

## Active Data Guard Failover + Transparent Application Failover

### Agenda:

Fusion-IO Overview  
ioN (All FLASH storage) deployment scenarios  
Oracle Active Data Guard Overview  
Transparent Application Failover (Configuration)

Demo (Plan A: Live, Plan B: VPN, Plan C: Pre-recorded)

Q & A

Contact / Follow-up:

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# Safe Harbor Statements

## Note on Forward-looking Statements

Certain statements in this release may constitute "forward-looking statements" within the meaning of Section 21E of the Securities Exchange Act of 1934 and Section 27A of the Securities Act of 1933, including, but are not limited to, statements concerning financial guidance for our first fiscal quarter of 2014 and our full fiscal year 2014, our position to capture market share and our expectations regarding market trends, our expectations concerning our increased focus on our go to market strategy, product portfolio and our strategic partnerships, and benefits and value of our products and solutions to our customers and end users. These statements are based on current expectations and assumptions regarding future events and business performance and involve certain risks and uncertainties that could cause actual results to differ materially from those contained, anticipated, or implied in any forward-looking statement, including, but not limited to, risks associated with changes in the demand for our products, our expectation that large and concentrated purchases by a limited number of customers will continue to represent a substantial majority of our revenue and our ability to sustain or increase our revenue from our large customers or offset the discontinuation of concentrated purchases by our larger customers with purchases by new or existing customers, the continued adoption by customers of our ioMemory platform products, growing our sales through OEMs, resellers and channel partners and maintaining our relationships with OEMs, resellers and channel partners, including the timely qualification of our products for promotion and sale by our OEMs, long and unpredictable sales cycles, changes in the competitive dynamics of our markets, including the potential for increased pressure on the pricing of our products, reduced gross margins, increased sales and marketing expenses, the potential that we or our customers may not realize the benefits we currently expect from our acquisitions of ID7 and NexGen Storage, our ability to develop or acquire new products to meet customer needs and expectations, including additional software solutions to be integrated with our storage memory products, our acquisition and strategic partner strategy and disruptions in our business, operations and financial results as a result of acquisitions and strategic partner relationships, as well as the risks inherent in the integration and combination of complex products and technologies from acquisitions, undetected errors, defects or security vulnerabilities in our products, worldwide economic conditions and the impact these conditions have on levels of spending on datacenter technology like ours, and such other risks set forth in the registration statements and reports that Fusion-io files with the U.S. Securities and Exchange Commission, which are available on the Investor Relations section of our website at [www.fusionio.com](http://www.fusionio.com). You should not rely upon forward-looking statements as predictions of future events. Although we believe that the expectations reflected in the forward-looking statements are reasonable, we cannot guarantee that the future results, levels of activity, performance or events and circumstances reflected in the forward-looking statements will be achieved or will occur. Fusion-io undertakes no obligation to update publicly any forward-looking statement for any reason after the date of this press release.

## Use of Non-GAAP Financial Information

This presentation includes a discussion of "non-GAAP financial measures" as that term is defined in Regulation G promulgated by the U.S. Securities and Exchange Commission. The most directly comparable GAAP financial measures and information reconciling these non-GAAP financial measures to the Company's financial results prepared in accordance with GAAP are provided on the company's investor relations website at <http://investor.fusionio.com> under "Financial Information."




## Fusion-io Overview

- ▶ **5,000+** Customers Worldwide
- ▶ **900+** Employees Worldwide
- ▶ Deliver **>10x** improvement in application performance
- ▶ **Market leader** in enterprise flash memory application acceleration
- ▶ **OEM Partnerships** with HP, IBM, Cisco, Dell, Lenovo



# Products and Deployments

LOWER COST MORE DESKTOP DENSITY MORE EFFICIENCY  
 FASTER APPLICATIONS GREATER VM DENSITY  
 MORE TRANSACTIONS QUICKER DECISIONS

Shared	Direct	Virtualized
 <p><b>ioControl</b> HYBRID STORAGE</p> <p><b>ioN</b> HYBRID ACCELERATION</p>	 <p><b>ioMemory</b></p>	 <p><b>ioCache</b> ioTurbine</p> <p><b>ioVDI</b></p>
<p><b>Max Performance Control</b></p> <ul style="list-style-type: none"> <li>• Allocate across servers</li> <li>• Scale independently</li> <li>• Hybrid and QoS options</li> </ul>	<p><b>Max Acceleration</b></p> <ul style="list-style-type: none"> <li>• Closest to CPU</li> <li>• Fastest deployment</li> <li>• Scale with servers</li> </ul>	<p><b>Max Interoperability</b></p> <ul style="list-style-type: none"> <li>• Virtualize more</li> <li>• Consolidate servers</li> <li>• Offload SAN</li> </ul>



