Designing Scalable Oracle Database Solutions in AWS

Presented by

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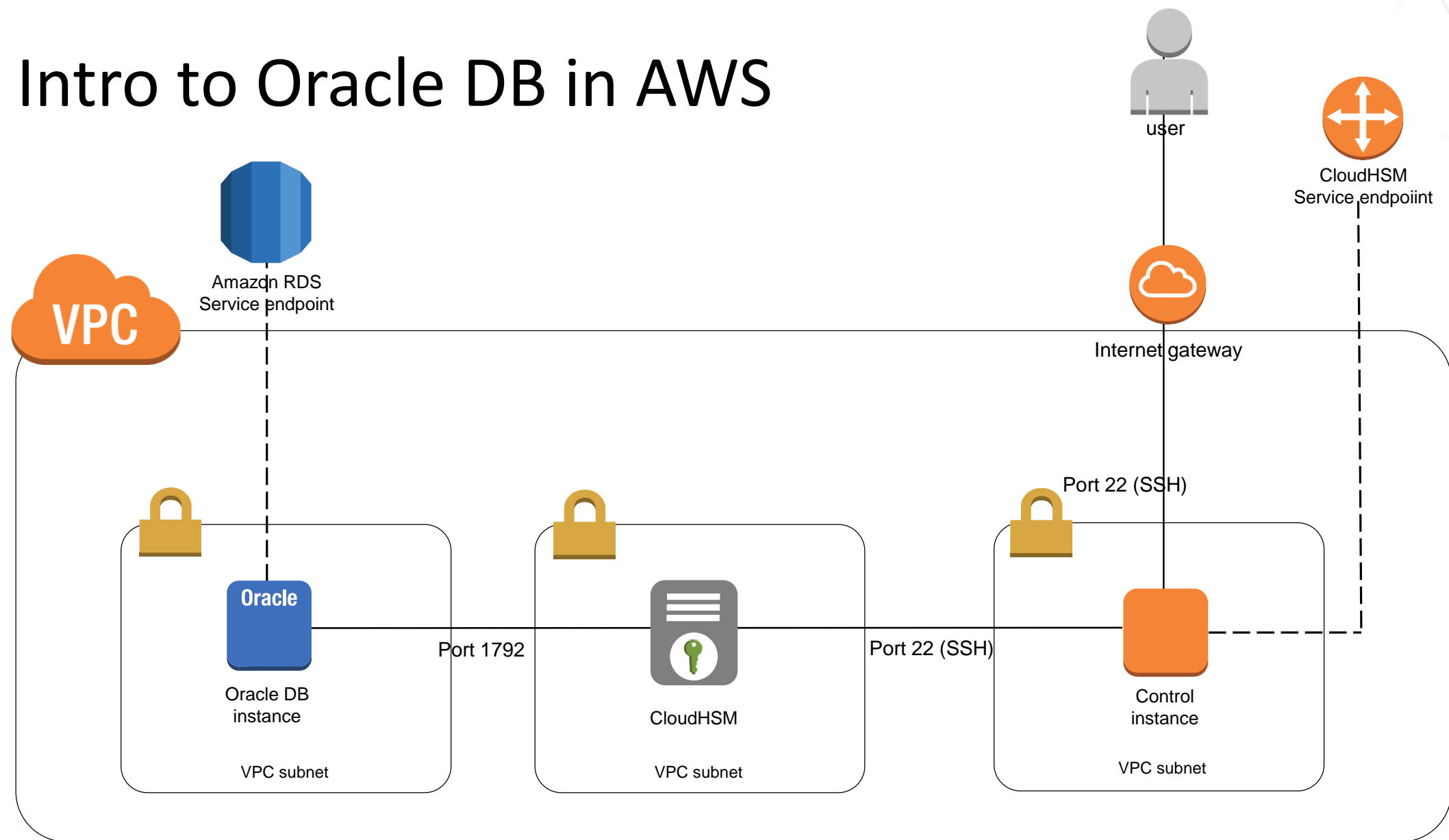
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About House of Brick

