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DAT201

Optimize your Oracle licenses on Amazon Web Services

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Agenda

Oracle products and licensing

Running Oracle on AWS

Oracle contractual licensing principles

Strategies for optimizing Oracle licenses on AWS

Common Oracle products

- Oracle Database
- Fusion Middleware
- Oracle Business Intelligence

- Oracle Applications
  - E-Business Suite
  - PeopleSoft
  - Siebel CRM
  - JD Edwards

Oracle licensing metric

- Oracle Database
- Fusion Middleware
- Oracle Business Intelligence

Processor

- Oracle Applications
  - E-Business Suite
  - PeopleSoft
  - Siebel CRM
  - JD Edwards

Application user

Oracle database editions

- Standard Edition
- Standard Edition 2

Licensed by socket

- Enterprise Edition

Licensed by core

Running Oracle on AWS

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Running Oracle on AWS

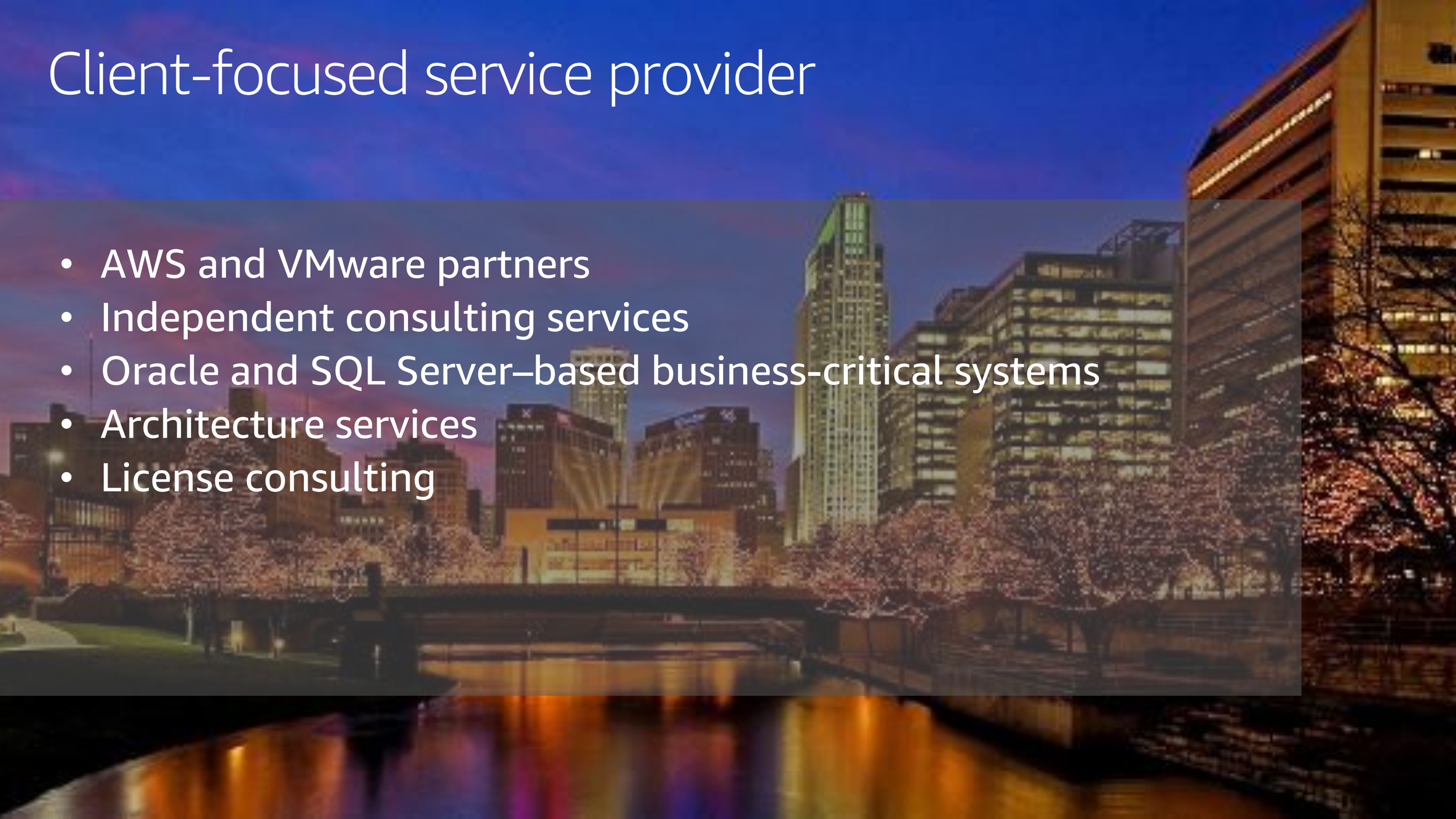
- Self-managed deployments
  - Amazon EC2
  - VMware Cloud on AWS