Fusion-io provides the broadest portfolio of flash solutions in the market

The product line includes:

- Direct Acceleration solutions in our ioMemory family, ranging from 365GB to 10+ TB of capacity per cards
  - Fusion-io delivers unmatched performance to systems, databases and applications. We offer the best performance per dollar, per watt, and per unit of space.
  - Fusion-io offers the highest performance density available. Organizations save on administration, power, cooling and floor space.
  - Fusion-io delivers enterprise reliability by eliminating points of failure, ensuring data integrity, and providing best-in-class availability. Our Adaptive Flashback provides self-healing services which ensures higher performance, minimal failure, and longer endurance than all other flash solutions.
  - In short, ioMemory offers:
    - Consistent Low Latency Performance
    - Industry-leading Capacity
    - Lowest CPU Utilization Per Unit of Application Work
    - Unrivaled Endurance
    - Enterprise Reliability via Self-Healing, Wear Management, and Predictive Monitoring
- Our Virtualization family is comprised of three offerings: 1) ioTurbine, 2) ioCache, and 3) ioVDI
- Software Caching with ioTurbine enables you to extend the value of your SAN investment and virtualize applications you didn't think you could virtualize.
  - Virtualize flash to accelerate applications connected to shared storage, reducing storage costs and extending storage investments.
  - The virtualization-aware software allows flash to be intelligently allocated by application and offers a common management view across physical and virtual servers.
  - Designed for all major SAN and NAS storage systems
  - Both bare metal and virtualized support
- ioCache
  - A bundle of Fusion's ioDrive and ioTurbine software caching
- The ioVDI software solution for VDI Integrates with Servers, ioMemory and Shared Storage to Deliver Virtual Desktops that Match the performance of SSD laptops (Q1 CY14 release)
- The final portion of our portfolio is our shared storage solutions. We're seeing tremendous business opportunities in this growing space as customers look to scale and share flash.
- Shared Memory/Storage solutions - ION and ioControl - which give you the flexibility to deploy shared targets that are either all flash or hybrid solutions based on your use case and needs
  - External shared flash storage solutions built with proven Fusion-io application acceleration products.
  - ION - External all-flash shared storage solutions accelerating business-critical applications and databases.
  - ioControl - Hybrid storage solution that perfectly balances flash performance and hard disk capacity.
  - ION -
    - 25-40x performance
    - Accelerate clustered servers at 100us response time
    - Accelerate databases 2.5x with flash as cache
    - Scale flash memory with a linear cost model
  - ioControl -
    - Hybrid storage target that combines flash with disk, balancing the cost of performance and storage
    - ioControl's integrated software gives you the ability to provision, prioritize, and control shared storage performance

## ioN Data Accelerator + Oracle deployment scenarios

**ioN, ioN HA works with Oracle Standalone + RAC databases**

**Selective database objects**

Place frequently accessed database objects in ioN  
Example: Tables and Indexes, Temporary tablespace, Redo/Undo segments

**Entire database**

Place all database objects for even better performance

**Oracle Times-10 (In-memory) database**

Place Times10 database and replication logs in ioN for improved performance

**Caching (Oracle Database Smart Flash cache)**

Configure ioN luns as centralized caching destination for enterprise applications

**Oracle VM**

ioN certified on Oracle VM platform



**ioN** | DA ▲ ACC+IFRA OR®

## Oracle Data Guard

Originally Data Guard is used for (BCP) business continuity plan or (DRS) disaster recovery solution, now Active Data Guard being used for **reporting, backup, application performance testing, upgrade test scenarios, Primary db block repair, Flashback and Snapshot** (No need to have FlashBack on).

Active Data Guard can be opened in **read-only** mode while the **recovery** is in progress.

