



Change Management Board Meeting

November 15, 2011

Video Conference: CO- Burns Video Bridge 3

Audio: 850 - 414 – 5666



Welcome and Call for Quorum

Eric Gordin, CMB Chairman



Agenda



| Time | Item | Lead |
|-------------|--|---------------|
| 1:30 – 1:35 | Welcome and Call for Quorum | Eric Gordin |
| 1:35 – 1:40 | Previous Meeting Recap and Action Item Review | Eric Gordin |
| 1:40 – 1:45 | CMB Chair <i>(vote)</i> | Eric Gordin |
| 1:45 – 1:55 | ITS Telecommunications Update | Frank Deasy |
| 1:55 – 2:15 | AVI TVT Algorithm <i>(vote)</i> | Clay Packard |
| 2:15 – 2:30 | SQL Server Schedule and Database IDs <i>(vote)</i> | Robert Heller |



Agenda



| Time | Item | Lead |
|-------------|---------------------------------------|----------------|
| 2:30 – 2:50 | SunGuide System Availability Overview | Mary Thornton |
| 2:50 – 3:05 | Database Storage Guidelines Overview | Clay Packard |
| 3:05 – 3:20 | SunGuide Report Template Management | Brian Ritchson |
| 3:20 – 3:50 | Top Priority Item by District | Eric Gordin |
| 3:50 – 4:00 | Action Items Review | Eric Gordin |

CMB agenda, slides, and attachments posted here:
http://www.dot.state.fl.us/trafficoperations/ITS/Projects_Deploy/CMB.shtm



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Previous Meetings Recap and Action Items Review

Eric Gordin



September 2011 Action Items



- SwRI to provide further information regarding Travel Time Algorithm.
- SwRI to provide cost estimate for ONVIF.
- SwRI to provide further information regarding TxDOT RCA application.



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CMB Chair (*vote*)

Eric Gordin



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ITS Telecommunications Update

Randy Pierce &
Frank Deasy



ITS WAN Update-The Future



- **FTE RTMCs, Pompano and Turkey Lake**
 - ITS WAN equipment installed at Pompano RTMC
 - Next Step: FTE switch configuration and connection to ITS WAN switch
- **Connecting D7 RTMC, Tampa**
 - ITS WAN equipment ready for on-site commissioning
 - Fiber testing complete, minor cleaning and polishing of a few terminations remaining
- **Connecting D1 RTMC, Ft. Myers**
 - ITS WAN equipment ready for on-site commissioning
 - TransCore preparing to test and characterize fibers
- **Connecting D3 RTMCs, Pensacola and Tallahassee**
 - Equipment procured, awaiting GBIC's



ITS WAN Update-The Future



- **Connecting MDX, Miami**
 - Connect directly to ITS WAN equipment at D6 RTMC
- **Working with VAS**
 - Replacing dedicated circuits with ITS WAN where fiber connections are available
 - Providing streaming video to State EOC



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AVI – TVT Algorithm

Presenter: Clay Packard, P. E.



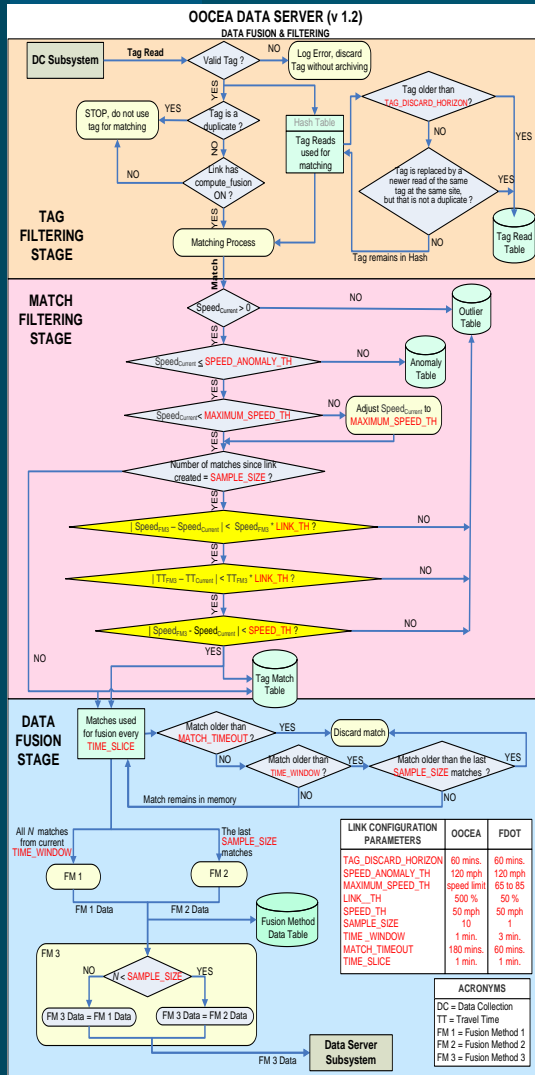
AVI – TVT Issues / Background



- **FTE's Footprint 1847: Probe TVT Inaccuracy**
 - rest stops + low volume = skewed values
- **Last meetings**
 - Presented OOCEA's filtering solution and cost
 - Agreed on need to eliminate bad data
 - “What is bad data?”
 - Algorithm diagram requested
 - “If we do it, let's get it right”

AVI – TVT Diagram

- **Tag Reads**
 - Handles tag and tag reader issues
- **Tag Matches**
 - Handles anomalous vehicle behavior
- **Match Aggregation**
 - Handles traffic volume issues in calculation



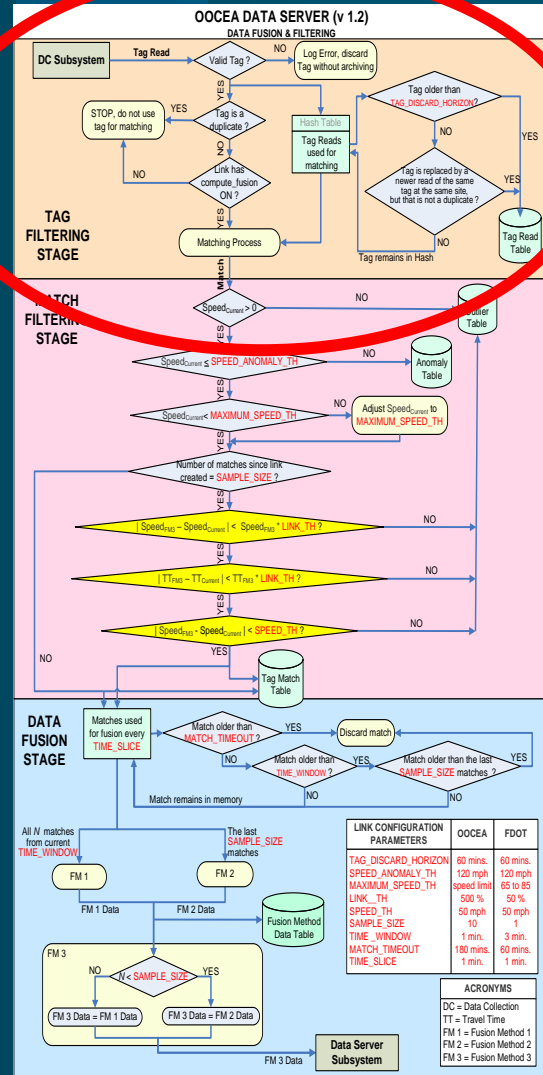


AVI – TVT Issues: Tag Reads



- Tag read error (invalid tag)
- Tag read multiple times (duplicate tag)
- Tag read not discarded as duplicate on next trip
- Reader has known maintenance issue

