Tuesday
November 18th
10:00 a.m. PDT
1:00 p.m. EDT

Linux and Replication:

Reducing Cost and Containing Risk in Migrations

Special Guest

Peter Hoversten
CTO, Sybase, Inc.

Sybase Customer – Iroquois Gas

Carl Moritz

Iroquois Gas Transmission

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Sybase Customer – Iroquois Gas

Business Challenge

- Respond quickly to rule changes and mandatory regulations

Solution – Three Phased Linux Approach

- 1st phase – move to Sybase ASE & Replication Server
- 2nd phase – move to PowerBuilder
- 3rd phase – move to Linux

Competitive Evaluation

- Microsoft – less stable than Unix, uncontrollable ownership terms
- Proprietary Unix – cost prohibitive >$100K vs. $14K for Lintel
- Linux – most cost-effective, stable enough, lean architecture

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Migration Process

- Bread-and-butter ordering system required 24x7 availability
- Replication Server migrated to new system while keeping current live <u>and</u> warm-stand-by systems on-line
- Obstacles were minor – getting the latest versions of products that supported Linux

Results

- Fast, low-cost implementation and maintenance
- Ten-fold increase in performance
- Productivity gains eliminated 4 of 6 application servers
- Dramatically improved customer satisfaction ratings
- Complied with FERC reporting regulations
- No unplanned downtime since migration

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Guest Speaker

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Why Migrate to Linux

Linux is

- more efficient
- more flexible
- more open
- more robust
- more customizable

Reduces

- Licensing costs
- Support and maintenance costs

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Why Sybase on Linux

"Access to Sybase's Renowned Reliability, Scalability, Availability and Price/ Performance at a Commodity Server Price Point"

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What is Migrating to Linux

- Existing applications using databases running on Windows, especially Microsoft SQL Server

- Existing applications using other vendors databases running on different flavours of UNIX

- Migrating Sybase database from other UNIX platforms

- Building new Sybase databases on Linux

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Benefits of Migrating with Sybase

- Reduce cost

- Increase reliability and availability

- Improve performance

- Easy migration from Microsoft SQL Server to Sybase

- Tightly integrated warm standby with fail-back

- Support for bi-directional data synchronization

System Recovery Time
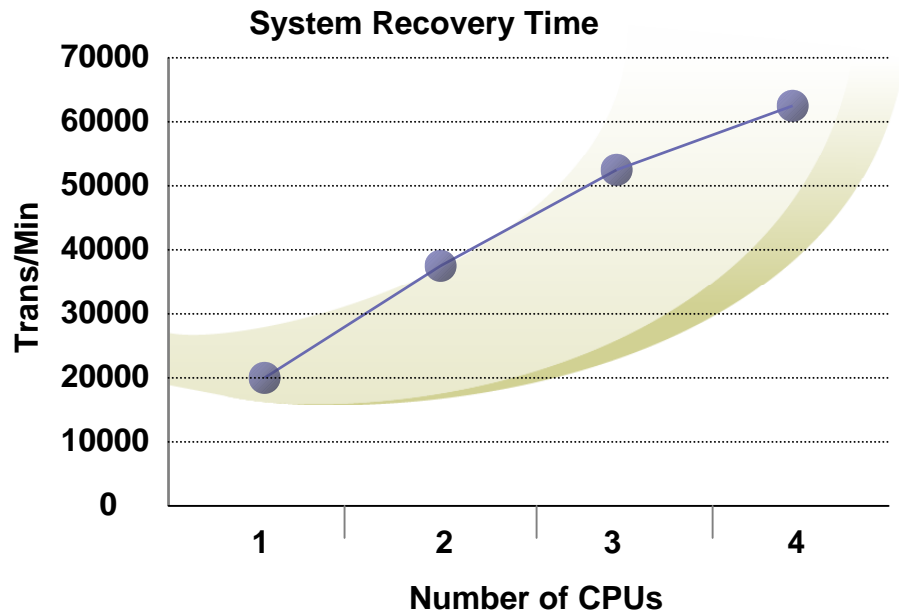
4 2.0Ghz Intel Xeon processors and 4GB of memory on Proliant Systems