- Managed database services
  - Amazon Relational Database Service (Amazon RDS)
    - Bring-your-own-license (BYOL)
    - License included (LI)

Oracle contractual licensing principles

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Client-focused service provider



- AWS and VMware partners
- Independent consulting services
- Oracle and SQL Server–based business-critical systems
- Architecture services
- License consulting

The biggest challenge moving Oracle to the cloud

"The one challenge which I think many of you will recognize if you have done **anything contractually around licensing going from on-prem to cloud**, that again is **our more significant challenge.** One that is true for the cloud industry."

Karine Semmer
Head of IT Hosting Transformation & Modernization Program at Medtronic
On stage at VMWorld 2017 opening general session

Standard processor-based licensing

Q. License Definitions and Rules

Processor: shall be defined as all processors where the Oracle programs are installed and/or running. Programs licensed on a processor basis may be accessed by your internal users (including agents and contractors) and by your third party users. The number of required licenses shall be determined by multiplying the total number of cores of the processor by a core processor licensing factor specified on the Oracle Processor Core Factor Table which can be accessed at http://oracle.com/contracts.

Oracle contract artifacts

Oracle Document	Contractual?
Technical Support Policies	Yes
Processor Core Factor Table	Yes
Ordering Documents	Yes
Software Investment Guide	No
Licensing Data Recovery Guide	No
Technology Hosting	No
Partitioning Policy	No
Cloud Computing Environment Policy	No

Counting cores for processor-based Oracle licensing



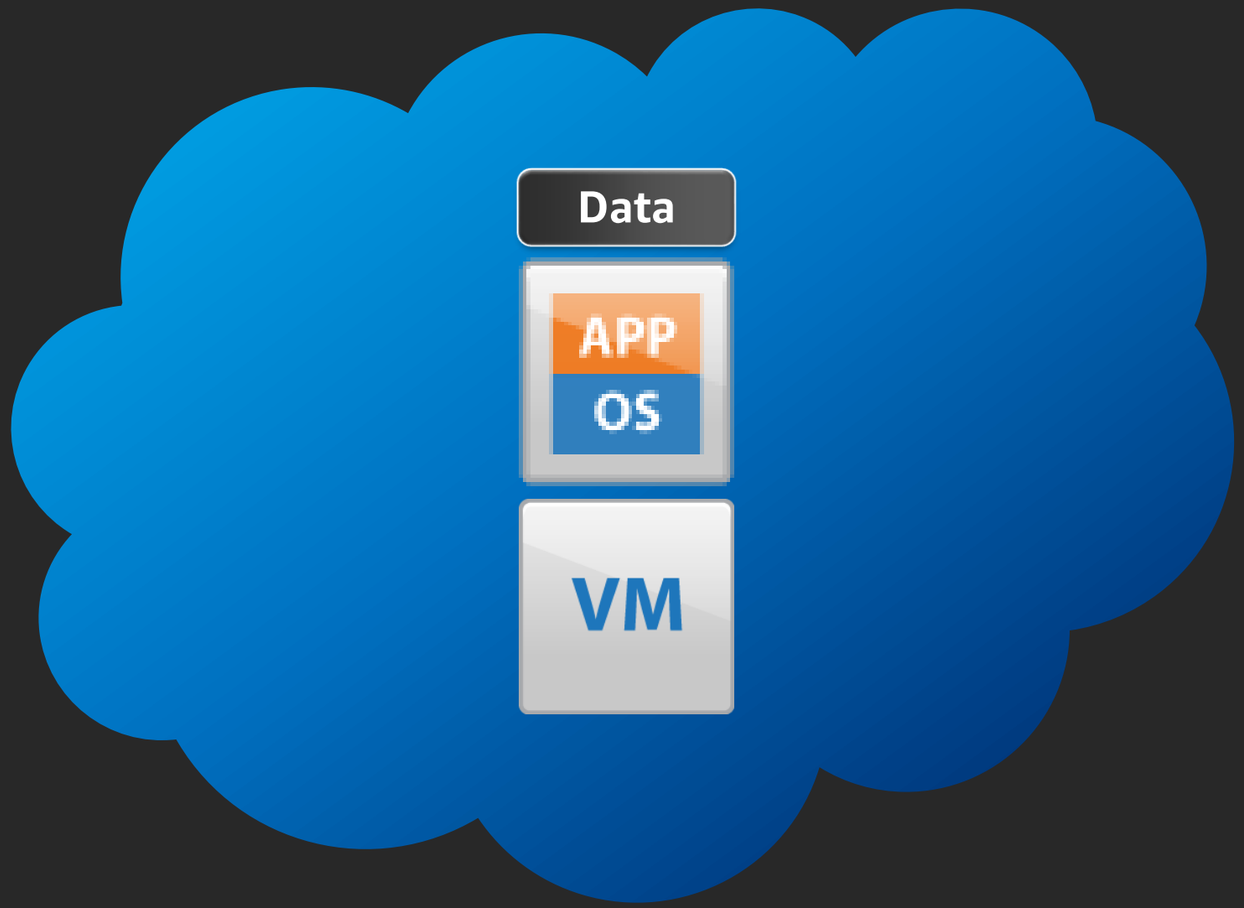
- Count all physical cores where Oracle is “installed and/or running”
- Apply core factor
- No contractual ability to license by vCPU

