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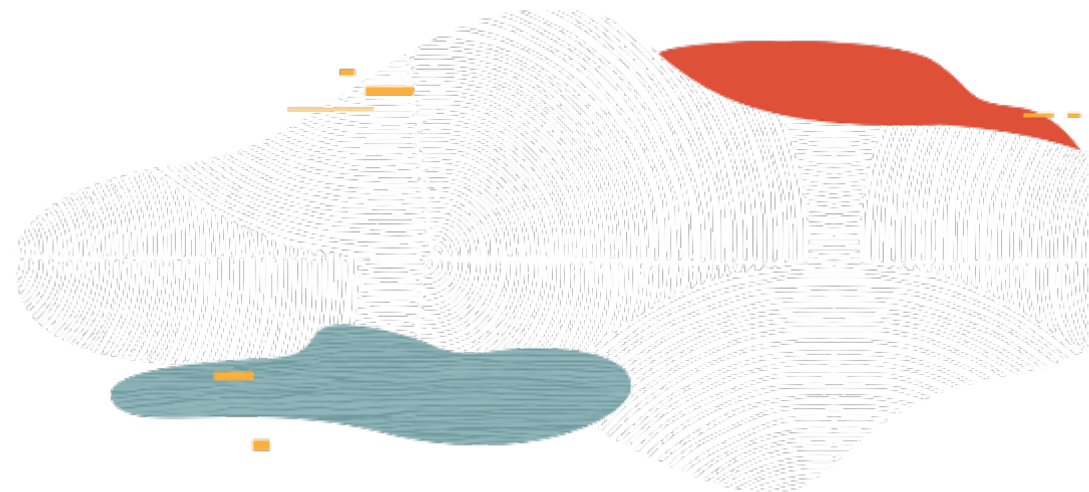
# Load Balancer

**L100**

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Oracle Cloud Infrastructure

Nov 2019



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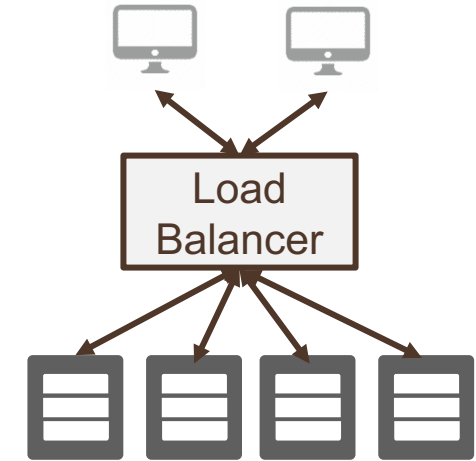
# Primer

A load balancer sits between the clients and the backends performs tasks such as:

- **Service Discovery:** What backends are available in the system? How should the load balancer talk to them?
- **Health Check:** What backends are currently healthy and available to accept requests?
- **Algorithm:** What algorithm should be used to balance individual requests across the healthy backends?

Load Balancer benefits

- **Fault tolerance and HA:** using health check + LB algorithms, a LB can effectively route around a bad or overloaded backend
- **Scale:** LB maximizes throughput, minimizes response time, and avoids overload of any single resource
- **Naming abstraction:** name resolution can be delegated to the LB; backends don't need public IP addresses

