4sl Consulting Group

Innovative in advisory, delivery and management solutions for financial services

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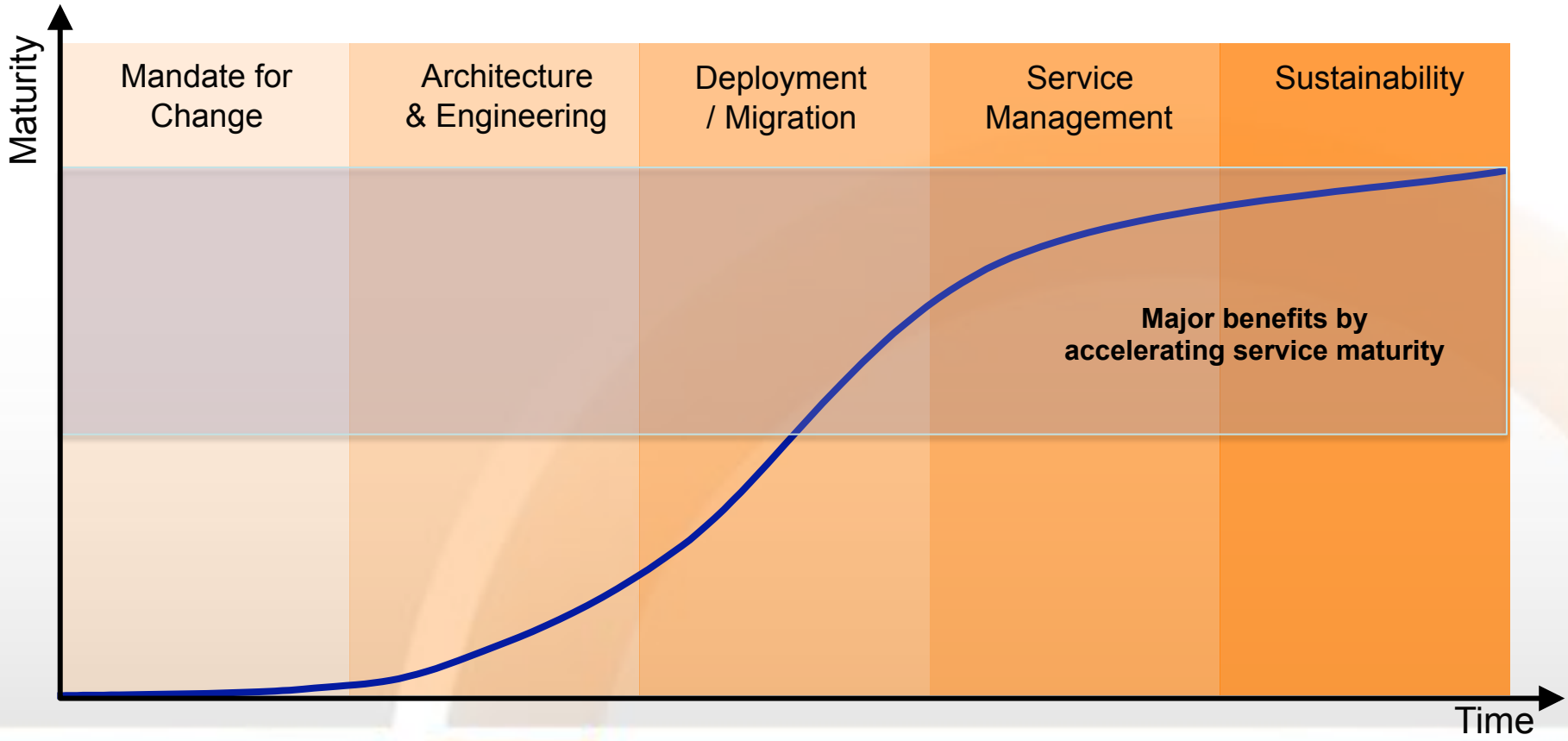
Accelerating Service Maturity