AVI – TVT Diagram: Tag Reads



- Tag Read Filtering (individual reads prior to matching)
 - Valid Tag Format
 - Tag is not a duplicate
 - Tag is not discarded as a duplicate after some time
- Configurable Parameter: **DISCARD_HORIZON [minutes]**
 - Tag Reader site is Active/Operational
- Else, dynamic linking is possible



AVI – TVT Issues: Tag Matches



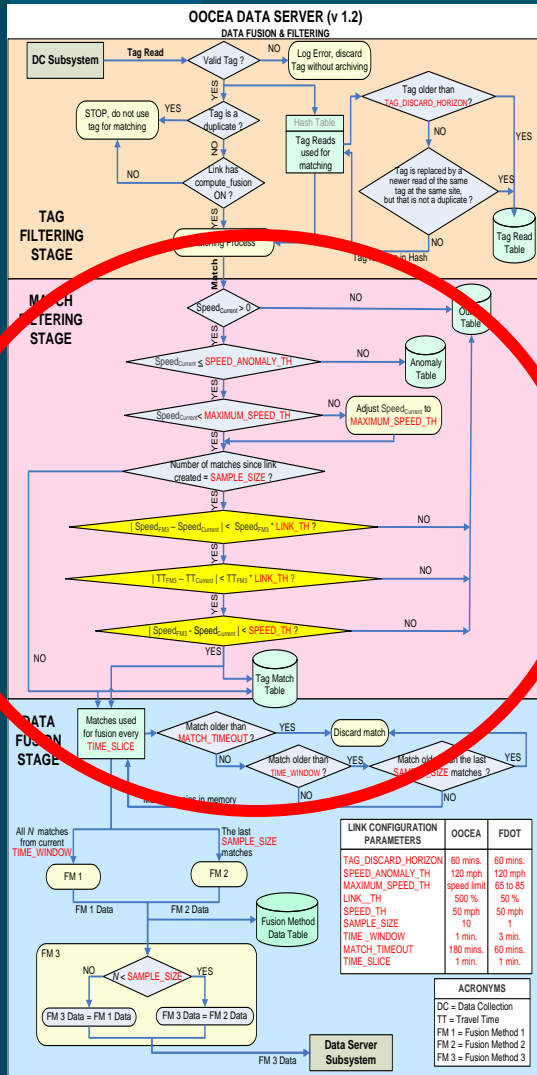
- Vehicle travels extremely fast (triple digits!?!)
- Vehicle travels faster than speed limit
- Upon system startup, comparison to existing conditions not possible
- Vehicle stops between probe detectors (rest area / Service Plaza)
- Vehicle in distress/caution driving slower than others (slow poke)



AVI – TVT Diagram: Tag Matches



- Tag Match Filtering (anomalous speeds removed)
 - SPEED_ANOMALY_TH [MPH]
 - MAXIMUM_SPEED_TH [MPH]
 - Average speed limit for link
 - SAMPLE_SIZE [quantity of vehicles]
 - LINK_TH [% of change in speed or TVT value]
 - SPEED_TH [MPH (change therein)]





AVI – TVT Issues: Match Aggregation



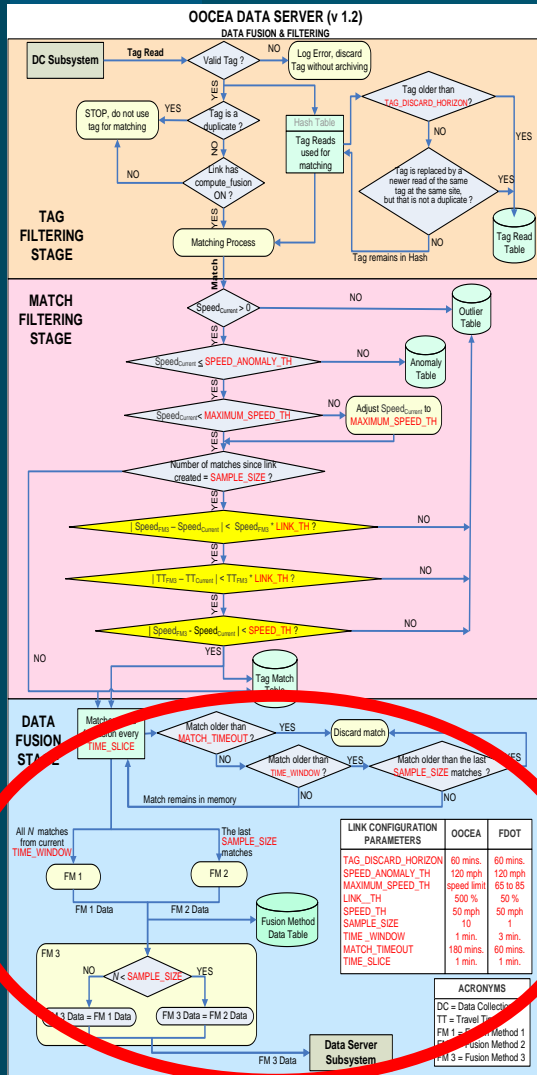
- Not enough matches within time slice
- Matches far outside of time threshold



AVI – TVT Diagram: Match Aggregation



- Tag Aggregation Fusion
 - Calculated every TIME_SLICE [minutes]