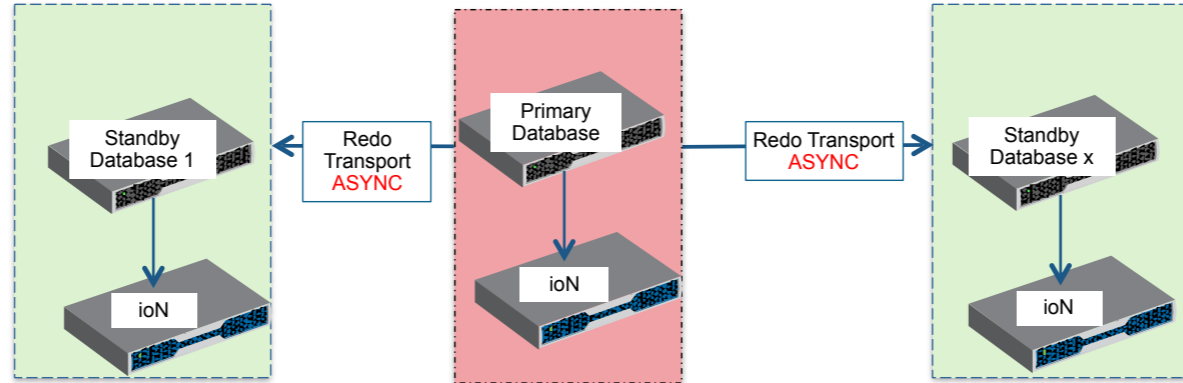
DG can be configured in different **modes**: max performance, max availability and max protection. (Async, Sync and Far Sync)

Provides confidence on the data consistency and availability as it provides visible monitoring and access to the real time data. (A feature is not possible on the h/w based replication).

Can be an alternate cost effective solution to RAC to provide High Availability.

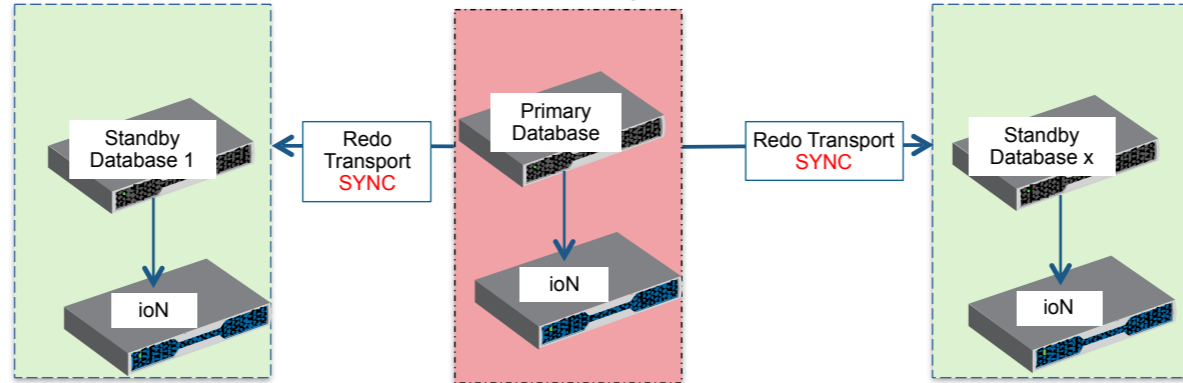
Getting better and better with each release.

## Data Guard – Maximum Performance



- Highest level of data protection that is possible without **affecting the performance** of a primary database..
- Transactions **commit** as soon as all redo data needed to recover those transactions has been written to the online redo log.
- Primary database performance is unaffected by delays in writing redo data to the standby database(s).
- This is the default protection mode.