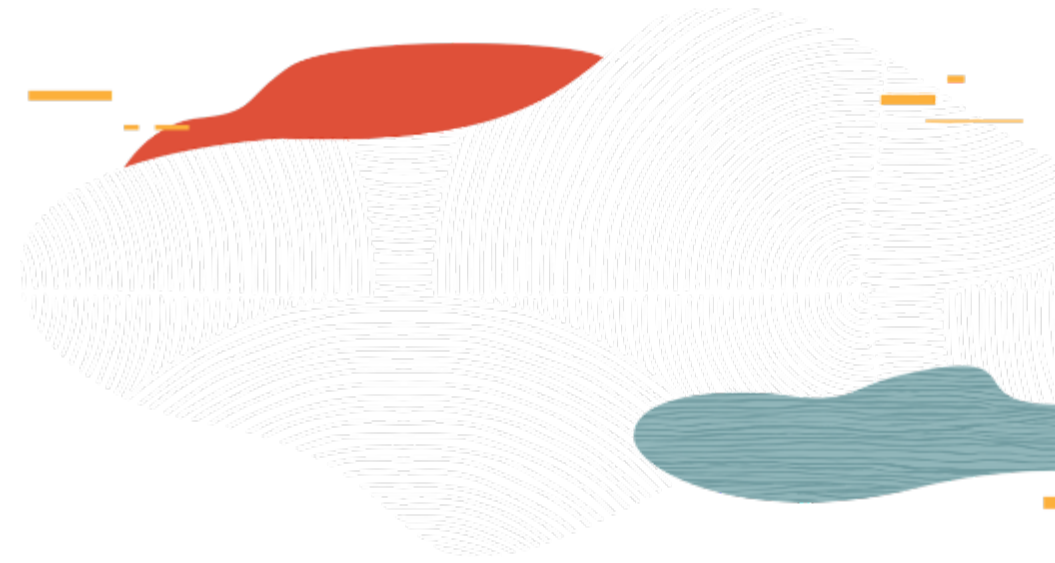


# OCI Load Balancing Service

- Load Balancer as-a-service, provides scale and HA
- Public and Private Load Balancer options
- Supported Protocols – TCP, HTTP/1.0, HTTP/1.1, HTTP/2, WebSocket
- Supports SSL Termination, End-to-End SSL, SSL Tunneling
- Supports advanced features such as session persistence and content based routing
- Key differentiators
  - Private or Public Load Balancer (with Public IP address)
  - Provisioned bandwidth – 100 Mbps, 400 Mbps, 8 Gbps
  - Single load balancer for TCP (layer 4) and HTTP (layer 7) traffic

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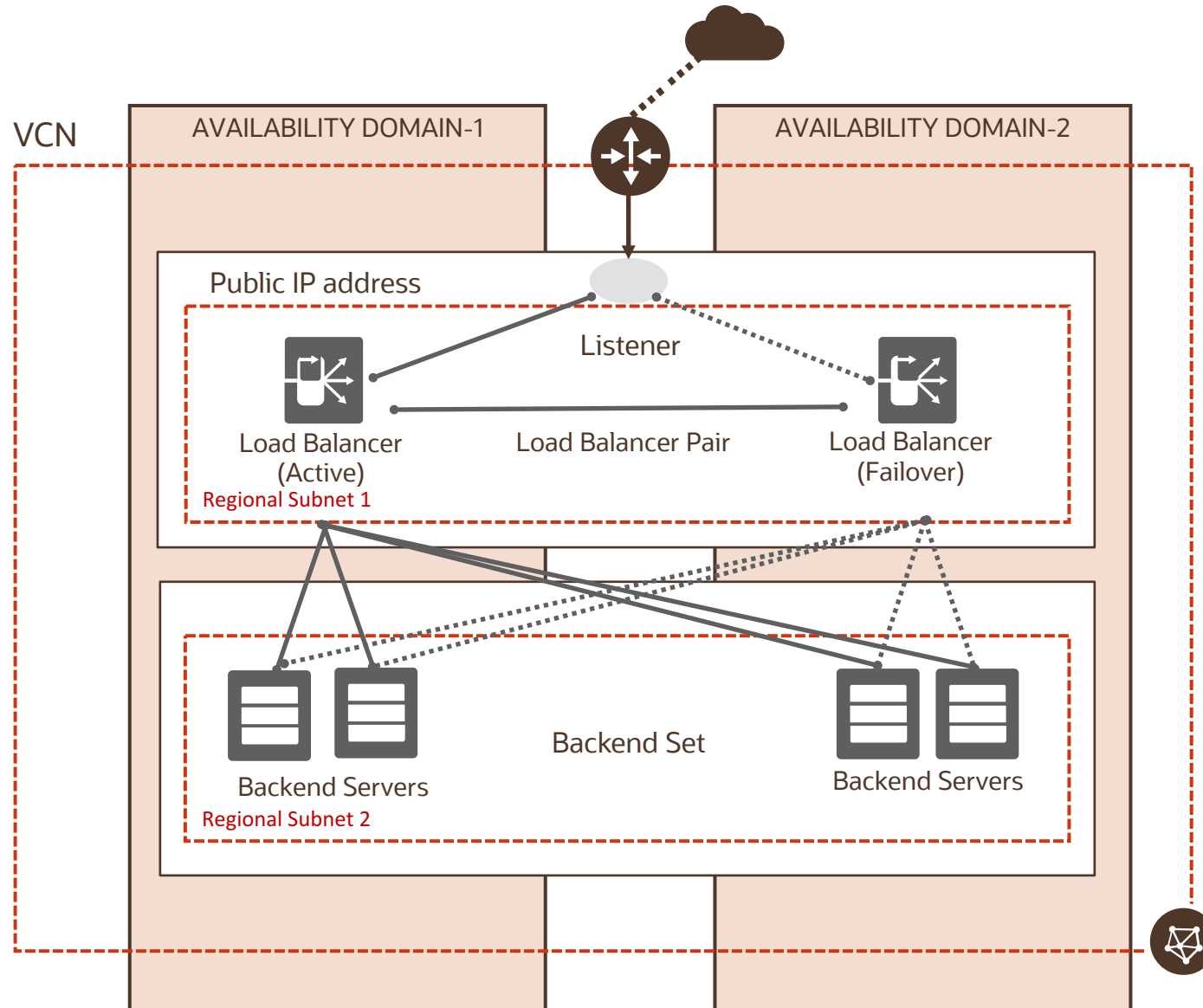
# Public Load Balancer



