APPC Resiliency

An ODL Cluster-based Approach

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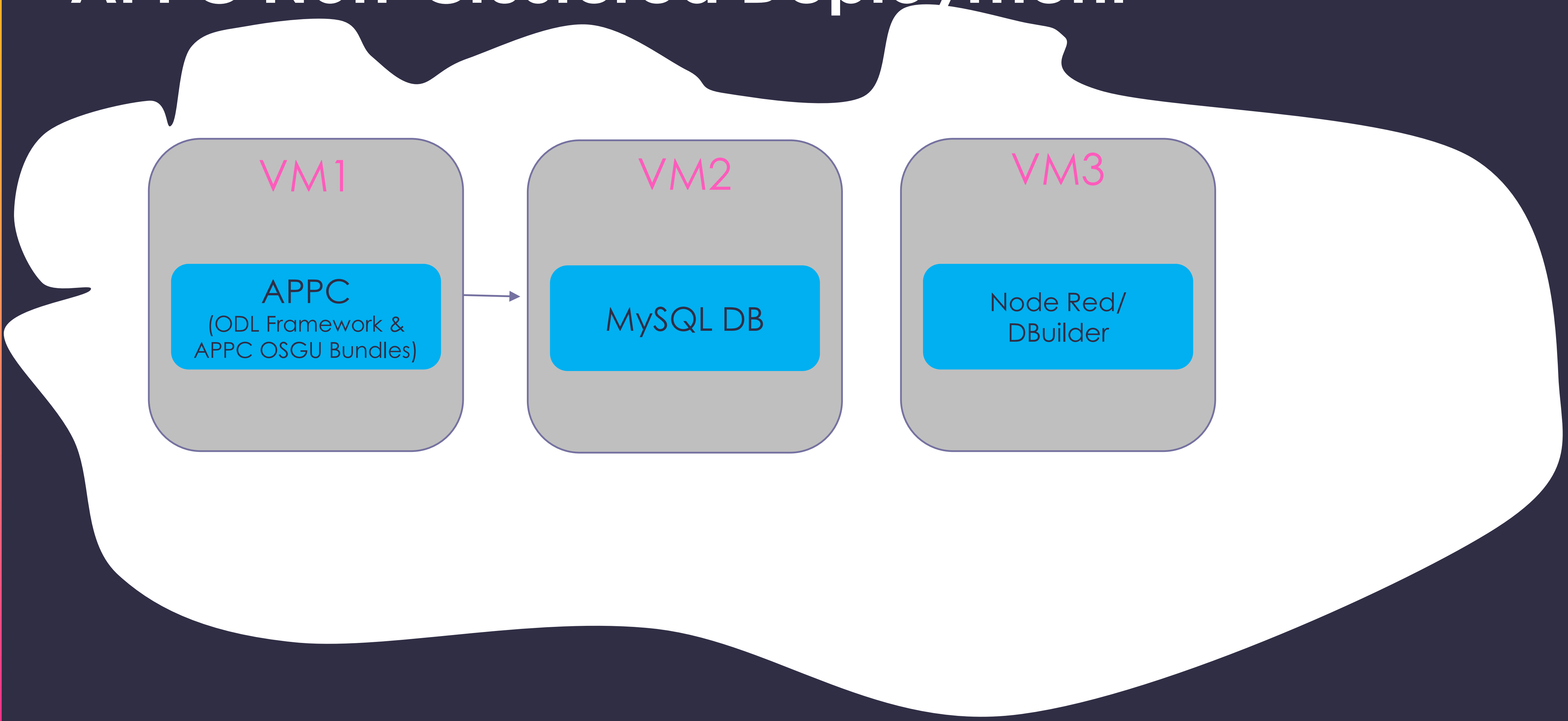
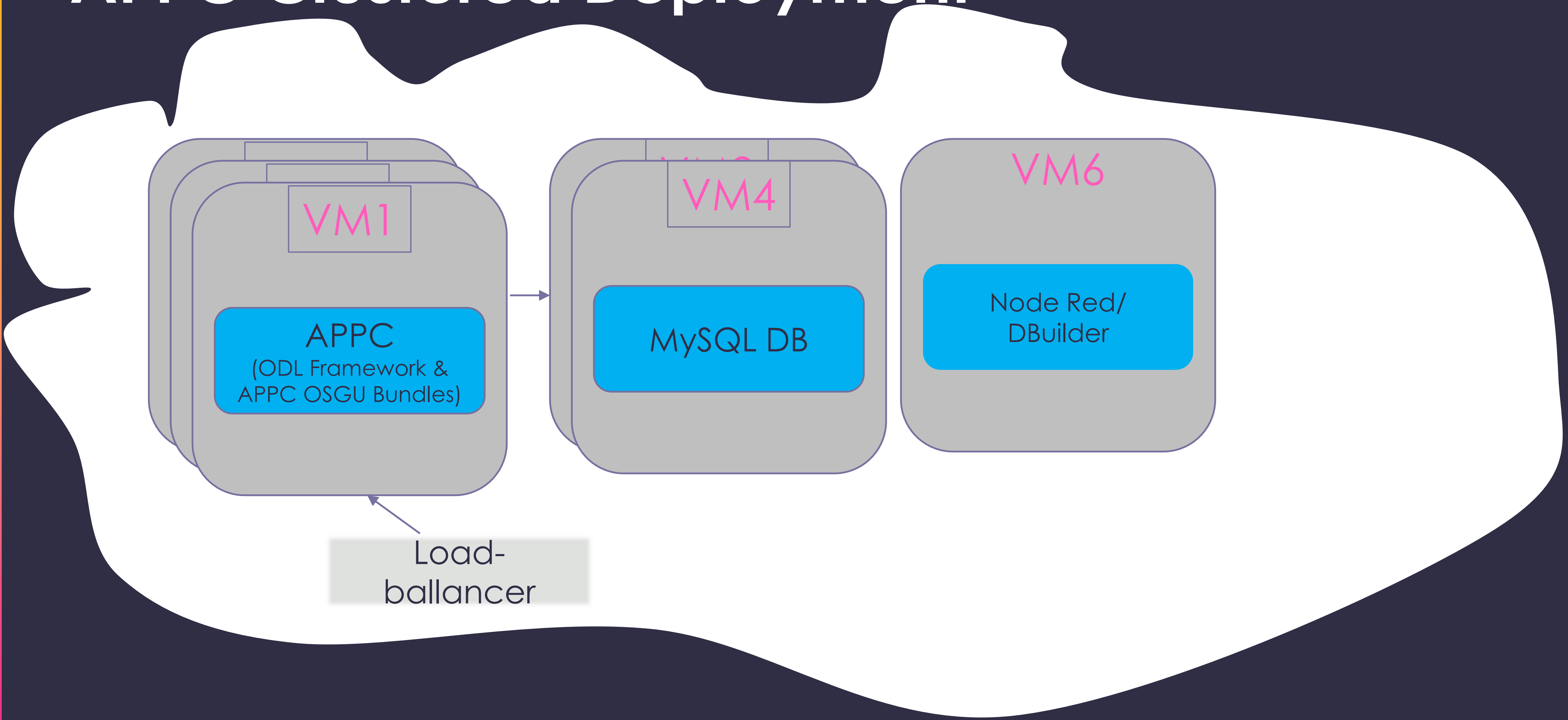
amdocs