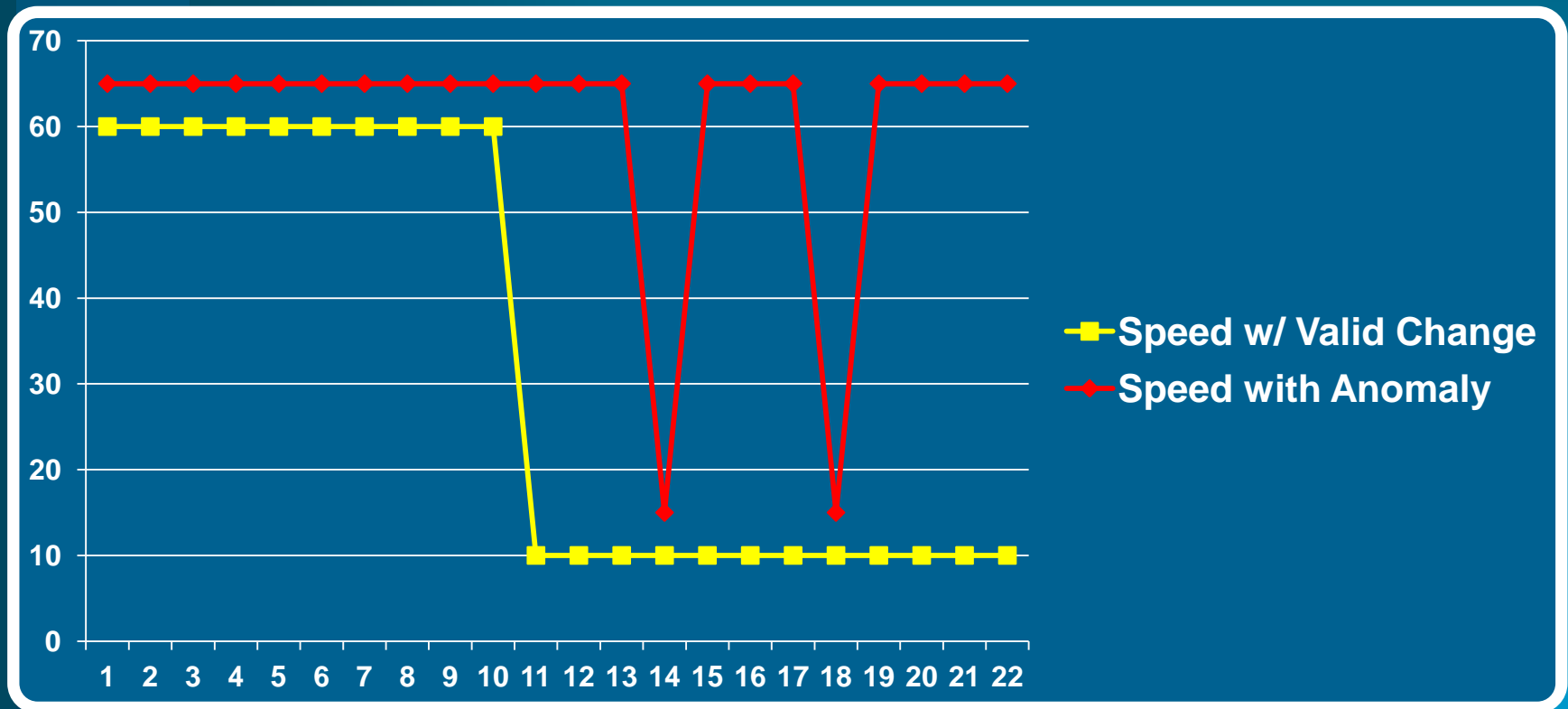




AVI – TVT Diagram: Filtered Change in Speed



- Incident Scenario: Immediate slowdown from free flow
- Goal to remove brief or few anomalies, NOT reject all changes

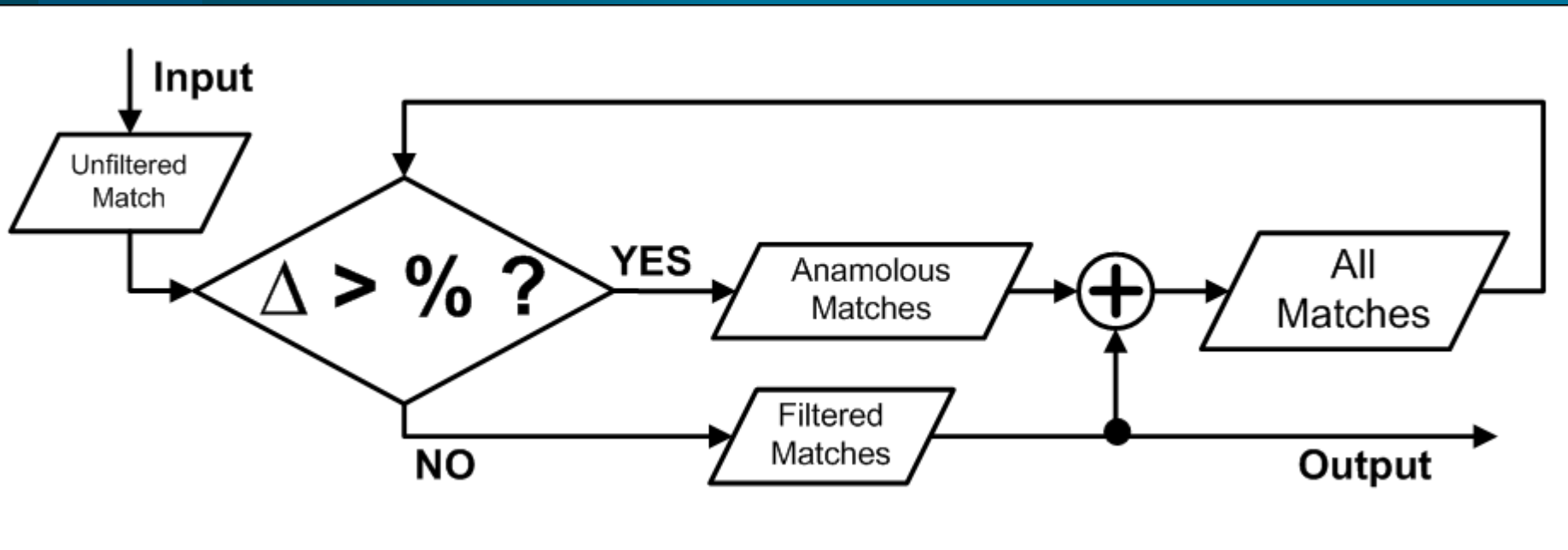




AVI – TVT Diagram: Change in speed filter



- **Solution:**
 - Include all data for the change in speed threshold filter,
 - otherwise, sudden changes in speed will be filtered

