New York Stock Exchange
Oracle Exadata – Our Journey

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New York Stock Exchange (NYSE) and Intercontinental Exchange (ICE)

- NYSE - world's largest stock exchange by market capitalization ($28 trillion)

- NYSE is owned by Intercontinental Exchange (ICE) - Architects of the world's markets

- 11 exchanges, 7 clearing houses 12,000 + listed contracts and securities

- Diverse markets span futures & options on interest rates, commodities, indexes and FX, as well as equities and equity options.

- We transact on average in <200 mics.

DATA ENVIRONMENT

- Data volume: ~50-60 billion transactions per day (at peak)

- Data size: ~ 15 TB of data per day (at peak)

- All data for equities, ETFs, options markets and the feed to the street

- Data for trading system latency, other markets

- Data services responsible for managing all the data and data platforms including Exadata

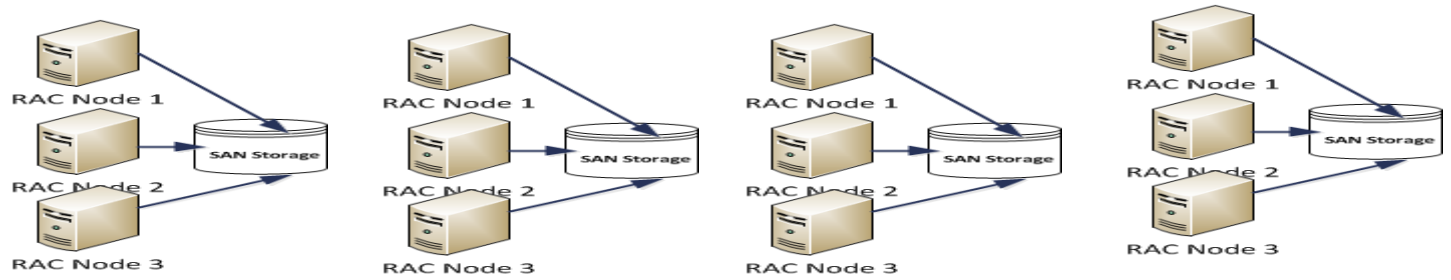# oracle database environment on EXadata

- Oracle - primary transactional database platform supporting all NYSE businesses

- OLTP and Data Mart environments - 250+ databases, over 500 instances

- Total database size - 350+ TB

- Daily transaction volume - ~1000 million transactions

- Large transactional databases: ~10-20 TB databases generating about ~ 300 GB of log per day

- Large Data Mart: >100 TB in size (after HCC compression for historical data)

CONSOLIDATION TO EXADATA

2004:

2006:

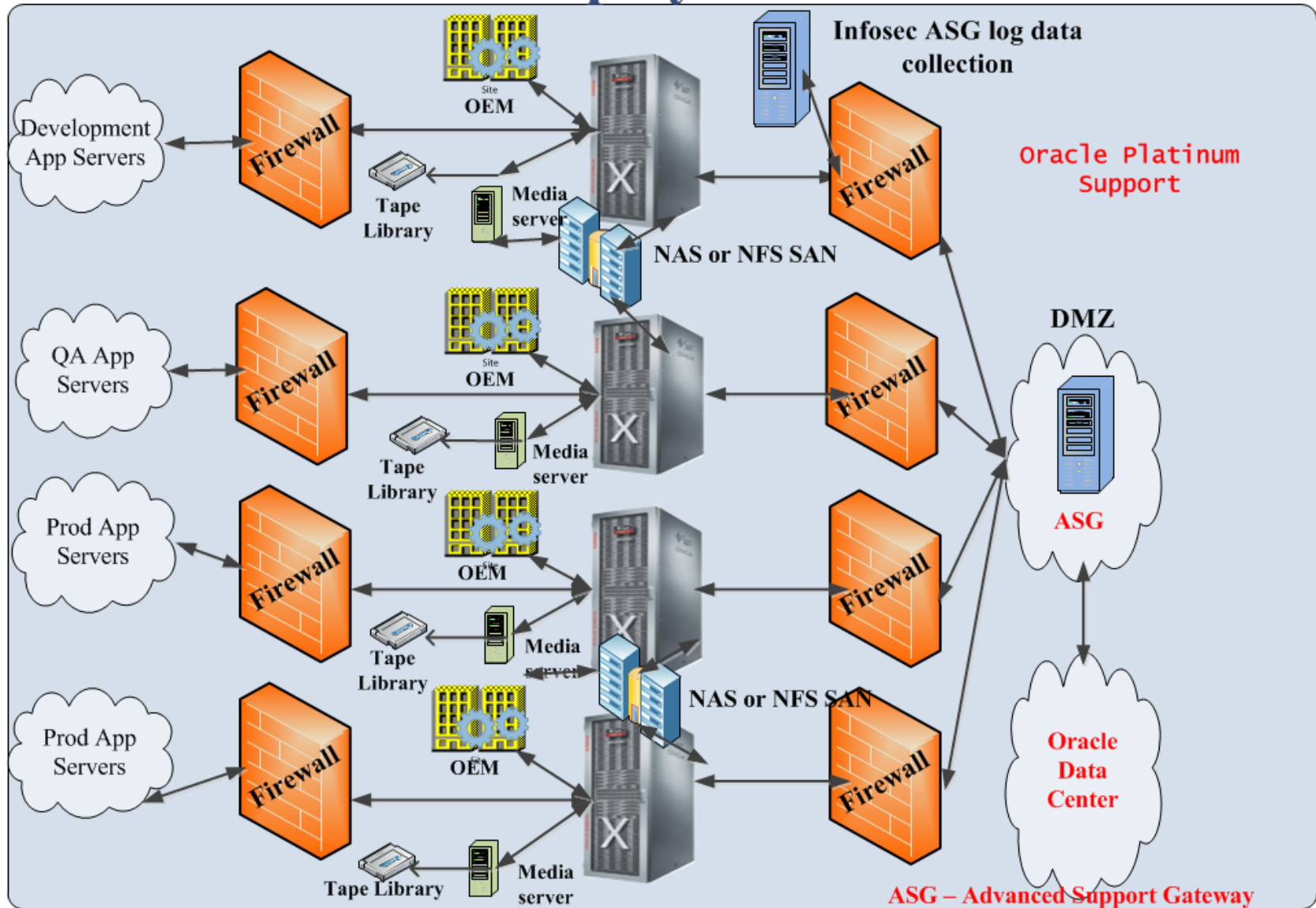RAC Node 1

SAN Storage
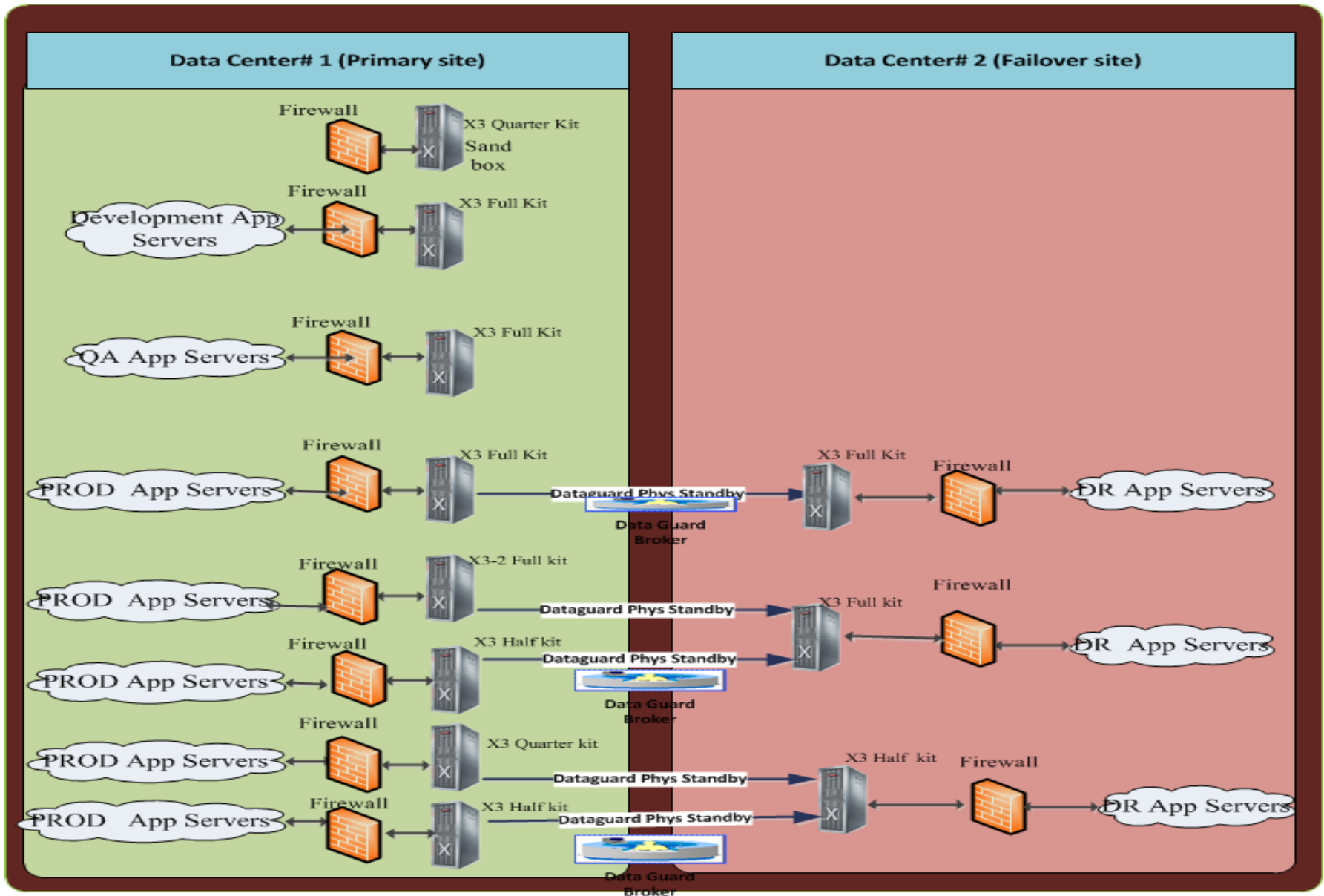
RAC Node 2

RAC Node 3

2014:

17 Exadata – 12 for NYSE

EXADATA Deployment Architecture

NYSE Exadata footprint

EXADATA FOR CONSOLIDATION

Some examples:

- Dev: ~60 databases consolidated on a full rack of X3-2
           with an average size of 1.6 TB

- QA: ~70 QA consolidated on to a full rack of X3-2
           with an average size of   2 TB

- Prod: ~ 50 databases consolidated on a full rack of X3-2
            with an average size of 9.5 TB

- Mix of OLTP and data marts

leveraging exadata for performance

- Performance gains of 2x – 25x

- Trade Reports database – 180,000 messages/sec - ~ 50% increase in processing speed

- For the same application, completion time decreased by 66%

- Data Mart - daily transactions of 2 TB applied to standby in real-time

- Data Loads – processing times decreased by 50%

- Data Mart – hybrid columnar compression - 4x compression gain vs ACO.

- 15-16x compression achieved on raw data using HCC

- Full Backup time of a ~150 TB data mart reduced by 85% (over Infiniband switches)

- Utilize SmartScan capabilities

migration

- Consolidation planning

    Database load compatibility analysis
    setup appropriate resources – parameters, limits

- Migration to Exadata using Data Guard, RMAN Closing and RMAN Duplicate

- Plan hardware - Dedicated network

- Test it out – connectivity, test with application and RAT testing for performance validation

CONSIDERATIONS

- Coordinate downtime

- Risk Mitigation:
  - Manage capacity
  - Oracle Homes – 2
  - Load Isolation
  - Instance caging, IORM deployed to manage resources consolidated

- Security isolation

- Rolling upgrades of databases

- Rolling Exadata bundle patches – cell servers, components, compute nodes and clusterware

- Observe utilization

- Re-evaluate database parameters

BENEFITS OF CONSOLIDATION

- Reduced time to market

- Platform as a service

- Database as a service

- Reduced cost
    - Hardware, licensing
    - operations