Database Services - Oracle RAC/Streams

Value Proposition

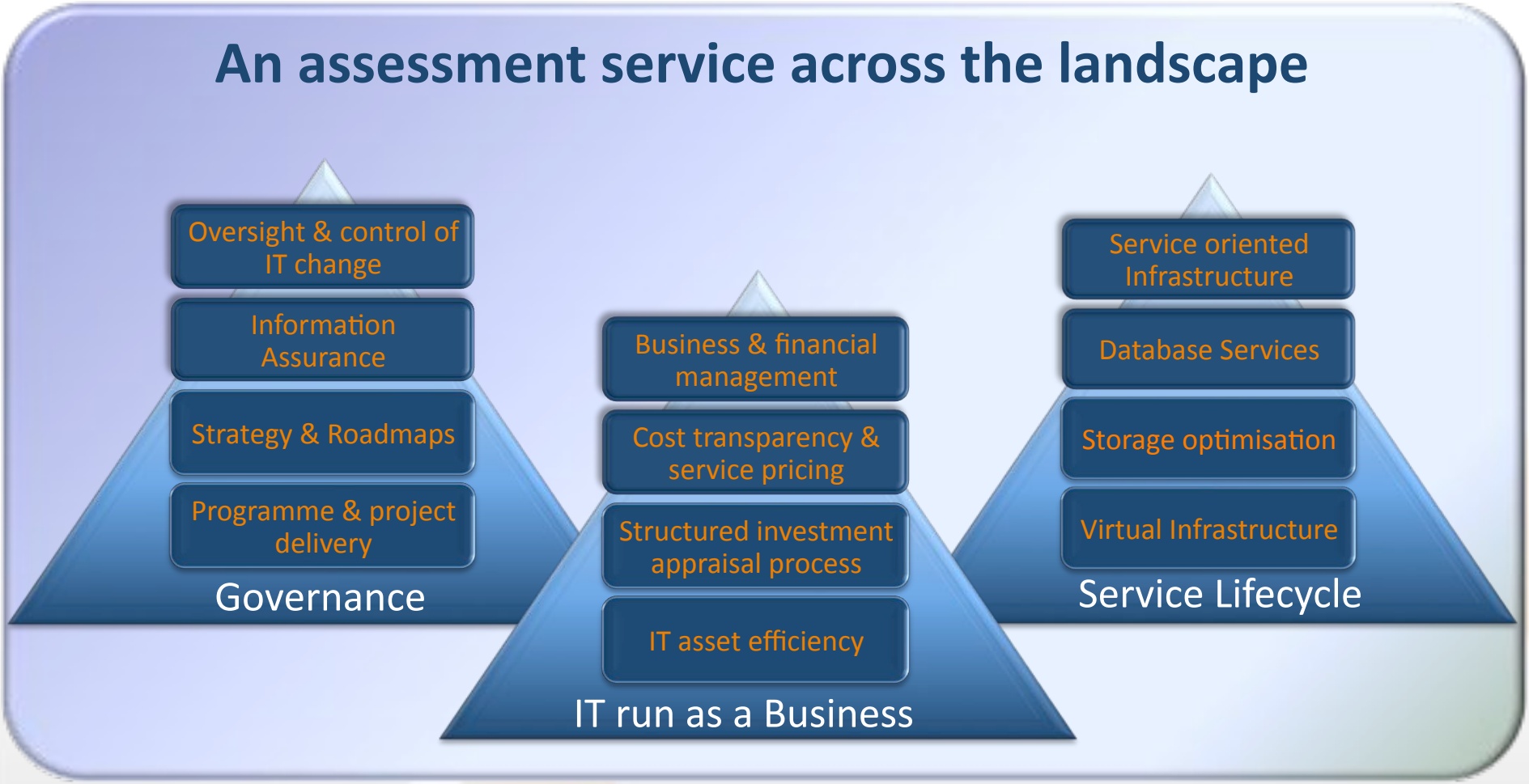
- In short, we help increase IT service efficiency & effectiveness by adopting a proactive lifecycle management approach