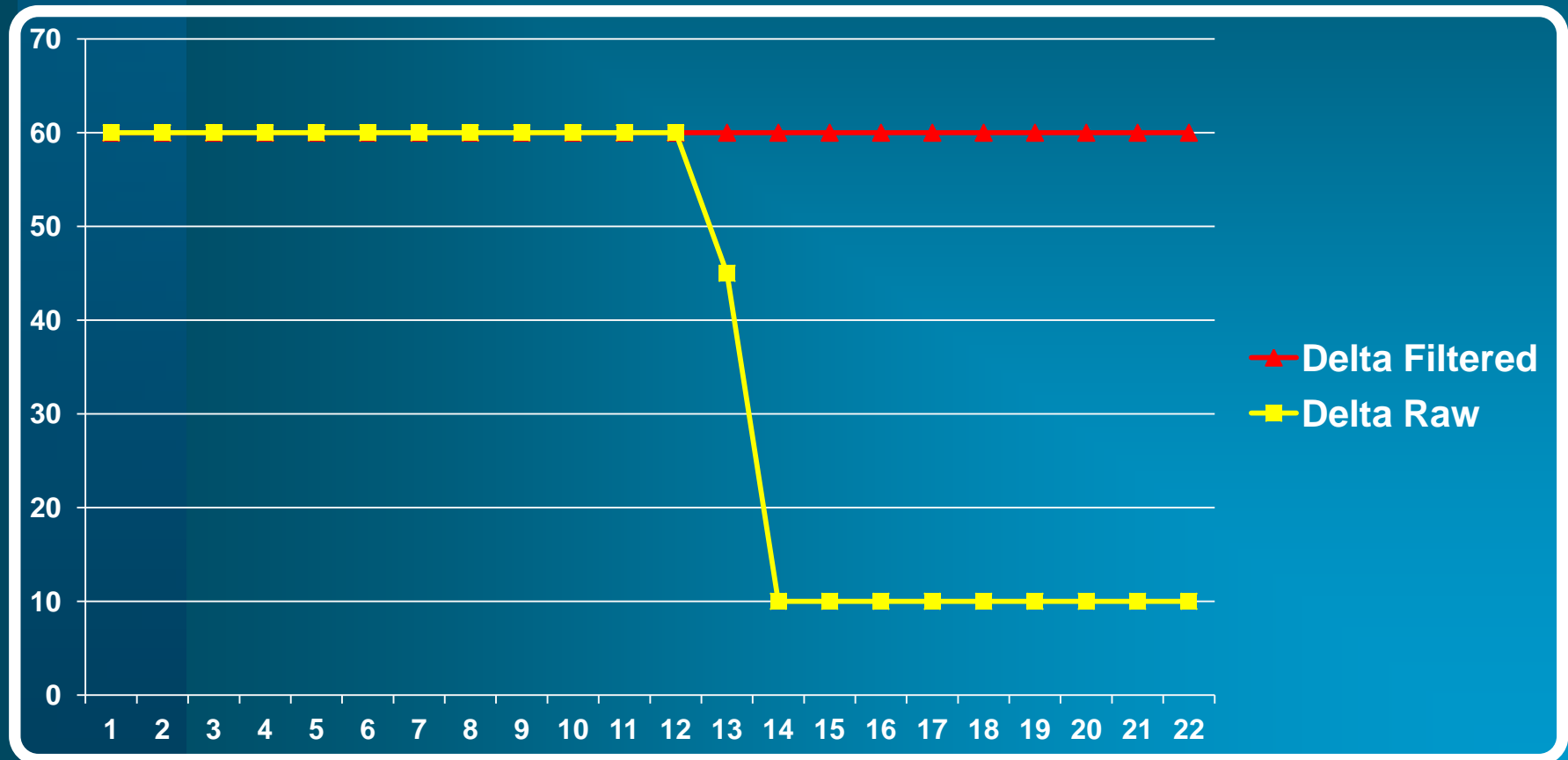




AVI – TVT Diagram: Change in speed filter



- Output using unfiltered comparison will pass a steadfast, abrupt change in TVT





AVI – TVT Algorithm



- **Cost: \$45K**
- ***(vote)***



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SQL Server Schedule Update Database IDs (*vote*)

Robert Heller



Database ID Change

- **Pros:**
 - Allow renaming of devices without losing configuration of the device
 - Smaller database size (Using shorter key than name string)
 - Faster searches on numbers than strings (inner join statements e.g. where Parent.id = child.id)
- **Cons:**
 - Massive software and database overhaul
 - C2C / FLATIS will need modification to support both during transition
 - Likelihood of introducing latent defects



Database ID Change



- Cost: \$200K
- *(vote)*



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SunGuide System Availability

Mary Thornton



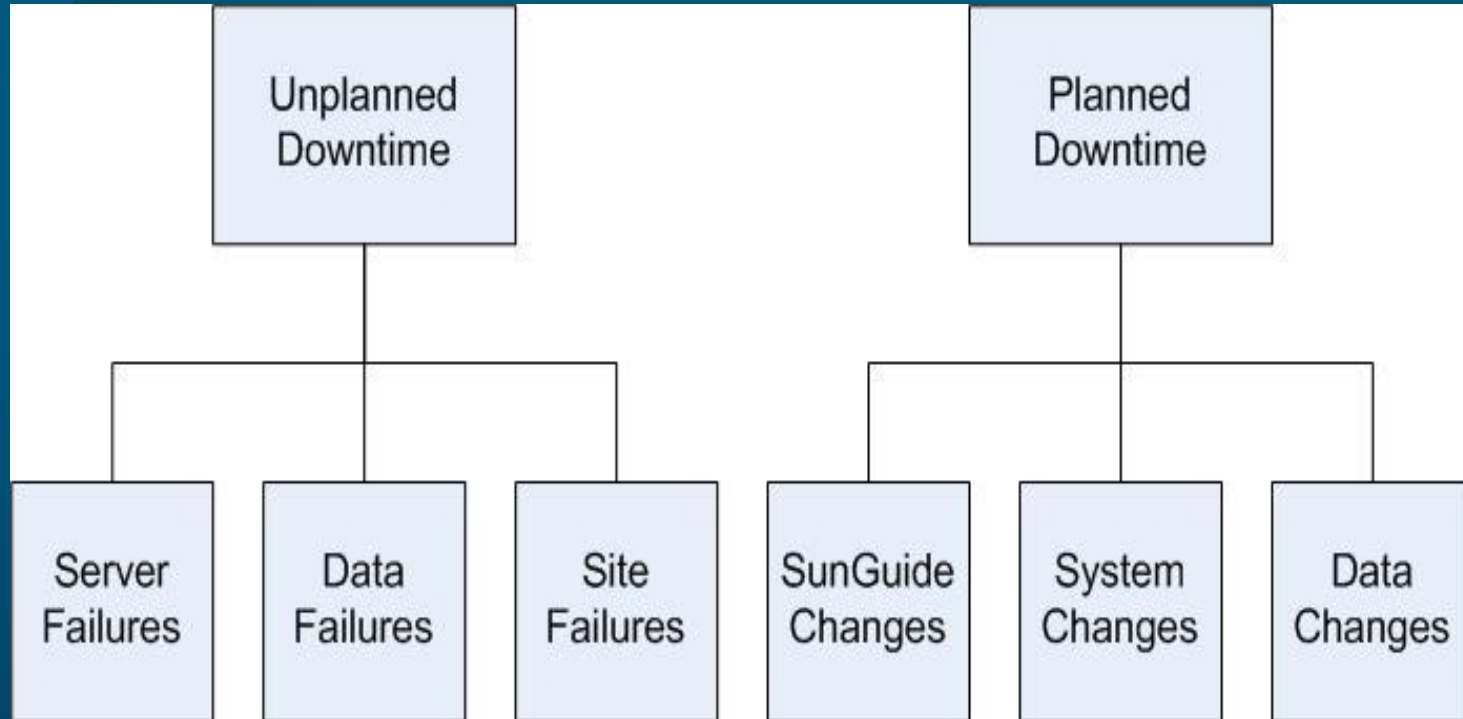
High Availability



- **Availability** - The time that a system or resource is available for use.
- **High Availability** – Availability as a percentage of time, where 100 percent means that the resource is available all of the time and there is no downtime.
- **Contingency Planning** – Planning or measures put in place to minimize system downtime and increase availability.



