENA_HOME/logs/lena- manager	30Û	10MB ~ 100MB	®
AgentDœ	LENA_HOME/logs/lena- agent	30Û	N/A	H» Ý E
InstallerDœ	LENA_HOME/logs/lena- installer	) m	1MB † *	®
#Oe | ä | Dœ	#Oe | ä | 34 ^ D LENA_HOME/servers/serv er_id/logs	) m	É * 5 x y i &	^ Dİ ^ r =

7.7. WAS Image OS ° j ± Š

P WAS ~ 7< : † î s \$ 9RS TA OS ' ` @. 9.

Table 26. P WAS ~ 7< † î s ` @™Š (2020° %P)

WAS Image	OS Image
jboss/wildfly	centos:7
open-liberty:full-java8-openj9	debian:buster (from adoptopenjdk/openjdk8-openj9)
store/oracle/weblogic:12.2.1.4	Oracle Linux
ibmcom/websphere-traditional	ubuntu:16.04
tomcat %! † î s K) tomcat:9-jdk8	%! Image Tag\$ openJdk %! Tag FROM openjdk:8-jdk (FROM debian:buster)

P² 3

¥ ´ µI | : LG CNS ¾ | ¤⁻ 7< ` ´ ±

¥ O\$: #² PB¾ ¬#m •³ ù ´ 10D 10 µs` t, | Øè E13 [07796]

¥ Ÿ ££: (02) 2099-6136

¥ † ¶ w : lana-support@lgcns.com