Understanding the Oracle cloud policy

“This policy applies to cloud computing environments from the following vendors: Amazon Web Services – Amazon Elastic Compute Cloud (Amazon EC2), Amazon Relational Database Service (Amazon RDS) and Microsoft Azure Platform (collectively, the ‘Authorized Cloud Environments’).”

www.oracle.com/us/corporate/pricing/cloud-licensing-070579.pdf

Counting vCPUs for Oracle cloud licensing



- Count vCPUs, not physical cores
- No core factor
- **Cannot run RAC with cloud policy**

- With AWS hyper-threading
  - 2 vCPU = 1 processor license
- With NO AWS hyper-threading
  - 1 vCPU = 1 processor license

Oracle DB license options in AWS

AWS deployment option	SE license included	Oracle cloud policy	Core-based license	Unlimited license agreement
Amazon RDS	✓	✓	✗	✓
Amazon EC2 compute	✗	✓	✗	✓
VMware Cloud on AWS	✗	✓	✓	✓
Dedicated hosts on EC2	✗	✓	✓	✓
EC2 bare metal instances	✗	✓	✓	✓

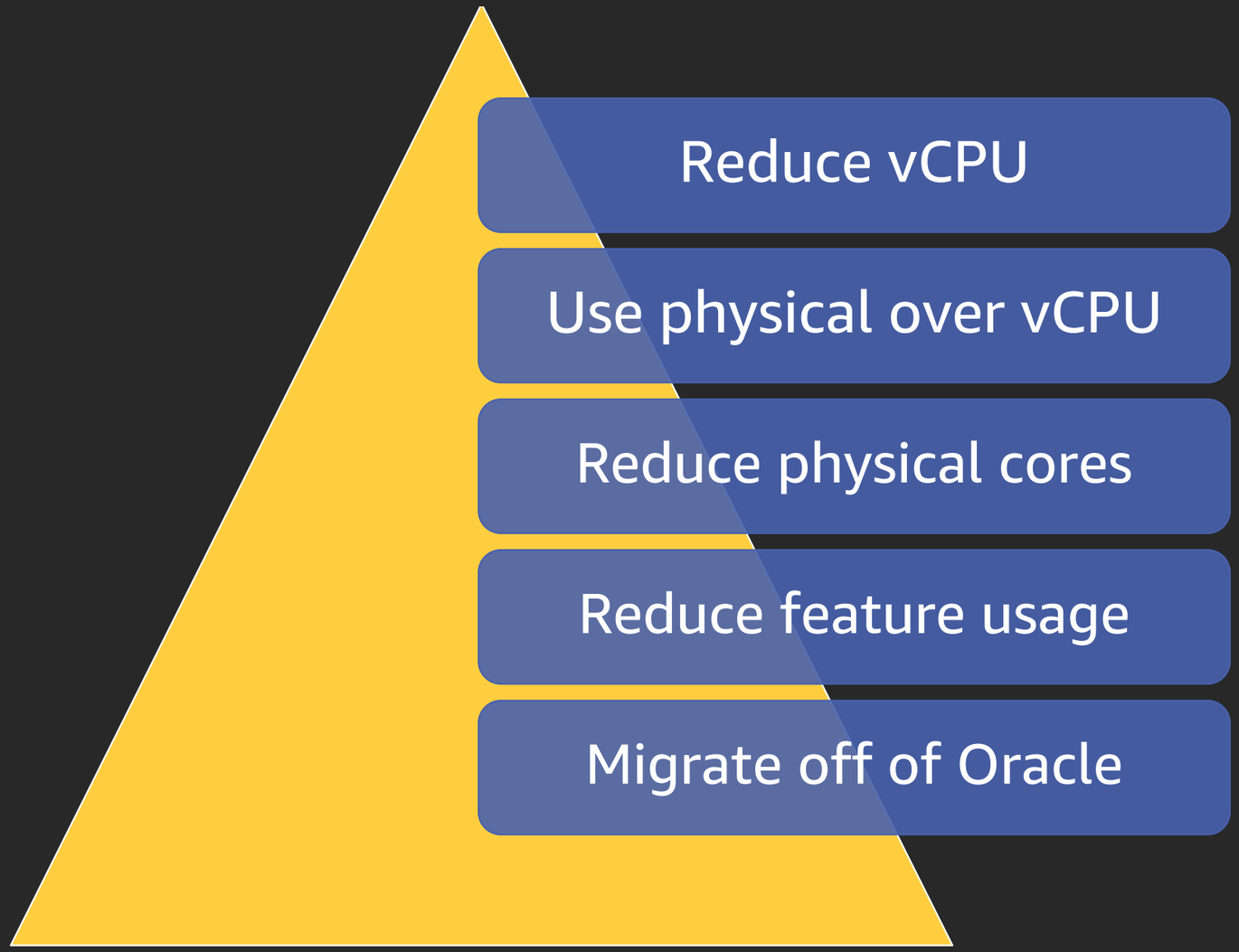
Strategies for optimizing Oracle licenses in AWS

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Where to look for optimizing Oracle licenses



Focus areas for optimizing Oracle License costs in AWS

vCPU licensing

- **SE LI instead of BYOL**
- **Optimize CPU**
- **Pre-migration right-sizing**
- **Transient instances to share licenses**

Hardware licensing

- **Reduce cluster size**
- **Optimize CPU**
- **Eliminate feature usage**
- **Database Freedom**

Amazon RDS features for Standard Editions—high availability

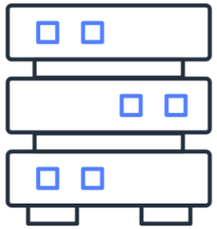
- The Amazon RDS Multi-AZ (MAZ) high-availability feature works across all editions
- Automatic failover with zero data loss
  - Typically 1-2 minutes of downtime
  - No fail-back required
- Used with BYOL or LI
- Need to license the secondary
- Does not require Enterprise Edition
- Does not require the Active Data Guard extra-cost option

RDS features for Standard Editions—encryption at rest

AWS Key Management Service (AWS KMS) encryption
Available on Amazon EBS storage volumes
Can be used in Amazon RDS for Oracle or Amazon EC2
Can be used across all editions and license types (BYOL or LI)
Does not require the Oracle Advanced Security extra-cost option

Oracle Transparent Data Encryption (TDE) is an option on Amazon RDS for Oracle with Enterprise Edition (EE)