Sources of Downtime





Application Servers



- **Server Failure**
 - Virtual server clustering (VMware, etc.)
 - MS Clustering
- **Data Failure**
 - Hardware redundancy (SAN)
 - Backups (File System)
- **Site Failure**
 - Multiple SANs
 - Multiple installations



Database Servers (SunGuide 5.1)



- **Site Failure**
 - Multiple SANs
 - Multiple installations
 - **Database Replication**
- **Server Failure**
 - Virtual server clustering
 - **Active/Active Clustering**
 - **Active/Passive Clustering**
- **Data Failure**
 - Hardware redundancy/Multiple SANs
 - **Backups**
 - **Database Redundancy**

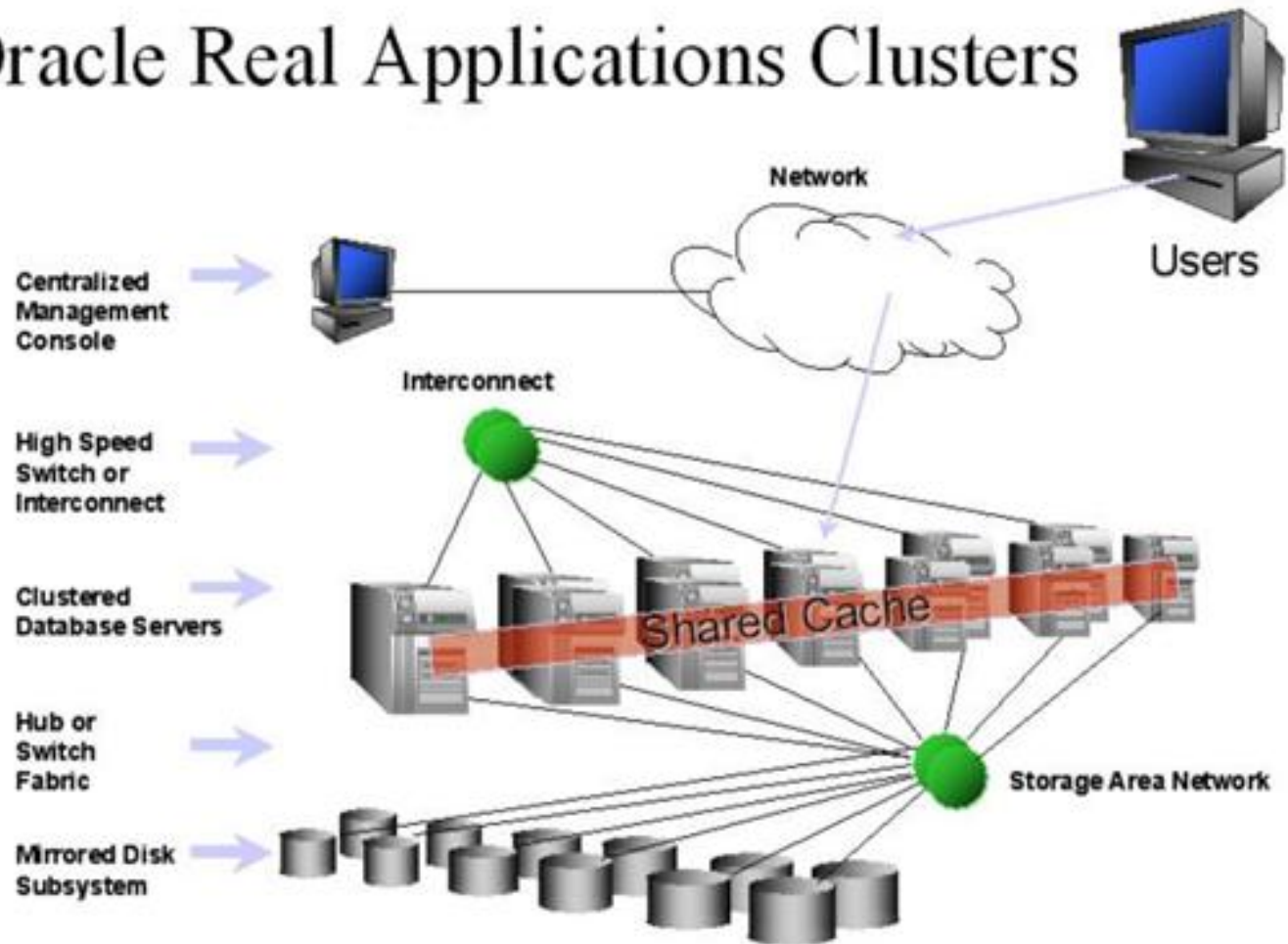


Database Backups

- **Logical backups**
 - Standard export and import
 - Data Pump export and import
- **Physical backups**
 - Offline backups
 - Online backups
 - File system backups
- **Strategy: physical as primary and logical as secondary**