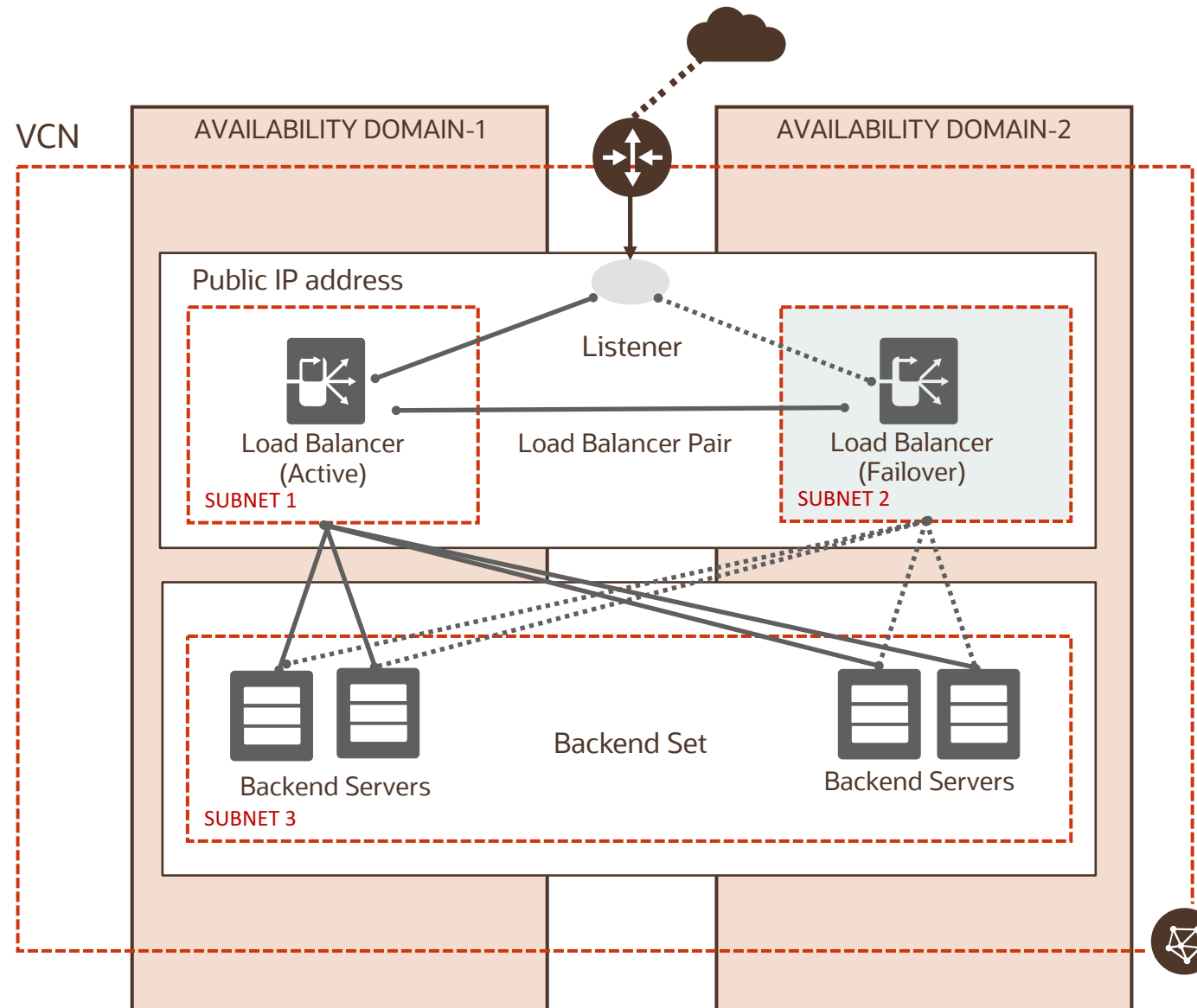
# Public Load Balancer

- Accepts traffic from the internet using a public IP address that serves as the entry point for incoming traffic
- Public Load Balancer is a regional service
- If your region includes multiple availability domains, a public load balancer requires either a regional subnet (recommended) or two availability domain-specific (AD-specific) subnets, each in a separate availability domain.
- Load Balancing service creates a primary load balancer and a standby load balancer, each in a different availability domain
- Supports AD failover in the event of an AD outage in an Oracle Cloud Infrastructure multi-AD region
- Floating Public IP is attached to the primary load balancer, and in the event of an AD outage Floating Public IP is attached to the standby load balancer
- Service treats the two load balancers as equivalent and you cannot denote one as "primary"