- Founded in 1998

- Oracle, Microsoft, AWS & VMware

- Focus on Business Critical Enterprise Applications

- House of Brick Services

  - Cloud and virtualization architectures

  - Oracle and MS license review and optimization

  - Application re-platforming and data migration

  - High availability and disaster recovery strategies

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Intro to Oracle DB in AWS

user

CloudHSM
Service endpoiint

VPC

Amazon RDS
Service endpoint

Internet gateway

Port 22 (SSH)

Oracle

Oracle DB
instance

Port 1792

CloudHSM

Port 22 (SSH)

Control
instance

VPC subnet

VPC subnet

VPC subnet

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Amazon RDS vs EC2

RDS

- Completely AWS managed DB service
- Feature limitations
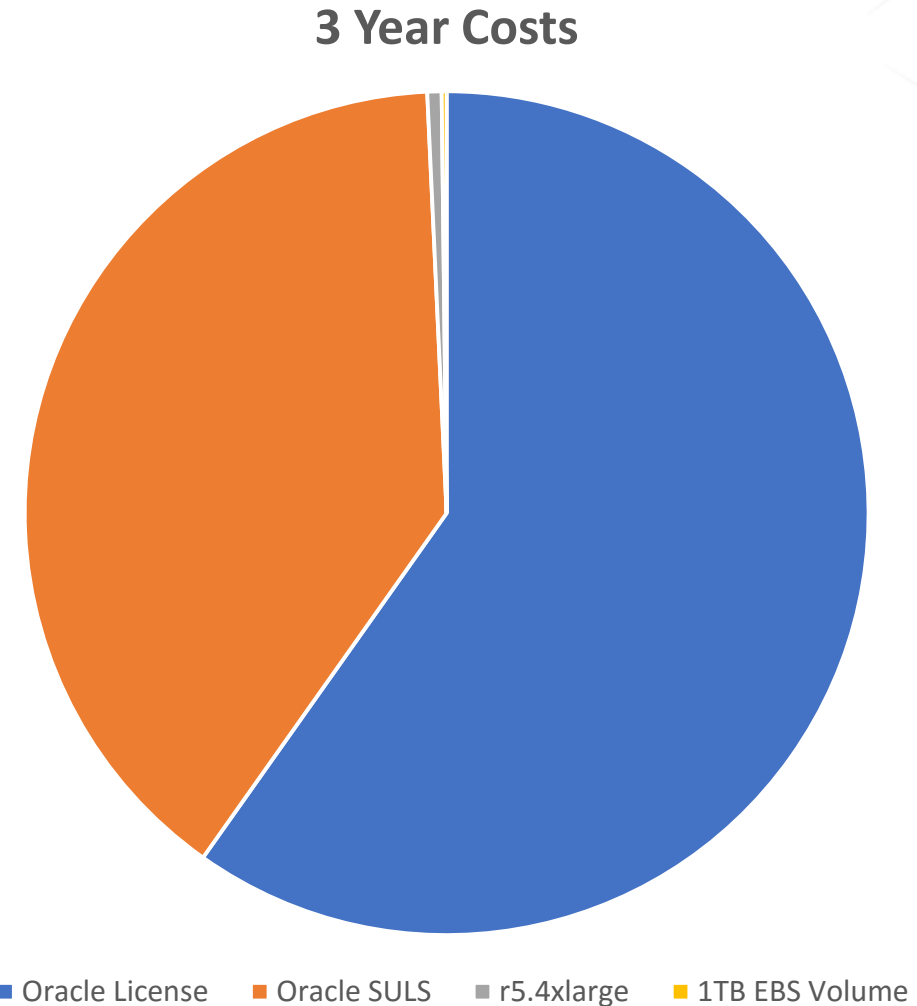- Version limitations
- License included option

EC2

- Traditional self managed Oracle installation
- Multiple O/S choices
- A few feature limitations