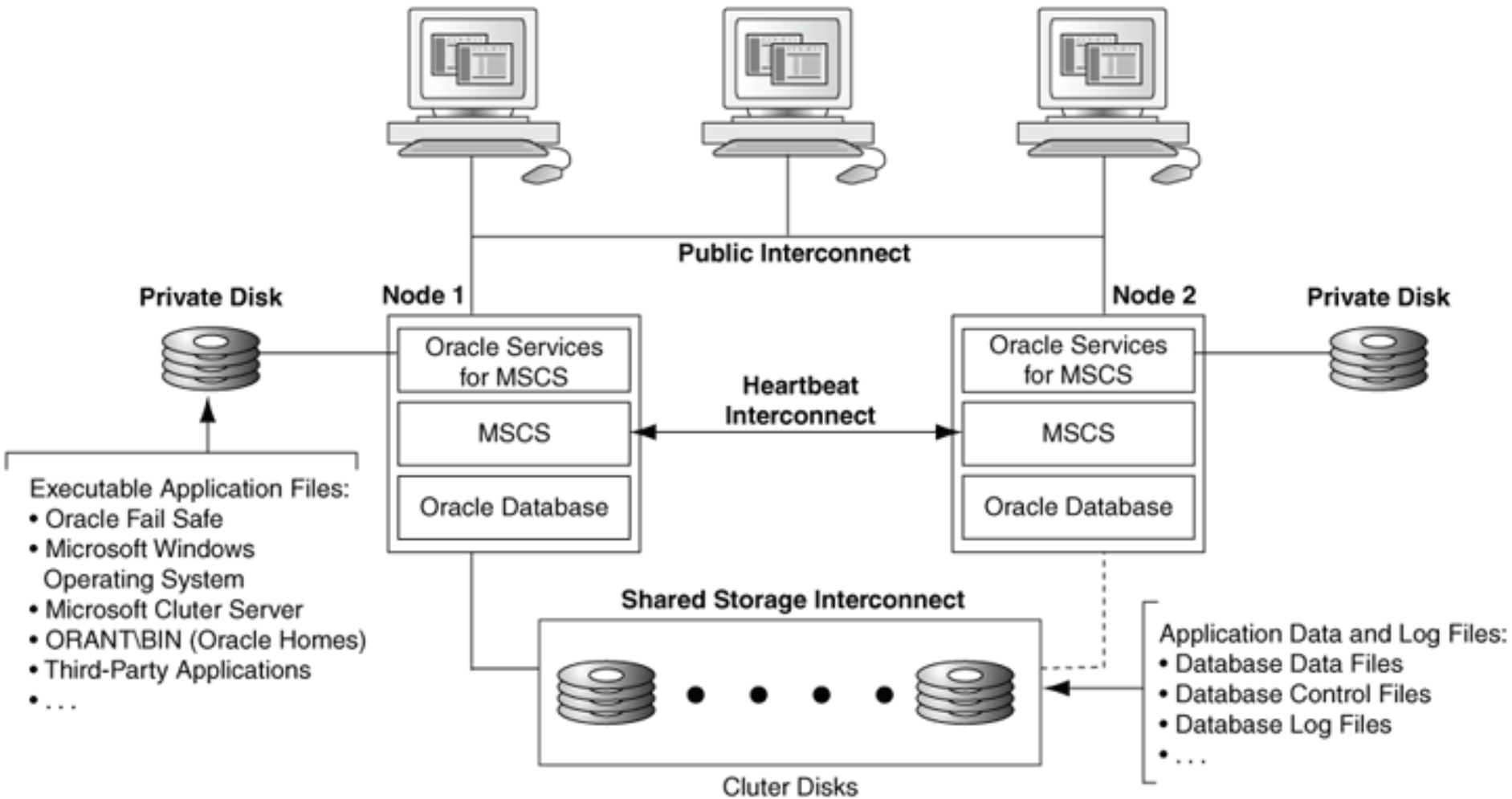
Active/Active Clustering

Oracle Real Applications Clusters



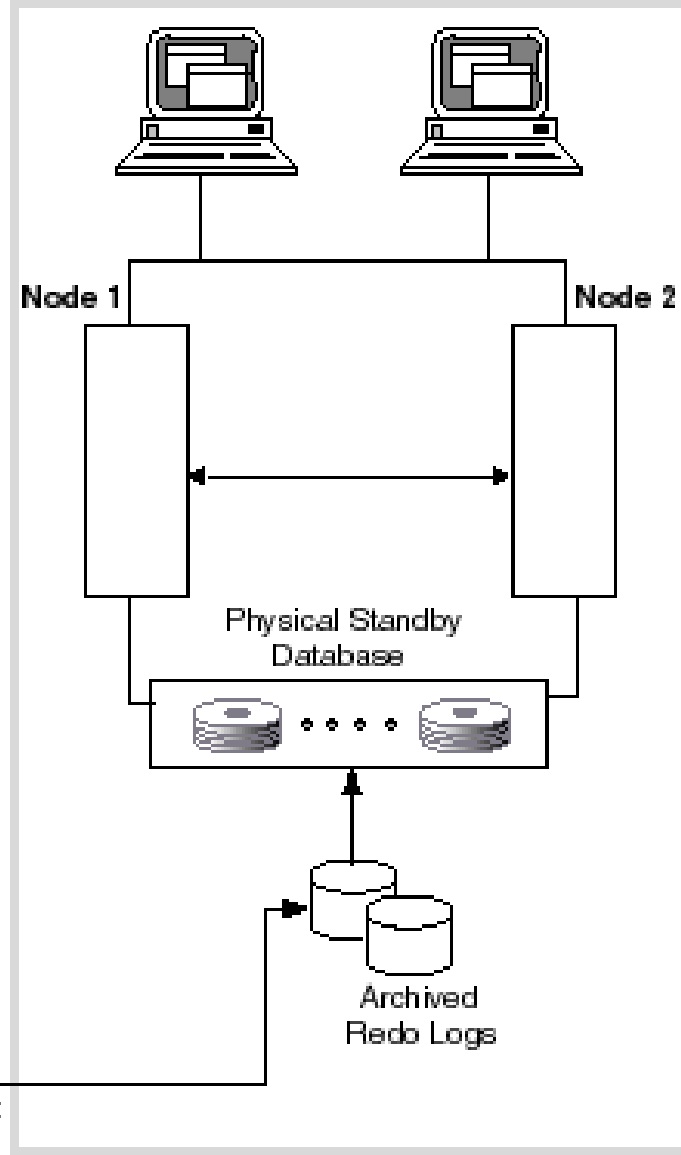
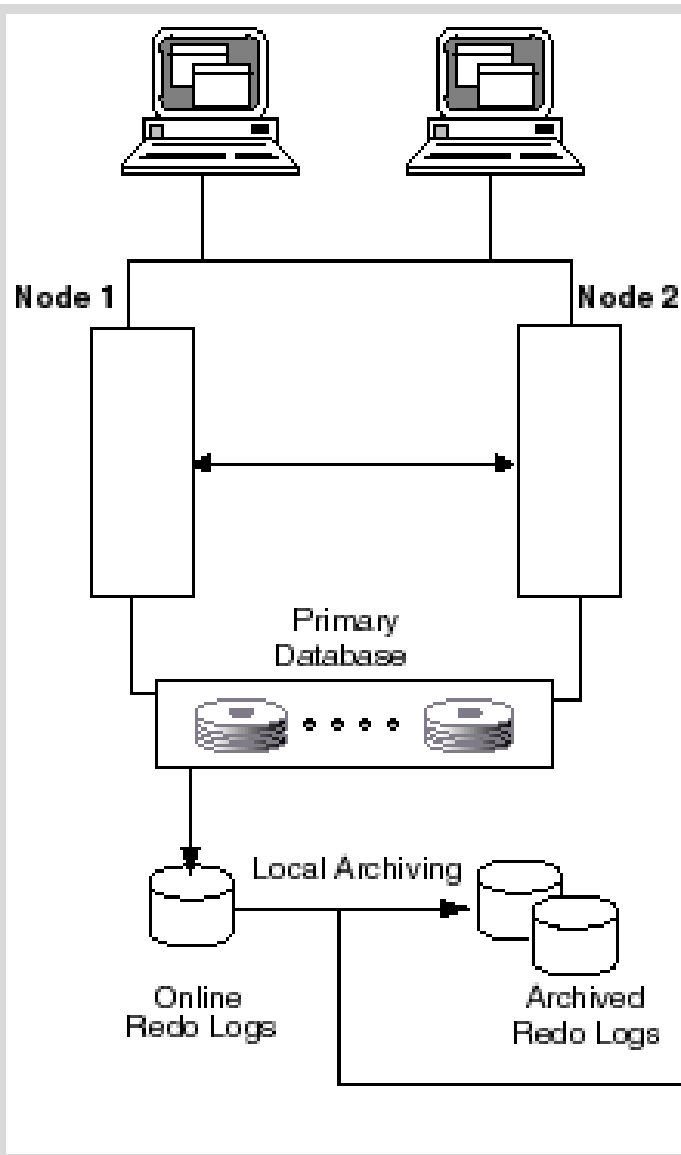


Active/Passive Clustering





Server Node Failover AND Total Site Failover – Combined!