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Migration Process Best Practices

Organize
- Separate static data from dynamic data
- Breakdown tables into functional areas

Initialize
- Move static data first using bulk copy or export/import
- Move functional data in stages by grouping together functional tables

Synchronize
- Use replication to synchronize

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Migration Challenges

- Cannot fit in all activities in one weekend alone
- Downtime may not be acceptable
- Partial migration of data may not be practical
- Non-availability of tools like heterogeneous dump and load

Replication is the only available solution to reduce cost and contain risk during migration

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Migration Process — Organize

Plan for schema migration

- Use automated tools for schema
- Modify the stored procedures and triggers where required (Oracle to Sybase, etc.)
- Plan for few iterations to get functionality right

Plan for data migration

- Estimate the volume of data to be migrated
  - Identify tables in terms of functionality
- Plan for data migration steps
  - "Big bang" (small databases)
  - "Piecemeal" for larger ones

Migration Process — Initialize

Plan for data migration

- Use the best available native tools to export data from database, examples bulk copy in Sybase

- Create scripts to import data from data sources, including text files, ODBC data sources (such as Oracle) and others

- Watch for limitations on the size of exported data file (2GB on Solaris etc)

Migration Process — Synchronize

Plan for Synchronization

- Recommend using a Replication Server (e.g. Sybase Replication)
    - Deliver live information to remote locations and/or consolidate from different sources
    - Replicate data among heterogeneous platforms

- Identify tables that need to be replicated and synchronized

- Define replication definitions and subscriptions to keep data in sync

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Executing the Migration Plan

Actual Migration

- Move static data first
- Migrate dynamic data next
    - Migrate functional data in 'chunks' as identified in the plan
    - Synchronize the functional data
    - Repeat the process for other functional 'chunks'

Testing and parallel runs

- Run in parallel for a week to ensure proper functioning
- Test new installation with batch jobs
- Go live
- Decommission the old server

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Benefits of Using Replication Server

Reduces risk during migration

- Allows parallel runs of old and new

Reduces cost of leveraging existing data

- Useful for bi-directional replication
- Eliminates custom programming

Extremely reliable – guaranteed delivery

- Can keep data in sync

Very flexible

- customizable transformations of data for new applications

Requires little maintenance

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Case Study: Media Company

Current Scenario

- European Media company
  - Involved in commercial and cable television advertising

- Application to book ads
  - Sybase 11.9.2, PowerBuilder as the development tool
  - Sybase ASE on Windows
  - Main database 4GB
  - Standby site being maintained using dump and load of transaction log every half hour

- Business Requirement
  - Lower cost
  - Improve Performance

Case Study: Media Company

Sybase Solution

- Platform for Migration
  - Intel 32 bit box, Red Hat 7.2, Sybase 11.9.2, raw partitions

- Approach – Preparation
  - Used the Linux box as a test bed in the first instance
  - Built the new schema by reverse engineering objects from the database
  - Exported and imported all data using BCP at a convenient time – smaller database size was a bonus
  - Created one way replication to keep the old production database on Windows and the new test database on Linux in sync

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Case Study: Media Company

Sybase Solution Additional Tasks

- Approach – Execution
  - Two days parallel run
  - Mid-week switch over
  - Decommissioned Windows Server

- Additional Tasks
  - Replaced Standby site with a similar Linux host to production
  - Replaced dump and load process with Sybase warm standby replication

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Case Study: Media Company

Benefits to Customer

- Performance
  - Improved performance over Windows server of similar configuration
- Cost
  - Lowered cost compared to Windows
  - Minimum spent on migration itself
- Risk
  - Reduced risk with a business continuity plan using warm standby solution
  - Eliminated lag time risk associated with dump and load
  - Successfully demonstrated and integrated Sybase Linux hosts into company's hardware strategy

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Case Study: Tier-1 Multi-National Bank

Current Scenario

- Trading System
  - Sybase 12.5, third party trading system running on multiple Solaris hosts
  - Peer-to-peer data replication across continents
  - 24 hour trading system during business days
  - Small window for any maintenance during weekends