APPC Non-Clustered Deployment



APPC Clustered Deployment



ODL Clustering

http://docs.opendaylight.org/en/stable-carbon/getting-started-guide/common-features/clustering.html

https://wiki.opendaylight.org/view/OpenDaylight_Controller/Clustering

Summary

- Each cluster has members
- One is elected leader
- Only leader can write
- Cluster is functional if (N/2) + 1 our of N cluster members are available
- Otherwise, reports isolated leader status and writes may start failing

Used in conjunction with a loader-balancer to maximize availability

For geo-redundancy

- members in backup site should be given non-voting status, so as to not impact latency in primary site members.

Findings/Recommendations

- Enhance APP-C so that requests can be retried
- No getting stuck in weird states on failure
- Make requests idempotent
- Enhance Dispatcher so single failure won't result in so many failures
- Closed loop action in isolated leader
- Alarm?
- Cluster-aware OAM
- Start/stop/status/health check of single or all APPC members
- Make default deployment
- Document?

$\left.\right\}$ Deployment & OAM Independent Work

Backup

Notes on ODL Clustering

- OpenDaylight Cluster does not provide load balancing of the incoming requests, but one can be set up to actually distributes the load of incoming request among cluster instances.
- Cluster Members
- We should have minimum 3 nodes
- OpenDaylight requires majority of nodes to be up to work as cluster. With 2 nodes if any 1 node fails, the other 1 cannot be a majority of 2 nodes. In 3 node cluster if 2 nodes fail, it cannot work as cluster. APP-C can still accept the request and process it, but it cannot write data on MD-SAL store.
- Every node needs an identifier. OpenDaylight uses nodes' role for this purpose.
- Seed Nodes are nodes who will work together as cluster. When cluster nodes come up they talk to each other and then elect a leader node.

Notes on ODL Clustering

- Data shards
- used to contain all or certain segment of OpenDaylight's MD-SAL data store. If we do not specify a module in the modules.conf file and do not specify a shard in module-shards.conf, then (by default) all the data is placed in the default shard (which must also be defined in module-shards.conf file). Each shard has replicas configured. We can specify the details of where the replicas reside in module-shards.conf file.
- Voting Status (Primary/Secondary)
- Primary/Secondary status useful for geo-redunency
- With APIs provided by cluster-admin module of OpenDaylight, we can modify voting state of cluster nodes. All the voting nodes are considered as primary nodes, and non-voting nodes are considered secondary nodes. OpenDaylight uses "Strong Consistency" for transactions among primary nodes but uses "Eventual Consistency" for secondary nodes.