Database Replication - Operation Modes



| Mode | Impact on data loss | Transmisson |
|---------------------------|---|-------------|
| High/Maximum Protection | Zero data loss | SYNC |
| High/Maximum Availability | Zero data loss – assuming that prior to the failure there was no disruption in synchronous communication while the primary database was committing transactions | SYNC |
| High/Maximum Performance | Minimal data loss – as little as a few seconds depending upon network bandwidth | ASync |



Database Replication - Data Protection



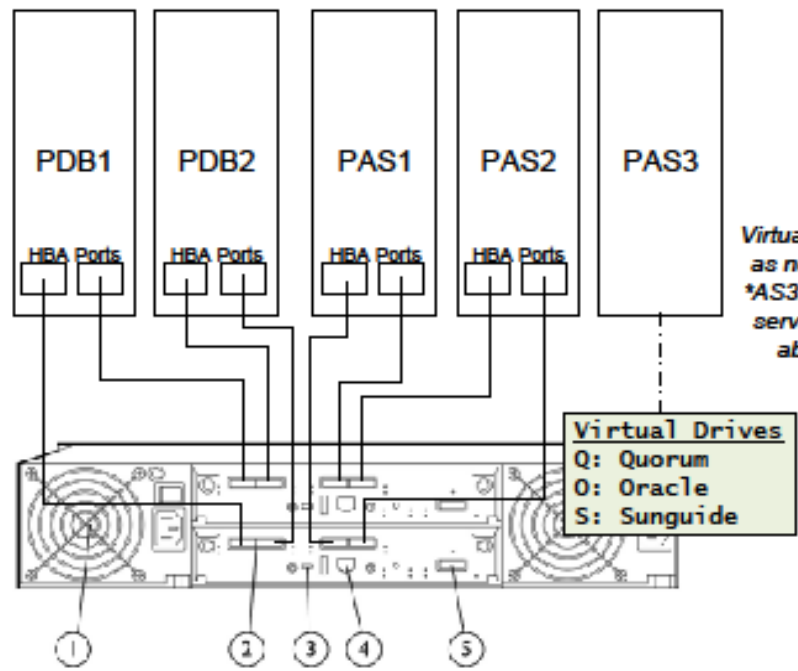
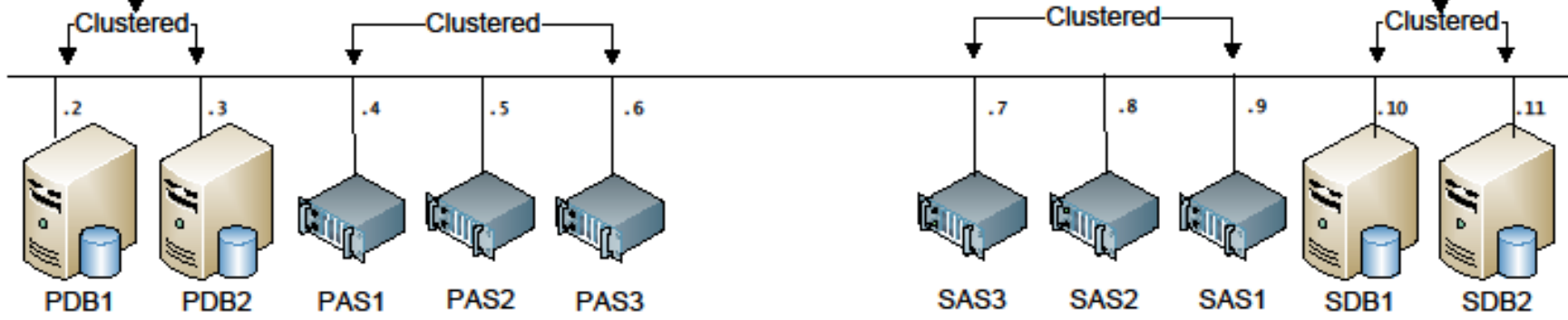
- Oracle
 - Configurable Apply
 - Configurable Time Delayed Apply
 - Real Time Apply
 - Flashback Recovery
- SQL Server

Title: OOCEA Server Configuration
 Drawn by: SWRI
 Date: 4 Nov 2010

Primary Site
 OOCEA Main Offices

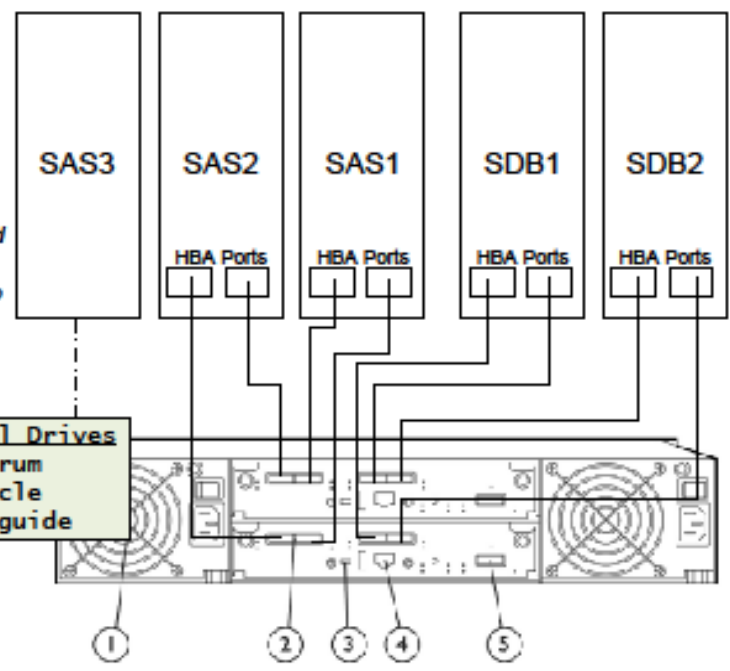
Secondary Site
 Hiwassee Toll Plaza

Data Guard Failover



P2000 G3 SAS controllers, 2 installed

*Virtual drives accessed as network shares by *AS3. These third app servers would not be able to host web services.*