# Public Load Balancer (Regional Subnets - recommended)

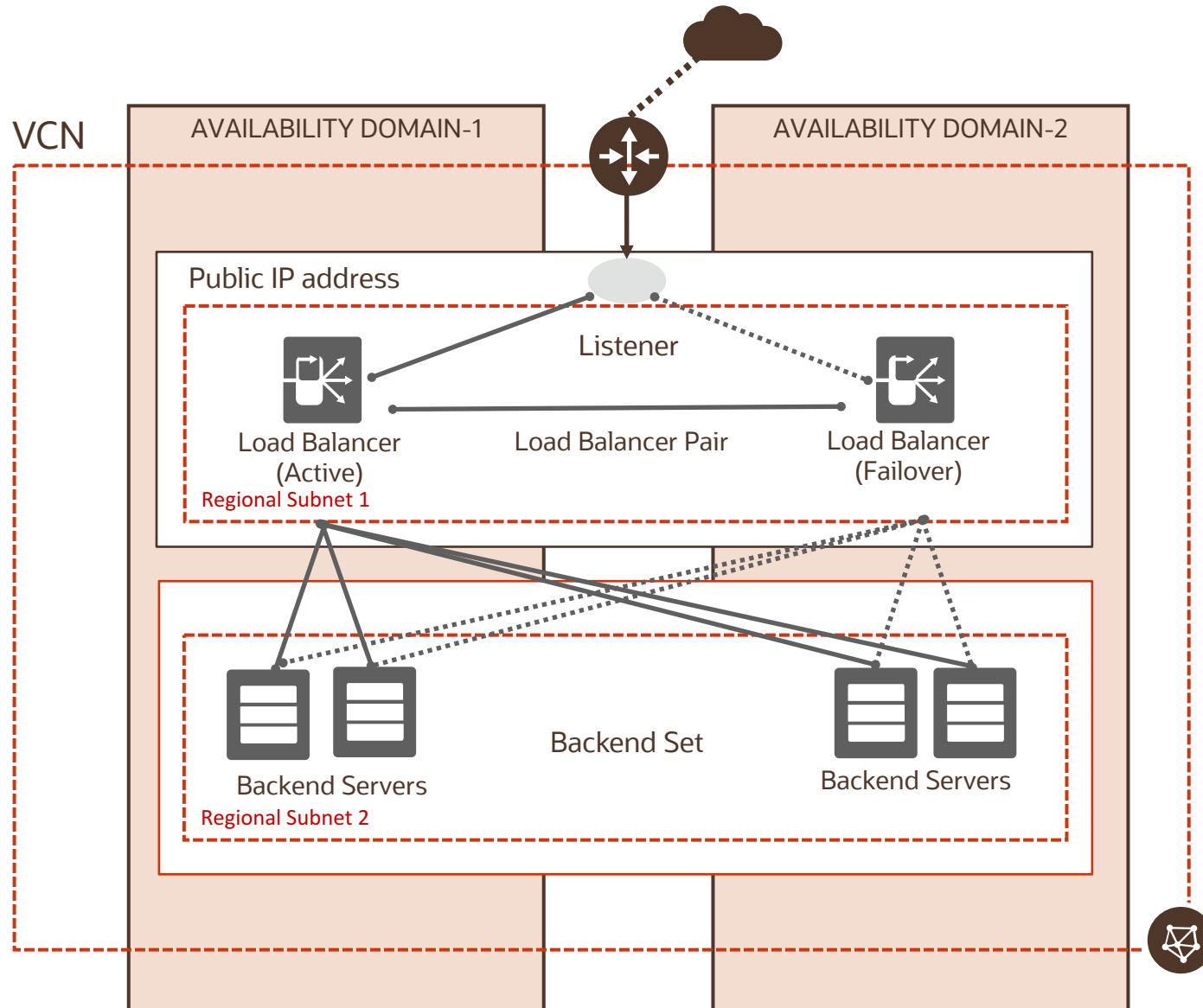


# Public Load Balancer (AD Specific Subnets)





# Concepts - Public Load Balancer



- **Load Balancing Policy** – tells the load balancer how to distribute incoming traffic to the backend servers
  - round-robin
  - IP hash
  - least connection
- **Backend Server** – application server responsible for generating content in reply to the incoming TCP or HTTP traffic
- **Health Checks** – a test to confirm the availability of backend servers; supports
  - TCP-level
  - HTTP-level health checks
- **Backend Set** – logical entity defined by a list of backend servers, a load balancing policy, and a health check policy
- **Listener** – entity that checks for incoming traffic on the load balancer's IP address

