ORACLE
Cloud Infrastructure

Virtual Cloud Network Best Practices

Level 201

Jamal Arif

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Objectives

- Best Practices VCN Design
- VCN and Subnet Sizing

- **Pre-requisites: Virtual Cloud Network Level 100**
- **Pre-requisites: Virtual Cloud Network Level 200**

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Review: Virtual Cloud Network

- VCN network range once created can’t be modified and it is a contiguous IPv4 CIDR block
- VCN is a regional construct and currently subnets are specific to an AD (regional subnets are in roadmap)
- Subnets can have ONE Route Table and MULTIPLE (5*) Security Lists associated to it
- Security Lists support stateful and stateless rules
- All hosts within a VCN can route to all other hosts in a VCN, the route table defines what can be routed into and out of the VCN
- Allowable VCN size range is from /16 to /30 (VCN reserves the first two IP addresses and the last one in each subnet's CIDR)

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VCN Best Practices

- Architect your networking infrastructure in a way to maximize use of Availability Domains for High Availability (ADs are fault tolerant and geographically distributed to sustain a natural disaster)
- For single AD applications, make use of Fault Domains
- Ensure VCN CIDR block does not overlap with other VCNs in Oracle Cloud Infrastructure (same/different regions) and with your organizations private IP network ranges
- Ensure not all IP addresses are allocated at once within a VCN or Subnet, instead plan to reserve some IP addresses for future use
- Divide your VCN network range across all ADs evenly
- Hosts that have similar routing requirements can use same routing tables across multiple availability domains for e.g. public hosts, private hosts, NAT instances etc.

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VCN Best Practices (2)

- Ensure security lists are used as Firewalls to manage connectivity North-South (incoming/outgoing VCN traffic) and East-West (internal VCN traffic between multiple subnets), and is applied at a Subnet Level. All instances with in that subnet inherit all security rules in that SL.
- Private subnets are recommended to have individual route tables to control the flow of traffic within and outside of VCN.
- OCI recommends to use OCI IAM policies to restrict unauthorized users from managing virtual cloud network resources in your tenancy/compartment. Only network admins are allowed to ‘manage’ VCN resources, and other users can have least privilege policies (use, inspect, read)
- Use OCI tags to tag VCN resources (Route Tables, Security Lists, Subnets etc.) so that all resources are following organizational tagging/naming conventions

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Example: VCN and Subnet Sizing

VCN CIDR Block – 10.0.0.0/16 – Extra Large IPv4 CIDR Block

- Divide in Four equal blocks – three for ADs and one spare
  - 10.0.0.0/18 → AD1
  - 10.0.64.0/18 → AD2
  - 10.0.128.0/18 → AD3
  - 10.0.192.0/18 → Extra
- With in each AD, we can have Public and Private Subnets
- Private instances are more prevalent than public instances so we should reserve a greater range for the private subnets.
  - 10.0.0.0/18 → AD1
    - 10.0.0.0/19 → AD1 Private Subnet
    - 10.0.32.0/19 → AD1 Public/spare
      - 10.0.32.0/20 → AD1 Public Subnet
      - 10.0.48.0/20 → AD1 Extra
  - Follow the same design pattern for all 3 Availability Domains.

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Example: VCN and Subnet Sizing

VCN Size	Netmask	Subnet Size	IPs/Subnet	Total Subnets	Total IPs
Small	/24	/27	29*	8	232
Medium	/20	/24	253*	16	4,048
Large	/18	/22	1021*	16	16,336
Extra Large	/16	/20	4093*	16	65,488

The first two IP addresses and the last one in each subnet's CIDR are reserved.