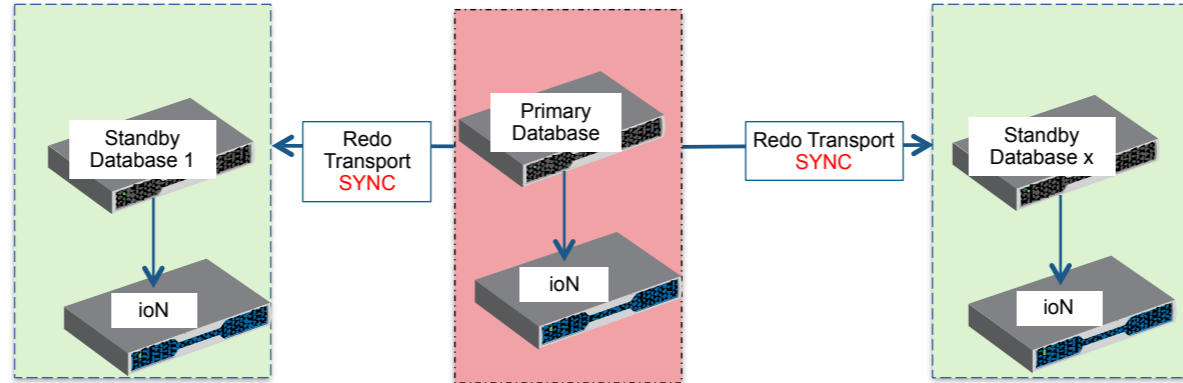
## Data Guard – Maximum Availability



- Highest level of data protection that is possible **without compromising the availability** of a primary database.
- Transactions **do not commit** until all redo data has been written to the online redo log and to at least one synchronized standby database.
- Switches to **maximum performance mode** if the primary database cannot write its redo stream to at least one synchronized standby database.

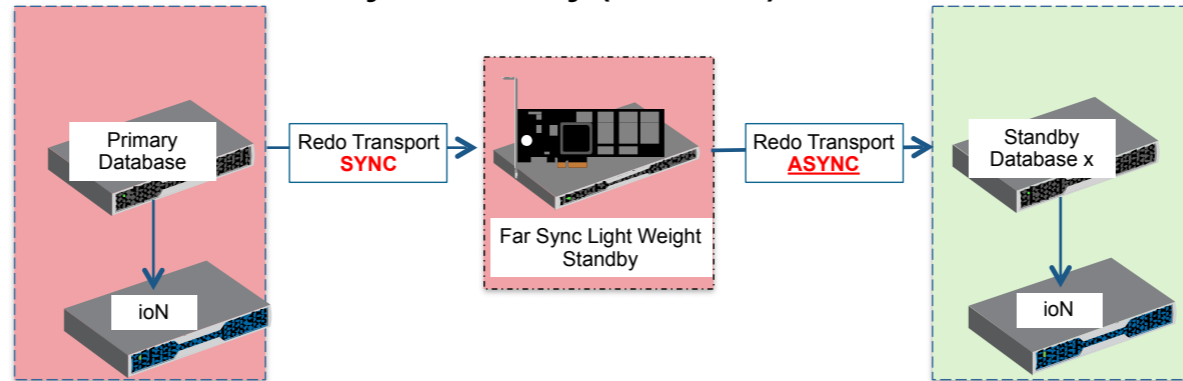


## Data Guard – Maximum Protection



- This protection mode ensures that **ZERO data loss occurs** if a primary database fails.
- REDO data **must be written to the primary online redo log and to at least one synchronized standby database** before the transaction commits.
- Primary database will **shut down**, if it cannot write its redo stream to at least one synchronized standby database.

## Data Guard – Far Sync Standby (New 12C)



- Far Sync provides **ZERO data loss** protection for a production database.
- Far sync instance receives changes **synchronously** from a primary database and forwards them **asynchronously** to a remote (long distance) standby.
- A far sync instance is a light-weight entity that manages only a control file and log files (No Data Files).
- Production can be quickly failed over, manually or automatically, to the remote standby database with **ZERO data loss**.

## Data Guard (max availability) + TAF Setup

### Application tnsnames.ora

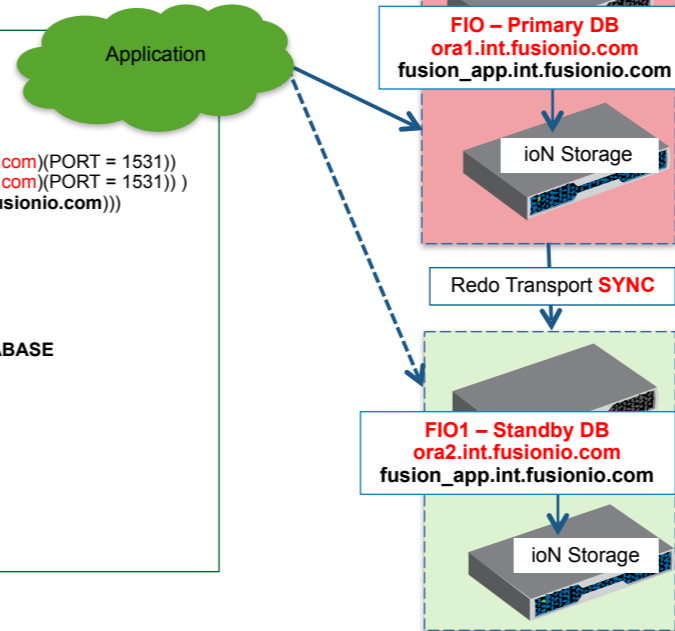
```
FUSION_APP =
(DESCRIPTION =
  (ADDRESS_LIST =
    (ADDRESS = (PROTOCOL = TCP)(HOST = ora1.int.fusionio.com)(PORT = 1531))
    (ADDRESS = (PROTOCOL = TCP)(HOST = ora2.int.fusionio.com)(PORT = 1531))
  )
  (CONNECT_DATA = (SERVICE_NAME = fusion_app.int.fusionio.com)))
```