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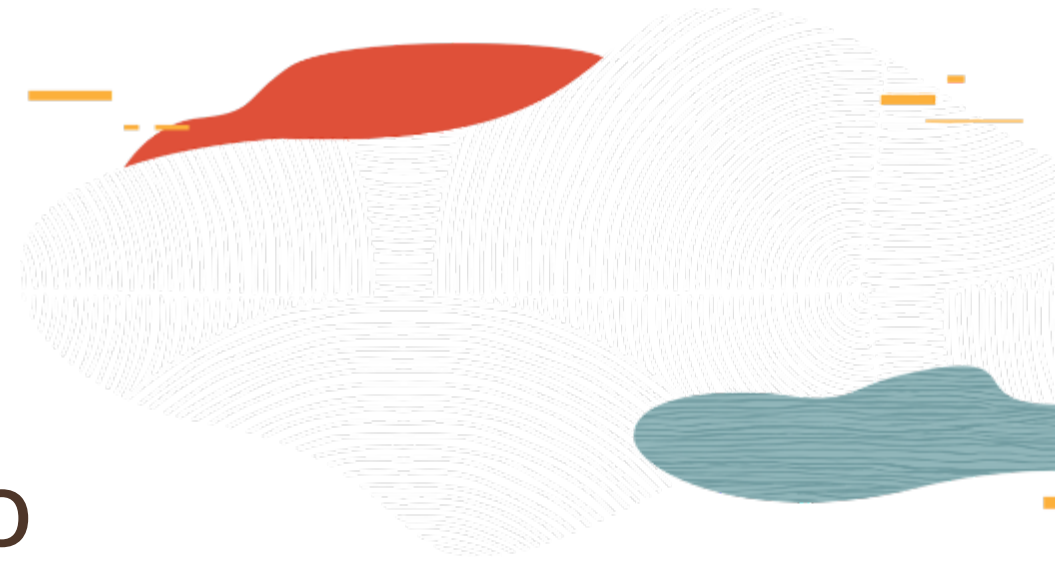
# Public Load Balancer Demo

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