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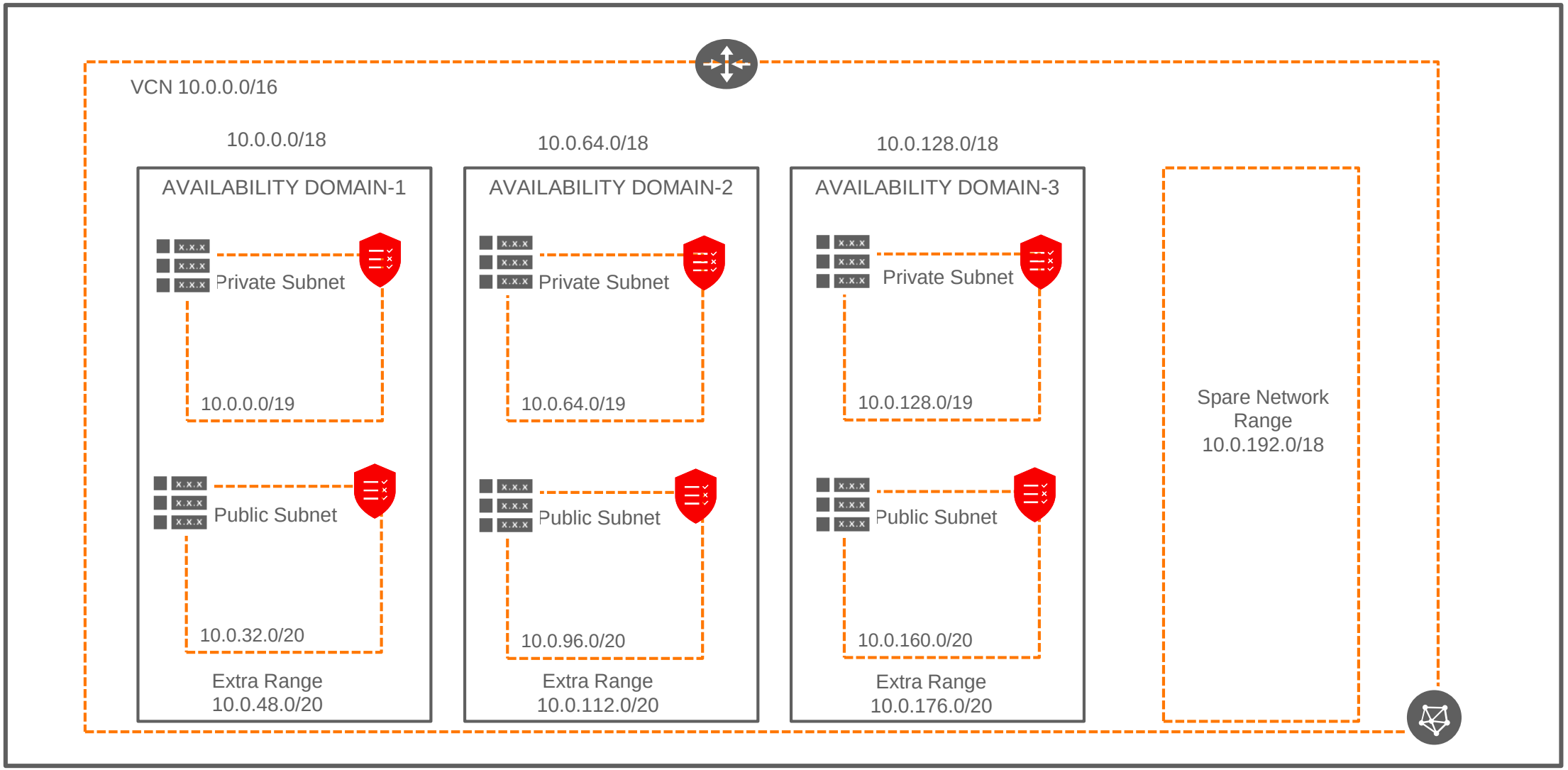
Example: VCN and Subnet Sizing