RDS features for Standard Editions—monitoring performance



Instance

Amazon CloudWatch

- CPU/Memory/IOPS/ Network
- Per minute metric storage in CloudWatch



Operating system

Amazon RDS Enhanced Monitoring

- Process/thread list
- Per second metric storage in Amazon CloudWatch Logs

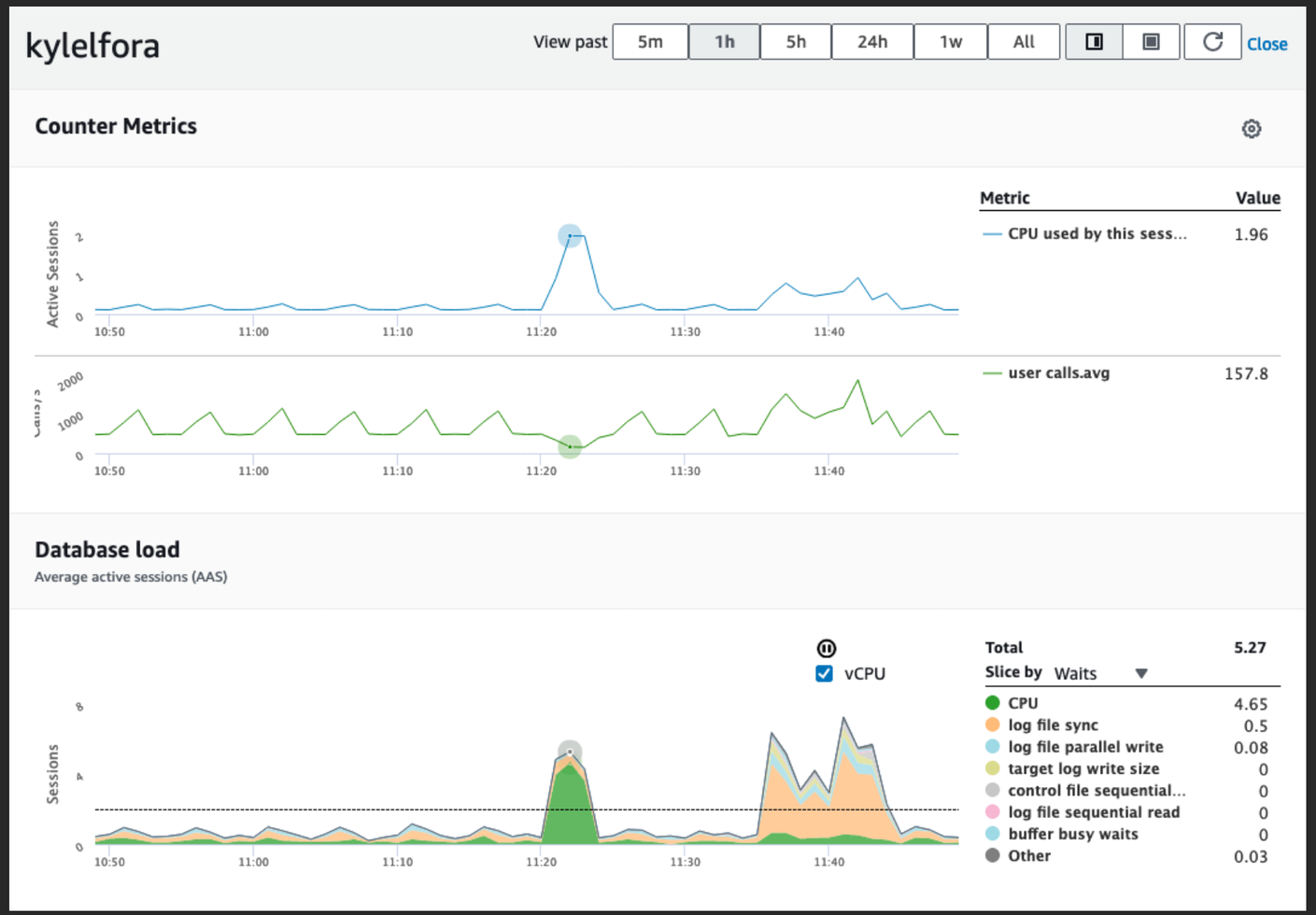


Database engine

Amazon RDS Performance Insights

- SQL/State/User/Host (“Database Load”)
- Per second metric storage in Amazon RDS

RDS features for Standard Editions—performance insights



Measure database load over time

Easy to identify database bottlenecks

- Top SQL/most intensive queries
- Top wait states impacting performance

Enables problem discovery

Adjustable timeframe—hour, day, week, and longer

Available for all Amazon RDS database engines

Right size your AWS instance

Use Statspack or O/S commands

If running Oracle EE with Diagnostics Pack use *Automatic Workload Repository (*AWR)

Run Oracle AWR reports in 10-minute snapshots during peak utilization

Hardware choices in AWS

- https://aws.amazon.com/ec2/instance-types/

- Examples:
  - R5 – 1 vCPU: 8 GiB memory ratio

  - Z1d – 1 vCPU: 8 GiB memory ratio
    - Sustained all core frequency of up to 4.0 GHz