- Business Requirement
  - Provide broader access to production data at a reasonable cost on non-production servers
  - Have flexibility to develop and deploy new applications without impacting production servers
  - Achieve the above within a limited budget

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Approach — Multi-phase

Phase I

- Proof of concept to demonstrate Sybase works

Phase II

- Validate Sybase works on Linux the same as Solaris
- Demonstrate the ease of migration

Phase III

- Setup the new Linux host and integrate with production environment

Questions to be addressed

Management

- How the money was being spent
- How the existing limited resources could be better utilized
- How to phase out the legacy and obsolete hardware and reduce the cost of ownership

IT

- What were the alternatives to the existing set-up?
  - Annual cost of each new Solaris host ~ $30-60K annual
- How to maintain current production hardware without impacting performance while containing cost

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Case Study: Tier-1 Multi-National Bank

Phase I: Proof of Concept

- Task
  - Prove existing databases can be leveraged
  - Low cost Intel hardware could be introduced
- Decision
  - Chose Red Hat and Sybase on Linux
  - 6 weeks Proof Of Concept (POC)
- Results of POC
  - Sybase on Linux works fine
  - Sybase on Linux is reliable
  - Sybase on Linux is maintainable
    - No additional skills required of DBA
 - Sybase on Linux is practically the same as Sybase on Solaris

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Case Study: Tier-1 Multi National Bank

Phase II: Setting up a test environment

- Task
  - Migrate some of the data
  - Test migration plans
  - Document findings
- Decision
  - Migrate a 50GB database to test peer-to-peer mode on Linux
- Results
  - "Middle-of-the-range" systems (i.e. each costing below $15,000) can provide a cost effective production system
  - Very minimal installation and configuration differences between Sybase Solaris and Linux
  - Schema could be easily reverse engineered and populated onto Linux

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Case Study: Tier-1 Multi-National Bank
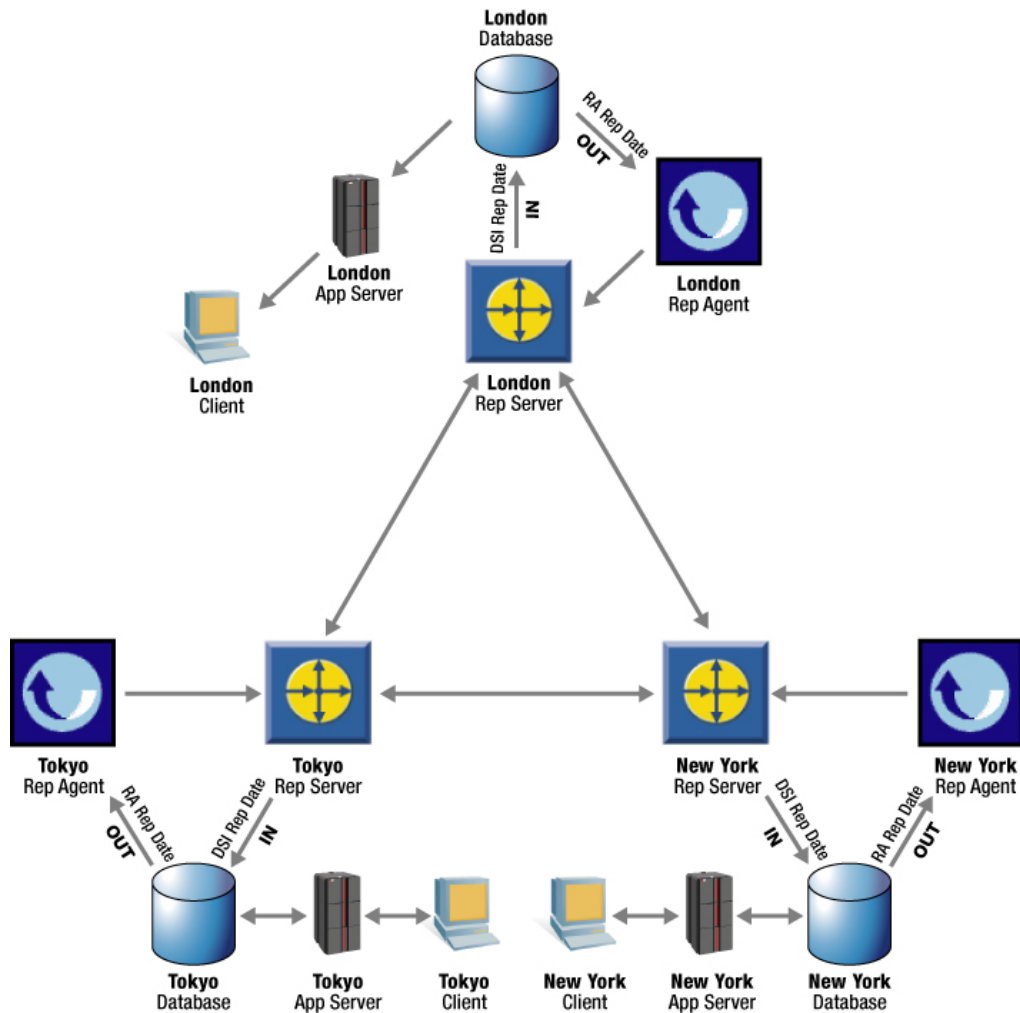
Current Production System