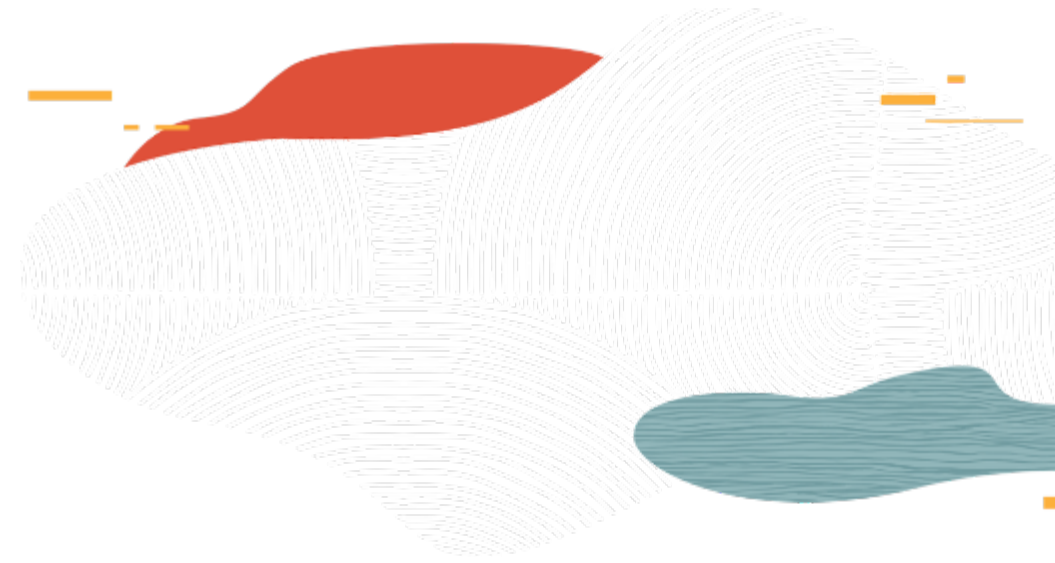
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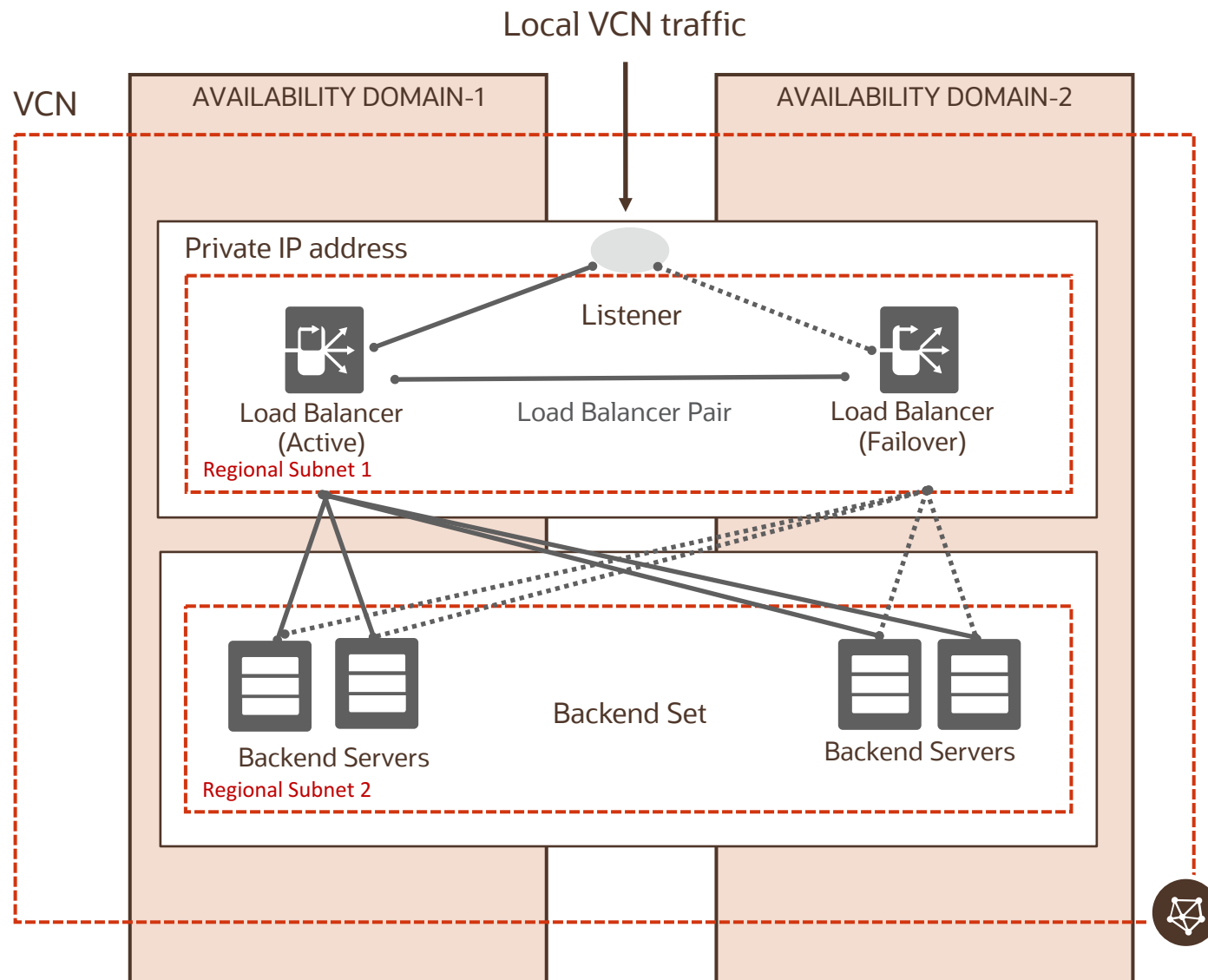
# Private Load Balancer