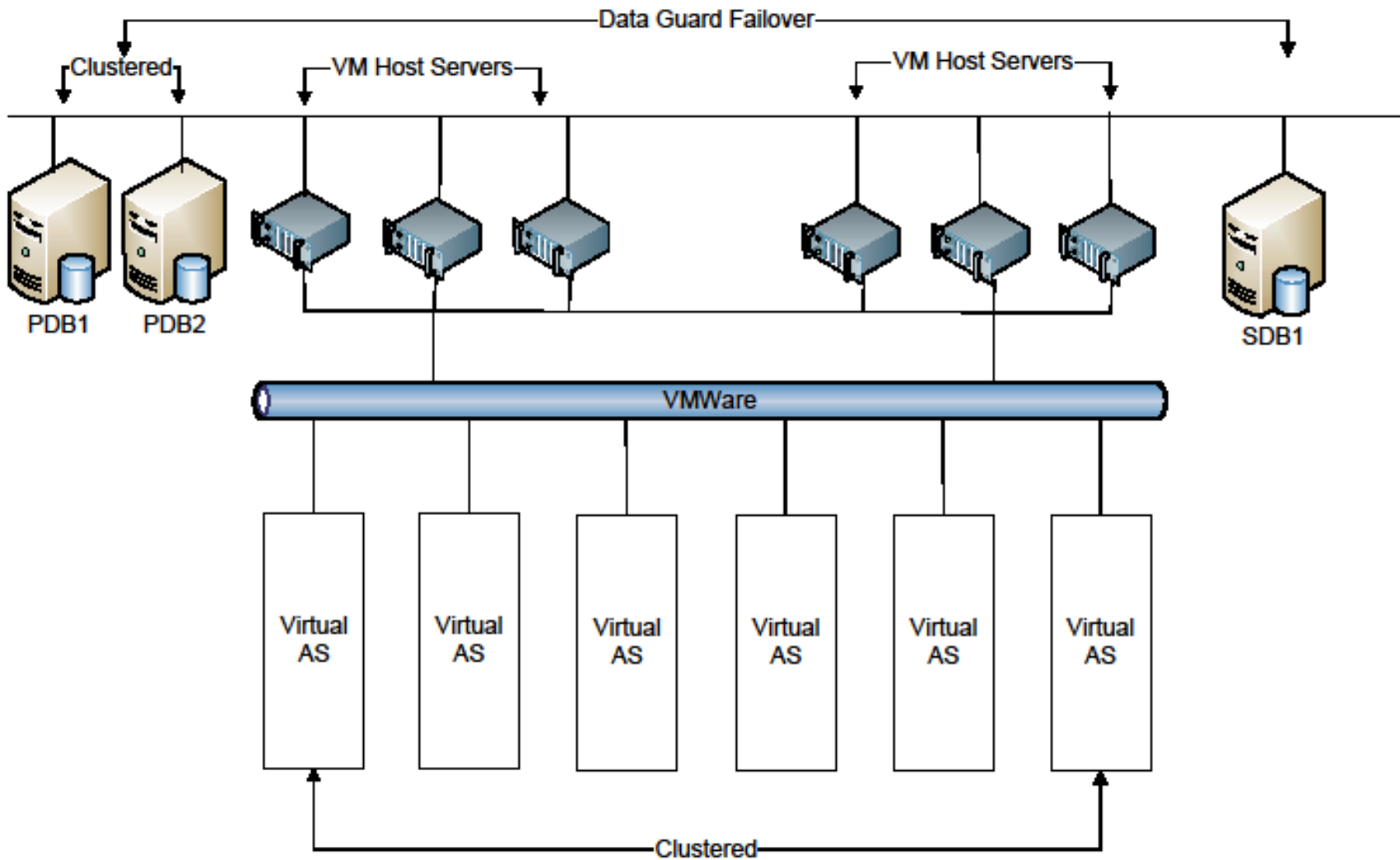
P2000 G3 SAS controllers, 2 installed

4 dual path connections at each site

Title: District 5 Server Configuration
Drawn by: SWRI
Date: 3 Nov 2011

Primary Site
Orlando

Secondary Site
Deland





Discussion



- **Exceptional Availability available to SunGuide**
- **Oracle and SQL Server both are capable**
- **SunGuide support is ready to help**
 - **Planning**
 - **Implementation**
 - **Maintenance**
- **Questions?... You know who to ask!**



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Database Storage Guidelines

Clay Packard, P. E.



Goals



- *SunGuide® Database Storage Guidelines*
- Contributions from Steve Novosad, Brian Ritchson, Clay Packard, Arun Krishnamurthy, Robert Heller, Mark Laird

~ Collaborate

~ Circulate

~ Confirm



District Database Survey Results



- **FDOT_OWN largest tables (samples thereof)**
 - DA_Device_Status
 - CCTV_Lock_Usage
 - EM_Event_Chrono
 - EMaudt_Event_Responder
 - IDS_Incident_Alarm

- **Purging or Archiving?**



FDOT_ODS Challenges



- **FDOT_ODS circa 2007 via SunGuide Release 3.0**
- **FDOT_ODS Largest Tables**
 - ODS_TSS_LANE_POLL_DATA
 - ODS_TSS_ROLLUP_DATA
 - ODS_TRAVEL_TIME_INFO
 - ODS_DMS_MESSAGES
- **Other Issues Issues:**
 - Re-Indexing and Re-Organizing
 - Footprint 1589: Storage redundancy of configuration data
 - Performance of Crystal Reports for large tables and complex joins
 - Reduce expensive SAN space cost



Other Database Operations



- **Operations:**
 - Backup
 - Archiving out of the database
 - Compression
- **Constraints:**
 - Data Retention Requirements
 - Acceptable downtime
 - Storage size requirements
 - Operations cost



Recommendations

- **Increase Poll Cycle from 20 to 30 seconds**
 - (33% off raw TSS data)
- **Eliminate TVT or reduce retention from 3 to 1 years**
 - Derived – save as much as 31 GB!!!)
- **Remove hourly and daily roll-ups**
 - (Derived – from 15 minute)
 - (20.6% off roll-up storage size)
- **Reduce raw TSS retention from 14 to 2 days**
 - (86% off raw TSS data)
- **Enhance purge scripts and other maintenance tasks**



Next Steps



- Questionnaire:
 - What is maximum acceptable downtime?
 - Current backup and archival practices?
 - Current maintenance practices?
- Comments?
- Discussion?
- Priorities?



Change Management Board



SunGuide Report Templates Management

Brian Ritchson



Report Template Development



- Perform the development, maintenance, and version control of SunGuide reports
 - at Central Office
 - by Brian Ritchson and Clay Packard
- Our team has extensive knowledge
 - Crystal Reports
 - SQL
 - SunGuide



Current and Future Activities



- **New report templates under development:**
 - **Secondary Crash**
 - **Detector Reliability**
- **Enhancing existing templates:**
 - **Add county filter to Performance Measures**
 - **AVL report clarification and adding columns**
- **Standardization of formatting on current and future reports**
- **Transition all reports to MS SQL for SunGuide 6.0**



Process for District Requests



- **Report Template Request Form**
 - Available from Footprints homepage
- **Please attach the forms to a footprint issue**
- **This request form can be used for new reports, improvements, and bug fixes.**



General Report Template



<REPORT TITLE>



Report Template Version 1.0

Created On: November 15, 2011 11:45:34
 Center: District 9
 Filter Parameters Selected: User Selected Filters

Period:
 Event(s) Found:
 Event ID Range:

Report Content

Created On: November 15, 2011 11:45:34

11/15/2011

Page 1 of 1



Benefits



- **Significant cost savings**
 - **No need to purchase a license for the crystal reports developer tool**
 - **No need to hire in house developers**
- **Report request are processed in a separate queue from other footprint issues**
 - **Faster turn around**



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Top Priority Item by District

Eric Gordin



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Action Item Review

Eric Gordin