- Production data in excess of 50GB
- 1200 tables in the database on each hub
- Full replication definitions for tables in each site
- Full table subscriptions from each site to another
- Replication Server in combination with Open Switch provided fault tolerance
  - Loss of a hub would only impact that location
 - Users affected by the loss would automatically be transferred to the fail-over hub by Open Switch

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Case Study –Tier-1 Multi-National Bank

Phase III: Going Live!
- Decided on a 4-way Linux host with 8GB of RAM, 4 Intel P3 at 1GHz, RH AS 2.1, Veritas Cluster for Linux, EMC storage in the hub in London
- Created Sybase Data Server on Linux
- Added Replication Server to the same host
- Broke down business in terms of functionality
- Identified data (tables) that each subscriber needed
- Created subscriptions from all replicate sites to the tables on the database on Linux
- Used function replications to reduce the network traffic where applicable

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The New Setup
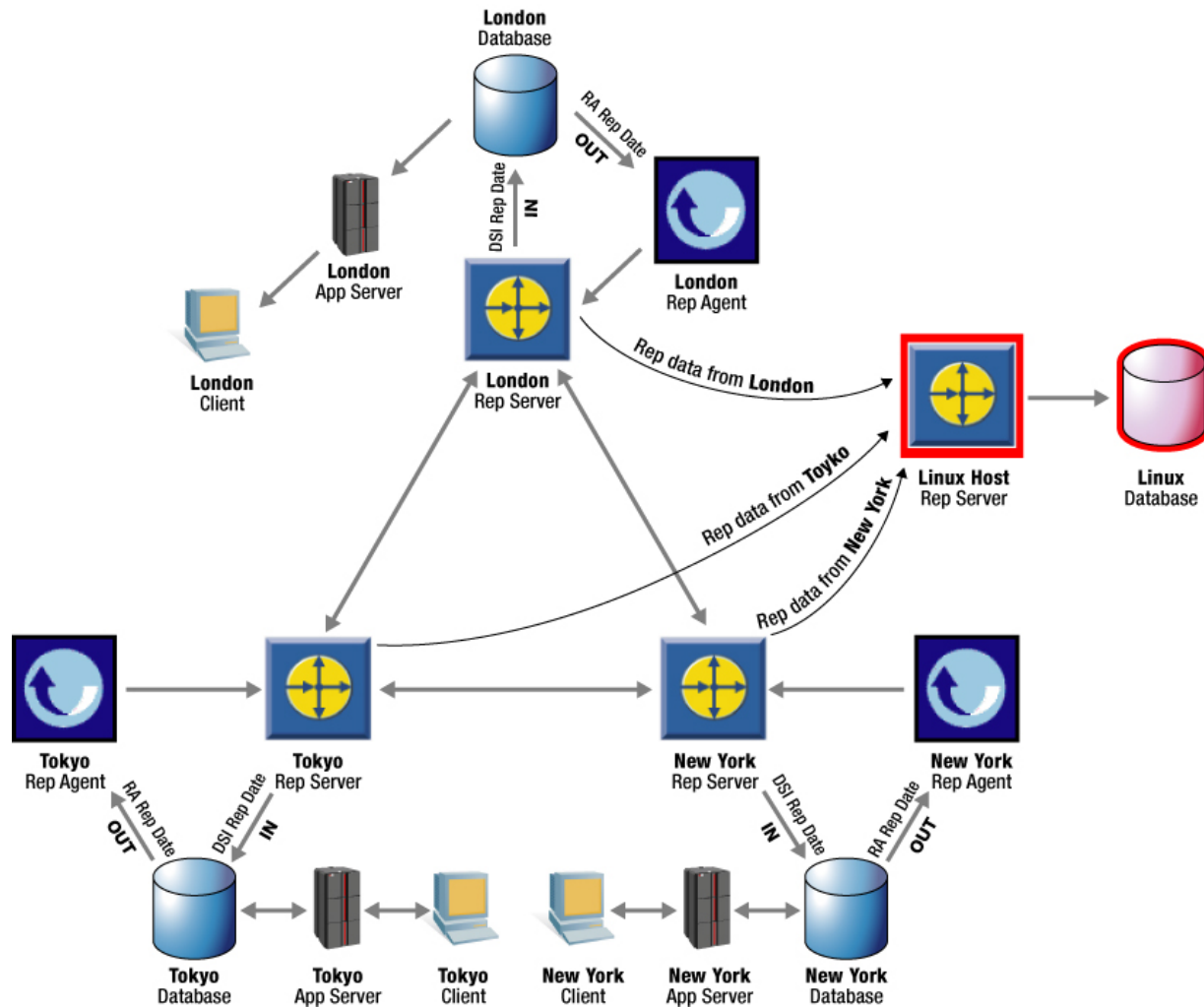
Case Study: Tier-1 Multi-National Bank

Phase III : Customer Impact

- Managed to integrate ASE and Replication Server on Linux with the mainstream production environment

- Provided value to business at affordable cost
  - Allowed a framework to be established for other projects within the Bank to use Linux

- Reduced maintenance cost and load on the main trading system
  - Combined replication and Linux savings

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Peer-to-Peer Replication

Overall Savings

Category	Resource Savings	Cost Benefit
Business Support Staff	2@$350/day	$168,000