Oracle DB Cloud Solution Cost Example

		3 Year Costs
Oracle License	$1,144,000.00	
Oracle SULS	$755,040.00	
r5.4xlarge	$10,458.00	
1TB EBS Volume	$3,600.00	

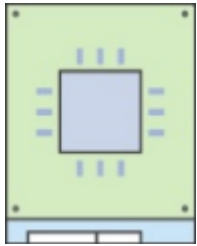■ Oracle License   ■ Oracle SULS   ■ r5.4xlarge   ■ 1TB EBS Volume

Principles of Oracle DB Architecting in AWS

- Oracle processor licenses are most expensive component
  - Architect to maximize license usage

- Think about scalability in cloud terms
  - In the cloud, more CPU/RAM/IOPS are always a few clicks away

Oracle DB Storage In AWS Elastic Block Store

EBS Volume Types

GP2

General Purpose SSD

- O/S volumes
- Logfiles
- Archive logs
- Tablespaces

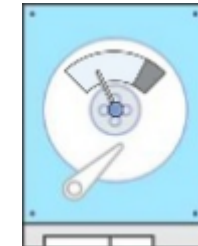**IO1**

Provisioned IOPS SSD

- Tablespaces
- Redo logs
- Flashback logs

ST1

Throughput Optimized HDD

- RMAN backups
- Cold tablespaces

SC1

Cold Storage HDD

- Tablespaces
- Redo logs
- Flashback logs

Oracle DB Storage in AWS

- A well tuned database is always limited by I/O
- Volume type is flexible, provisioned IOPS are very flexible
- Volume I/O limits versus instance I/O limits
- Instance local storage is fast and dangerous
  - NVMe SSD in modern instance families
  - Does not count against instance EBS I/O limits
  - Does not cost anything (included with instance price)
  - Does not survive instance reboot

The Case for RAID

- Software RAID is an option in EC2

- Interesting software RAID use case: RAID 0 volumes of GP2
  - Build high-IOPS RAID volume inexpensively
  - Savings tempting at large scale

- Interesting software RAID use case: RAID 1 instance store/EBS volumes
  - Linux allows "write-mostly" config
  - EBS volume handles only writes
  - Instance store SSD handles reads