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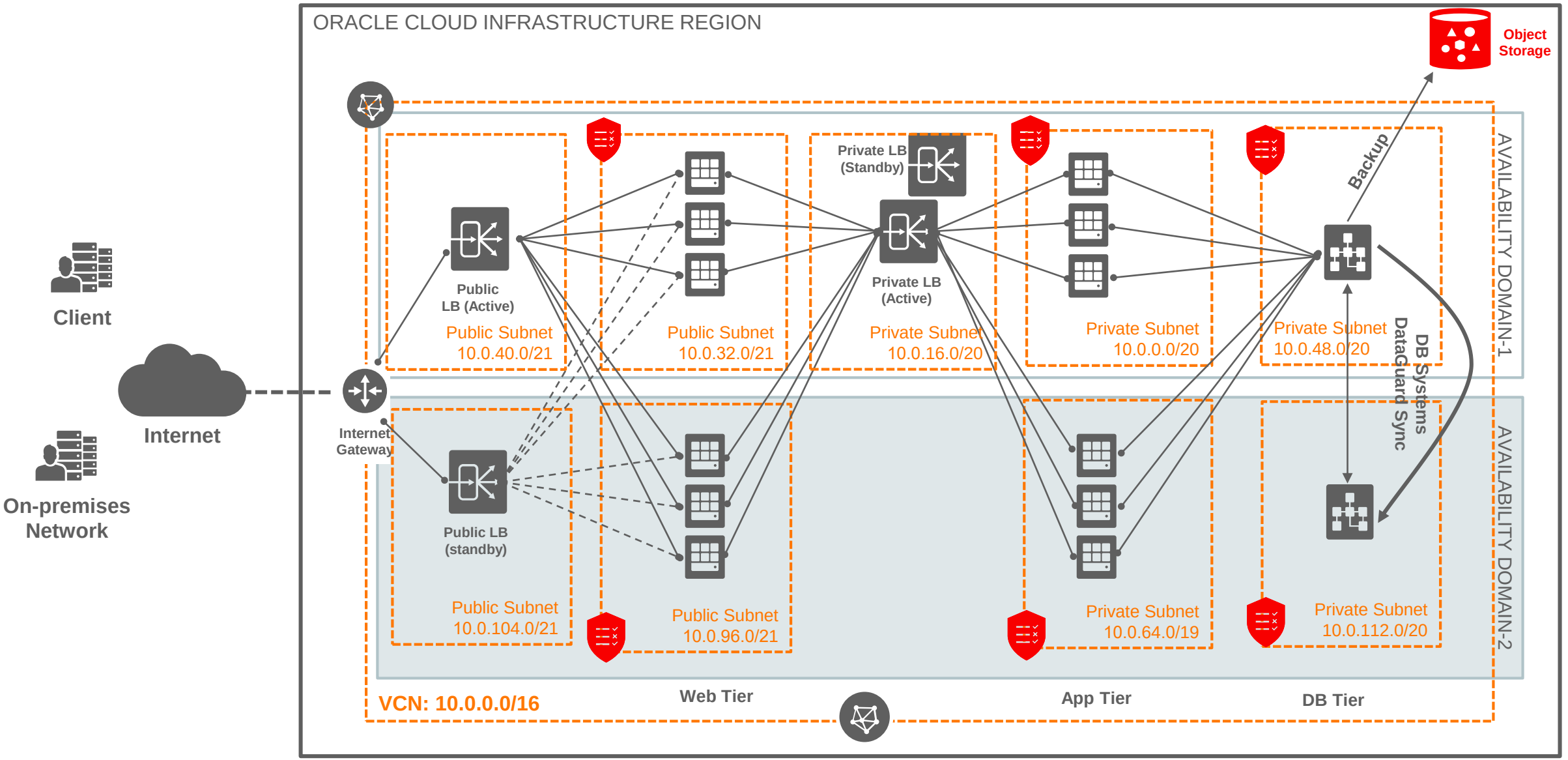
Example: Three Tier Application Architecture (Extra Large VCN size)