Reduction in local IT support	2@$700/day	$336,000
Elimination of support costs	20% X 2@$700/day	$33,600
Application upgrade centralization	40 days developer + 5 days DBA + 15 days app support	$35,000
Elimination of local DR sites	H/W purchase cost of $50,000 +$30,000 maintenance	$80,000

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Summary of Savings

Savings per hub per year	Amount
DR site	$80,000
Support staff	$537,600
Application upgrade savings	$35,000
Total	**$652,600**

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Savings from Introducing Linux

Savings from using Sybase on Linux	Amount
Hardware savings	$25,000
Host maintenance savings including license costs	$20,000
Residual savings by freeing up resources on the main data servers	$35,000
Total	**$80,000**

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Summary

- Linux is proving to be a stable platform for mission critical databases

- Sybase ASE is without a doubt a Price/Performance leader on Linux

- Sybase offers the most comprehensive range of products of any RDBMS on Linux

- Migration to Linux brings in considerable benefits including performance improvements and simplified maintenance

- Replication technology is critical to reducing cost and containing risk during and after migration

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Question and Answer Session

For More information about Sybase and Linux visit:

- **Iroquois Gas Success Story**:
  http://www.sybase.com/success_stories

- Further information on **Sybase and Linux**:
  http://www.sybase.com/linux

- **LinuxWorld** (January 20-23 in NYC)
  http://www.linuxworldexpo.com/

- **TechCast: What's New in Rep Server 12.6**
  Coming soon!

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