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EC2 Instance Families

IOPS Optimized
- I-Series

General Purpose
- T-Series
- M-Series

CPU Optimized
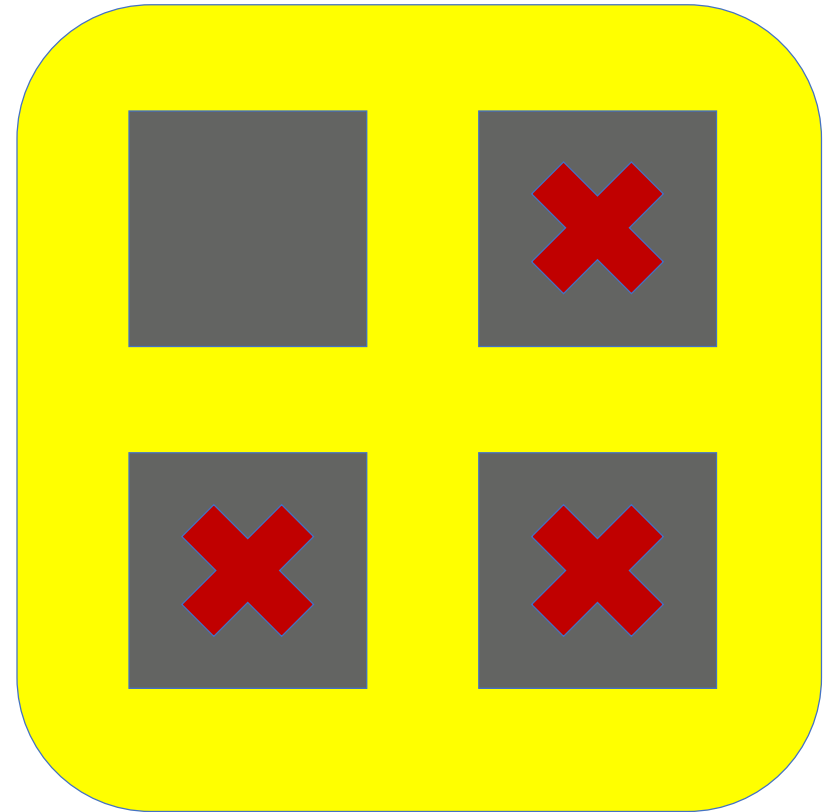- C-Series

RAM Optimized
- R-Series
- X1-Series

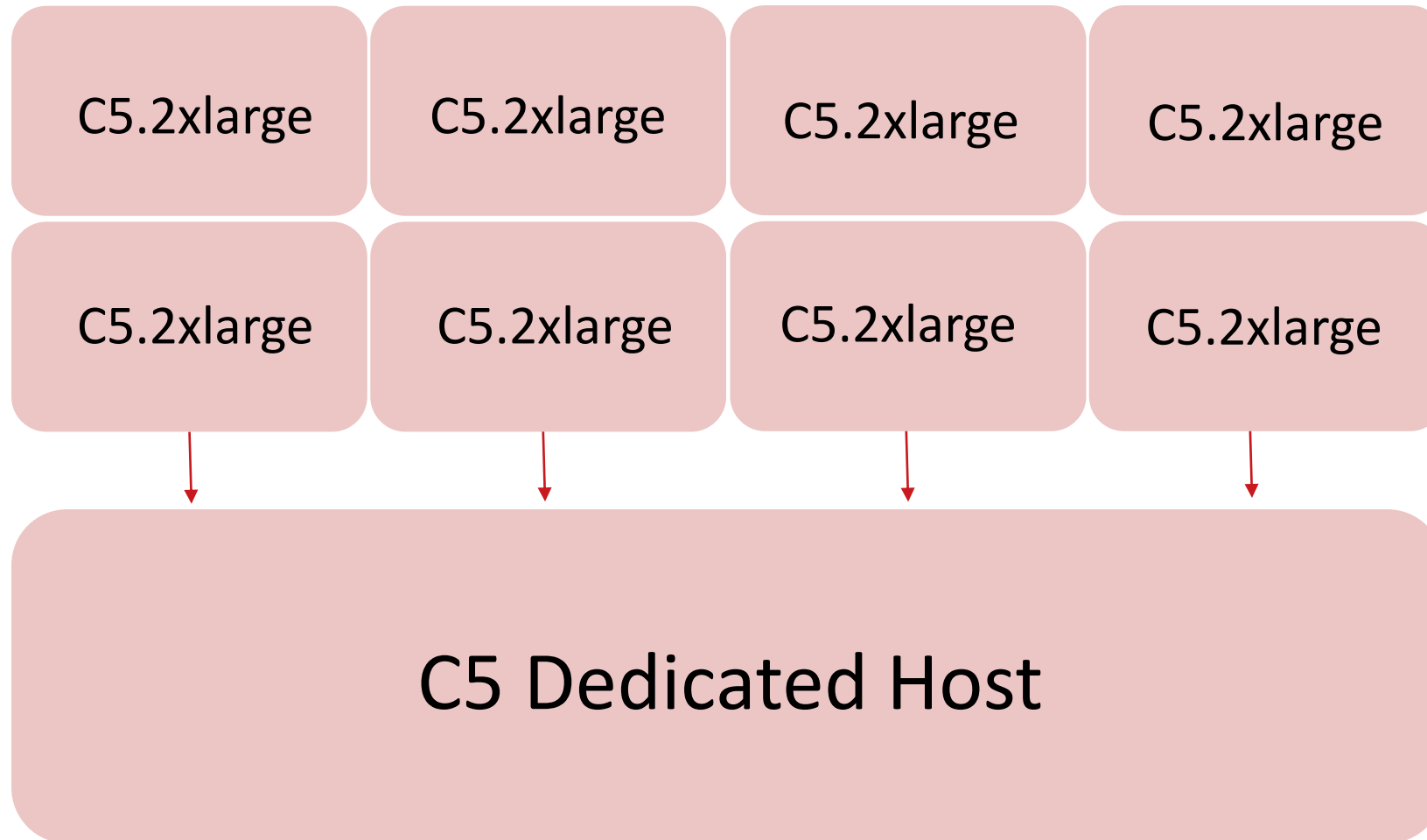House of Brick® TECHNOLOGIES

AWS Optimize CPU Feature

- ## Optimize CPU Allows
  - Enable/Disable hyperthreading
  - Reduce vCPU count on instances
  - No price break on disabled vCPUs
  - Applicable to EC2 and RDS