  - X1e – 1 vCPU: 30 GiB memory ratio

Hardware choices in AWS—best practices

https://aws.amazon.com/ec2/instance-types/

Check for newer instance types periodically

- AWS or RDS “what’s new” posts

Newer generations of a given family typically have:

- Same or better performance
- Lower cost
- For example: R5 versus R4

Using Amazon RDS for Oracle or Amazon EC2 with EBS volumes for storage

- Easy to change instance type by detaching/re-attaching storage with minimal downtime

Optimize CPU

The AWS Optimize CPU feature is available on Amazon EC2 and Amazon RDS for Oracle

Used with BYOL

Reduce the number of vCPUs a VM is launched with

- No underlying difference versus how a VM is carved up in AWS
- Changes to vCPUs require terminating the VM and re-launching a new VM

Can turn off Intel hyper-threading

Straight talk on Optimize CPU to limit Oracle license

Binding license agreement

- Only installed and/or running
- Not possible to be installed and/or running on nonexistent cores or vCPU

Proving the concepts in an audit

- We have defended hardware & virtual CPU disablement
- Have not yet defended AWS Optimize CPU

Non-contractual cloud policy

- Cloud policy is non-contractual
- Subject to change
- If Oracle is serious about Optimize CPU, why haven’t they updated the policy to say that?

Risks and pitfalls with Oracle licensing

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Oracle license considerations on AWS

Unlimited license agreement

- Cannot count AWS usage in certification (check your ULA)
- Installed AND running
- Be careful not to over-certify

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Terminating support

- Keeping a subset of licenses under support terminates the others

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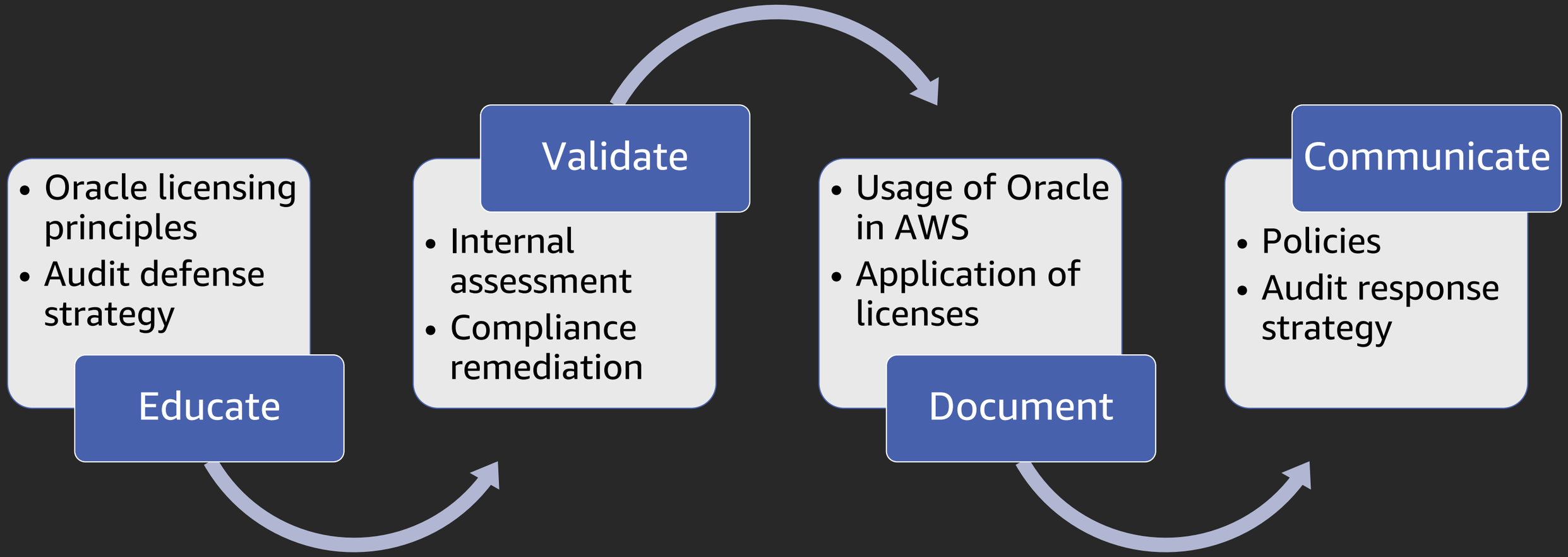
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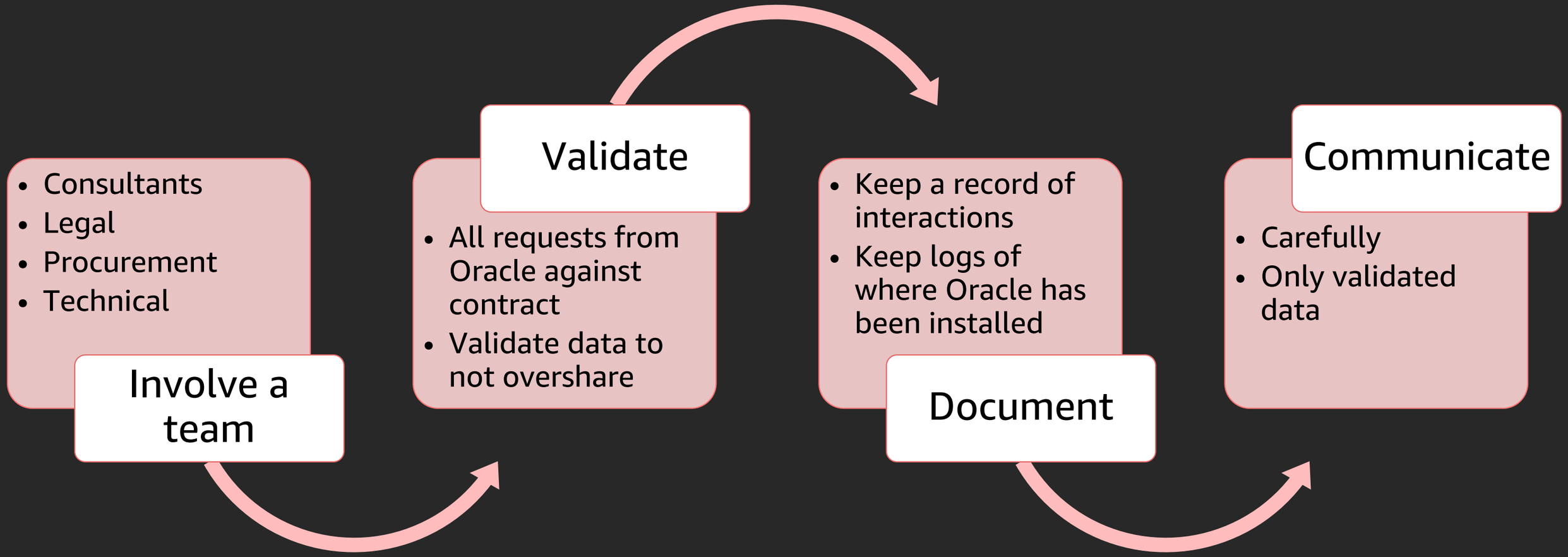
Unlicensed EE feature usage