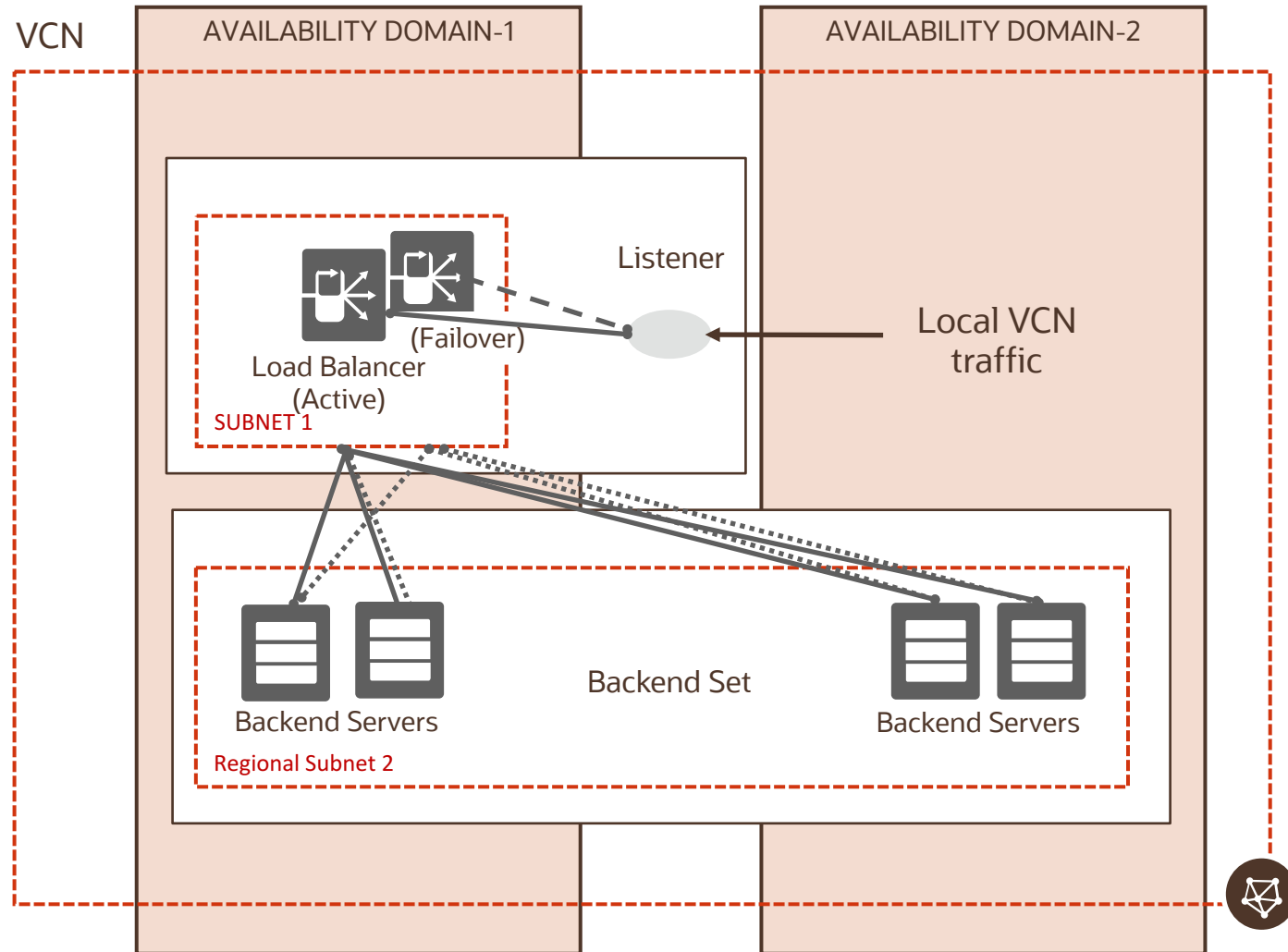
# Private Load Balancer

- Assigned a private IP address from the subnet hosting the load balancer
- The load balancer can be regional or AD-specific, depending on the scope of the host subnet; highly-available within an AD with AD specific subnets or Highly available with regional subnets
- The primary and standby load balancer each require a private IP address from that subnet
- The load balancer is accessible only from within the VCN that contains the associated subnet, or as further restricted by your security list rules