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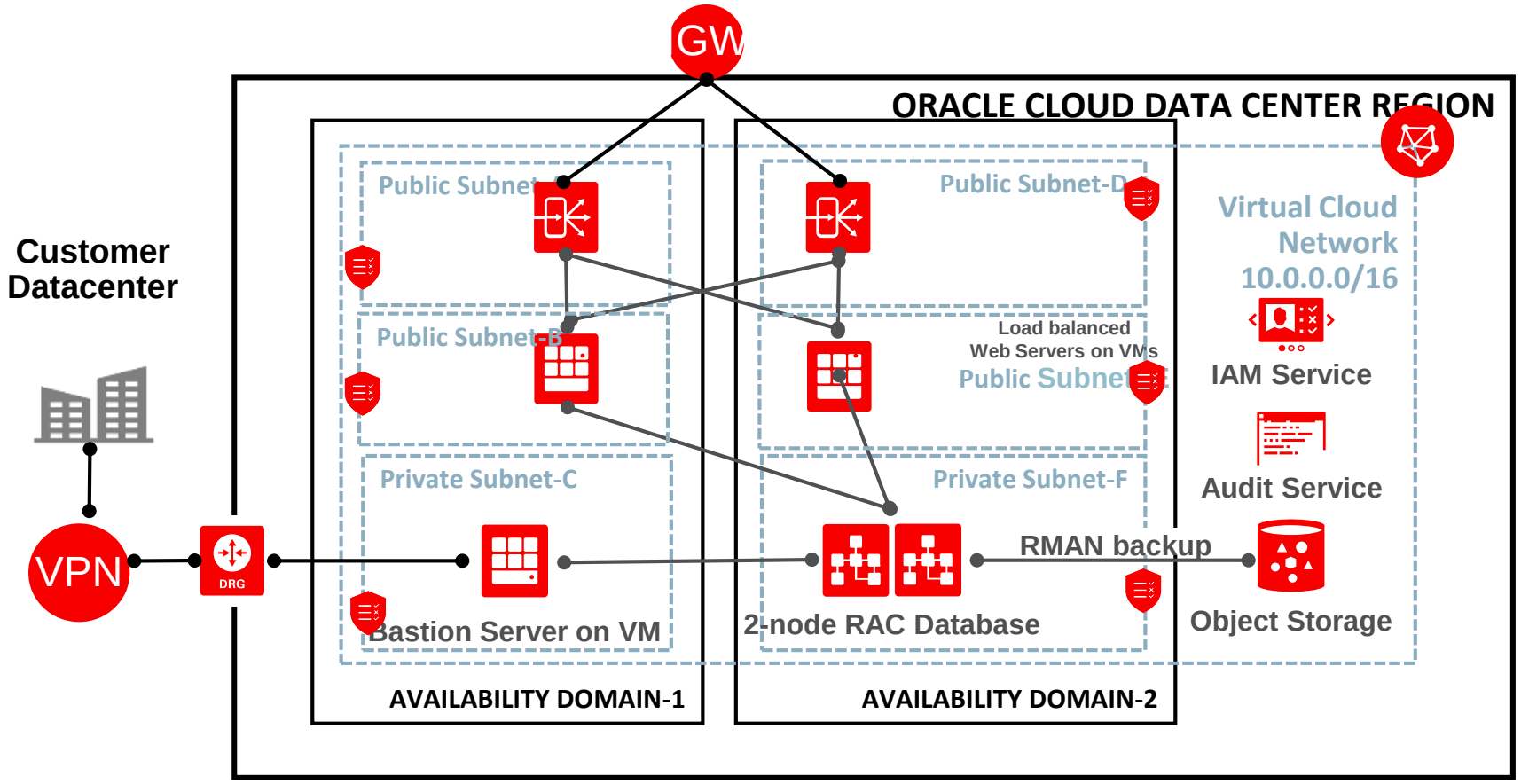
Example: Oracle Customer Architecture (1)



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Summary

- Best Practices VCN Design
- VCN and Subnet Sizing

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