- Oracle leaves features turned on by default
- Disable if possible
- Regular monitoring

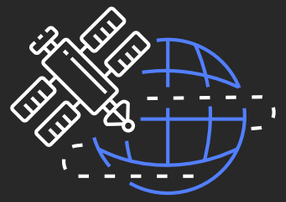
Preparing for an Oracle audit



Defending an Oracle audit



Next steps and more information



RAC on VMware Cloud

Whitepaper



Oracle on VMware Cloud on AWS TCO

Whitepaper



Amazon RDS for Oracle and Oracle on Amazon EC2

Proof of concept

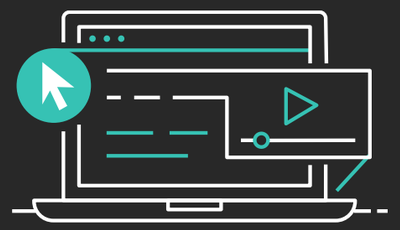


Re:Invent, VMworld & IOUG

Sessions

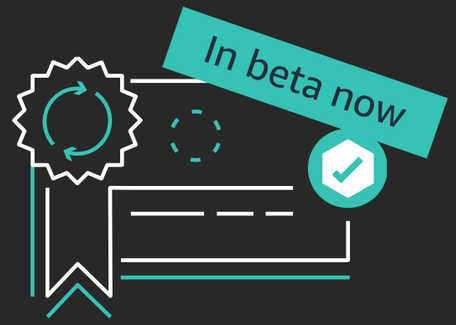
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Thank you!

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