# Private Load Balancer (Using Regional Subnets)

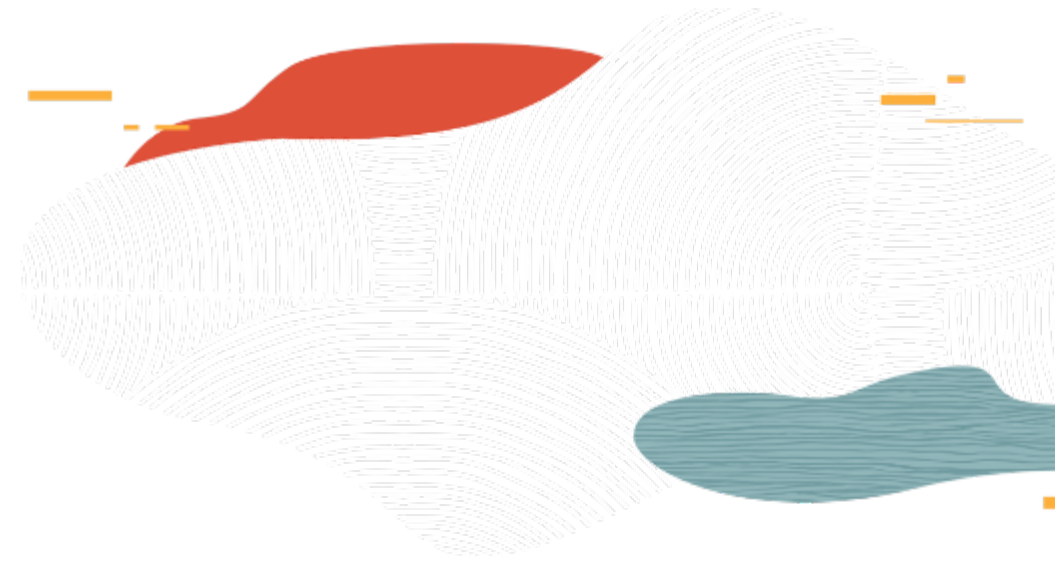


# Private Load Balancer (with AD Specific Subnets)



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# Policies, Health Checks



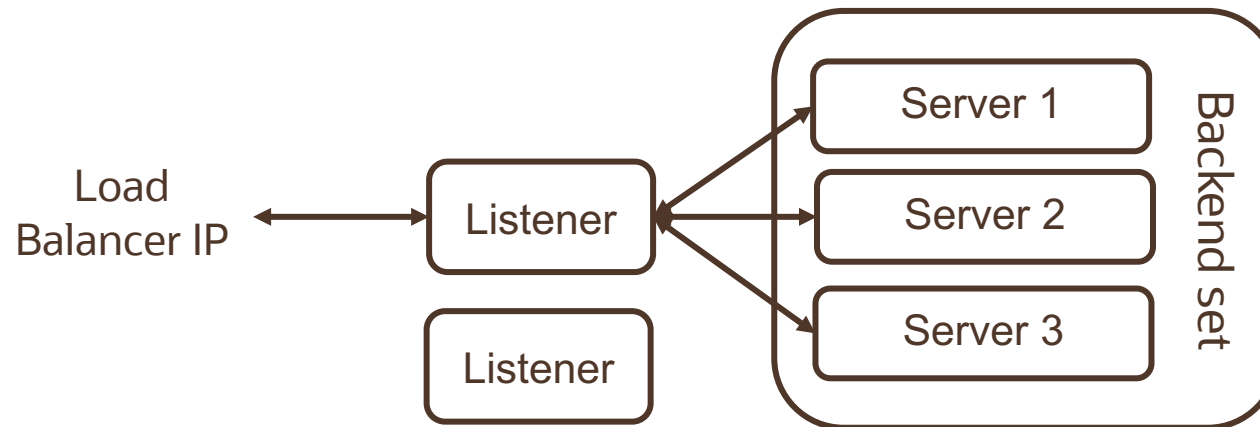
# Load Balancing Policies

- **Round Robin:** default policy, distributes incoming traffic sequentially to each server in a backend set. After each server has received a connection, the load balancer repeats the list in the same order.
- **IP Hash:** uses an incoming request's source IP address as a hashing key to route non-sticky traffic to the same backend server
- **Least Connection:** routes incoming non-sticky request traffic to the backend server with the fewest active connections
- Load balancer policy decisions apply differently to TCP load balancer, cookie-based session persistent HTTP requests (sticky requests), and non-sticky HTTP requests
  - A TCP load balancer considers policy and weight criteria
  - An HTTP load balancer w/ cookie-based session persistence forwards requests using cookie's session info
  - For non-sticky HTTP requests, the load balancer applies policy and weight criteria



# Health Check

- Health check is a test to confirm the availability of backend servers. Health Check is activated for
  - Backends
  - Backend set
  - Overall Load Balancer
- A load balancer IP can have up to 16 listeners (port numbers). Each listener has a backend set that can have 1 to N backend servers



- Health API provides a 4-state health status (ok, warning, critical, unknown)
- Health status is updated every three minutes. No finer granularity is available

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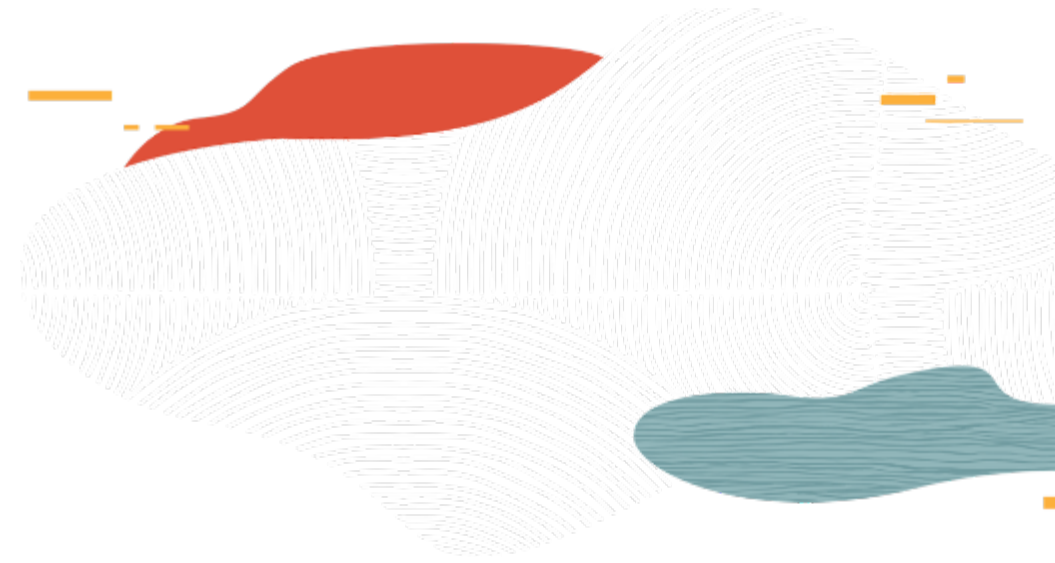
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Thank you