### Service and Trigger (On Primary DB)

```
DBMS_SERVICE.CREATE_SERVICE('fusion_app','fusion_app');
DBMS_SERVICE.START_SERVICE('fusion_app');
```

### CREATE TRIGGER fusion\_apprtrigg AFTER STARTUP ON DATABASE

```
declare
  v_role varchar(30);
begin
  select database_role into v_role from v_$database;
  if v_role = 'PRIMARY' then
    DBMS_SERVICE.START_SERVICE('fusion_app');
  else
    DBMS_SERVICE.STOP_SERVICE('fusion_app');
  end if;
end;
```



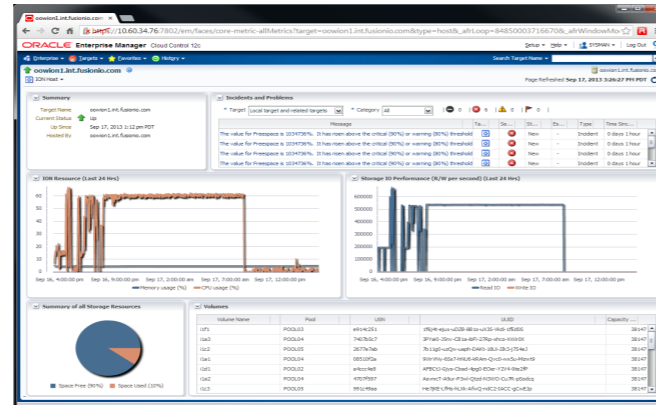
## Data Guard (Listener and tnsnames)

<u>Listener.ora</u>	<u>Tnsnames.ora</u>
<pre>LISTENER_FIO = (DESCRIPTION_LIST = (DESCRIPTION = (AADDRESS = (PROTOCOL = TCP)(HOST = ora1.int.fusionio.com)(PORT = 1531)) (AADDRESS = (PROTOCOL = IPC)(KEY = EXTPROC1531)) ) ) SID_LIST_LISTENER_FIO = (SID_LIST = (SID_DESC = (GLOBAL_DBNAME = fio_DGMGRL.int.fusionio.com) (ORACLE_HOME = /home/oracle/product/11.2.0.3/db_1) (SID_NAME = fio) ) (SID_DESC = (GLOBAL_DBNAME = fio_DGB.int.fusionio.com) (ORACLE_HOME = /home/oracle/product/11.2.0.3/db_1) (SID_NAME = fio) ) (SID_DESC = (GLOBAL_DBNAME = fio.int.fusionio.com) (ORACLE_HOME = /home/oracle/product/11.2.0.3/db_1) (SID_NAME = fio) ) ) )</pre>	<pre>LISTENER_FIO_FIO = (ADDRESS = (PROTOCOL = TCP) (HOST = ora1.int.fusionio.com)(PORT = 1531))  FIO = (DESCRIPTION = (ADDRESS = (PROTOCOL = TCP) (HOST = ora1.int.fusionio.com)(PORT = 1531)) (CONNECT_DATA = (SERVER = DEDICATED) (SERVICE_NAME = fio.int.fusionio.com) ) )  FIO1 = (DESCRIPTION = (ADDRESS = (PROTOCOL = TCP) (HOST = ora2.int.fusionio.com)(PORT = 1531)) (CONNECT_DATA = (SERVER = DEDICATED) (SERVICE_NAME = fio1.int.fusionio.com) ) ) )</pre>

## ION and Data Guard – with Transparent Application Failover

Pre-recorded live demo

## ioN Plug-in for Oracle Enterprise Manager



Monitor ION from the popular EM !

Live Performance stats !

Threshold based escalation !

Historic reports (Availability, Capacity) !

Integration with the existing escalation and alert procedures!