R5.LARGE

EC2 Dedicated Hosts

C5.2xlarge	C5.2xlarge	C5.2xlarge	C5.2xlarge
C5.2xlarge	C5.2xlarge	C5.2xlarge	C5.2xlarge

C5 Dedicated Host

Oracle High Availability in AWS

- ## Multi-AZ High Availability (HA)
  - RDS: multi-AZ deployment
  - EC2: use replication
- ## Multi-Region replication
  - AWS database migration service
  - Oracle GoldenGate/SharePlex/SymmetricDS
  - EC2: Oracle Data Guard

Oracle Backups in AWS

RDS

- RDS automatic snapshot backups to S3
- RDS manual snapshot backups to S3

EC2

- Traditional RMAN backups
- Traditional Data Pump exports
- Cold filesystem level backups

S3

- Great for Oracle backups
- Encrypted at rest
- Immutable buckets
- Cross region replication

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Operational Oracle Considerations in AWS

- Log Monitoring
  - ElasticSearch/Splunk
  - CloudWatch logs
  - Oracle Enterprise Manager
- Stack Auditability
  - Oracle audit logs
  - AWS config
  - AWS CloudTrail
- Database Monitoring
  - Oracle Enterprise Manager
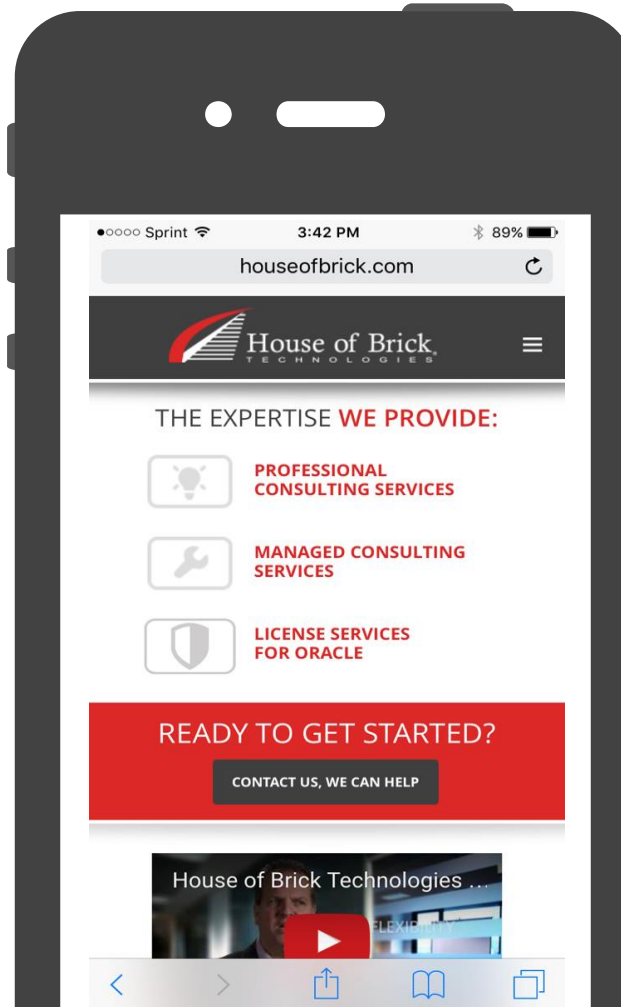 - CloudWatch

Further Resources from HoB

[White Paper: RAC on VMware Cloud on AWS](#)

[White Paper: Oracle on VMware Cloud on AWS TCO](#)

[Blog: Running Oracle in EC2? Leverage AWS' New Optimize CPUs Feature](#)

[Presentation: Migrating Critical Oracle Workloads to the Cloud](#)

Thank You

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