IT Landscape Profiling™

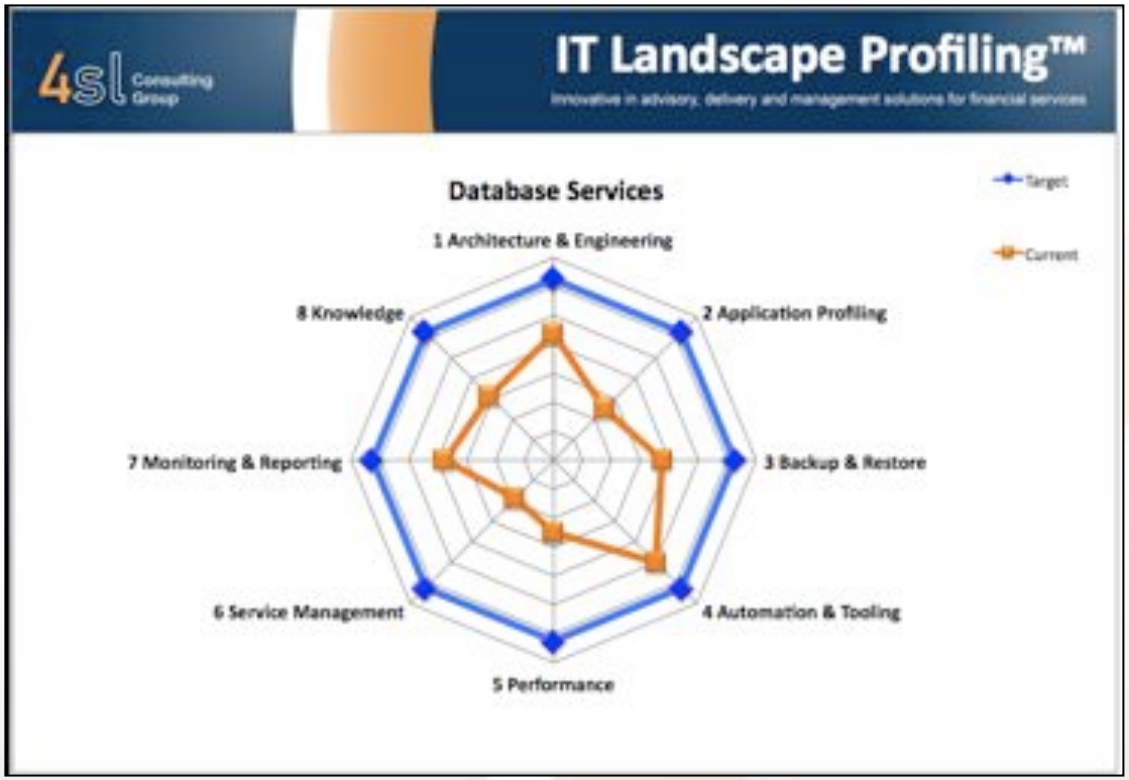
- An IT organisation has to deliver against a number of major objectives & disciplines.
- We see these as an **IT landscape** & have developed a rapid profiling method to help organisations deliver on these themes:
  - Effective ***Management & Governance*** for decision making & control
  - ***Running IT as a business*** for greater business alignment
  - ***Service Lifecycle*** to balance efficiency, effectiveness, stability & risk

An assessment service across the landscape



IT Landscape Profiling™

A rapid assessment to identify effectiveness & efficiency improvements



Alarm

- **Application Profiling**
- **Performance**
- **Service Management**

Concern

- **Backup & Restore**
- **Monitoring & Reporting**
- **Knowledge**

Desired

- **Architecture & Engineering**
- **Automation & Tooling**

Service Lifecycle – Database Services

Oracle Streams

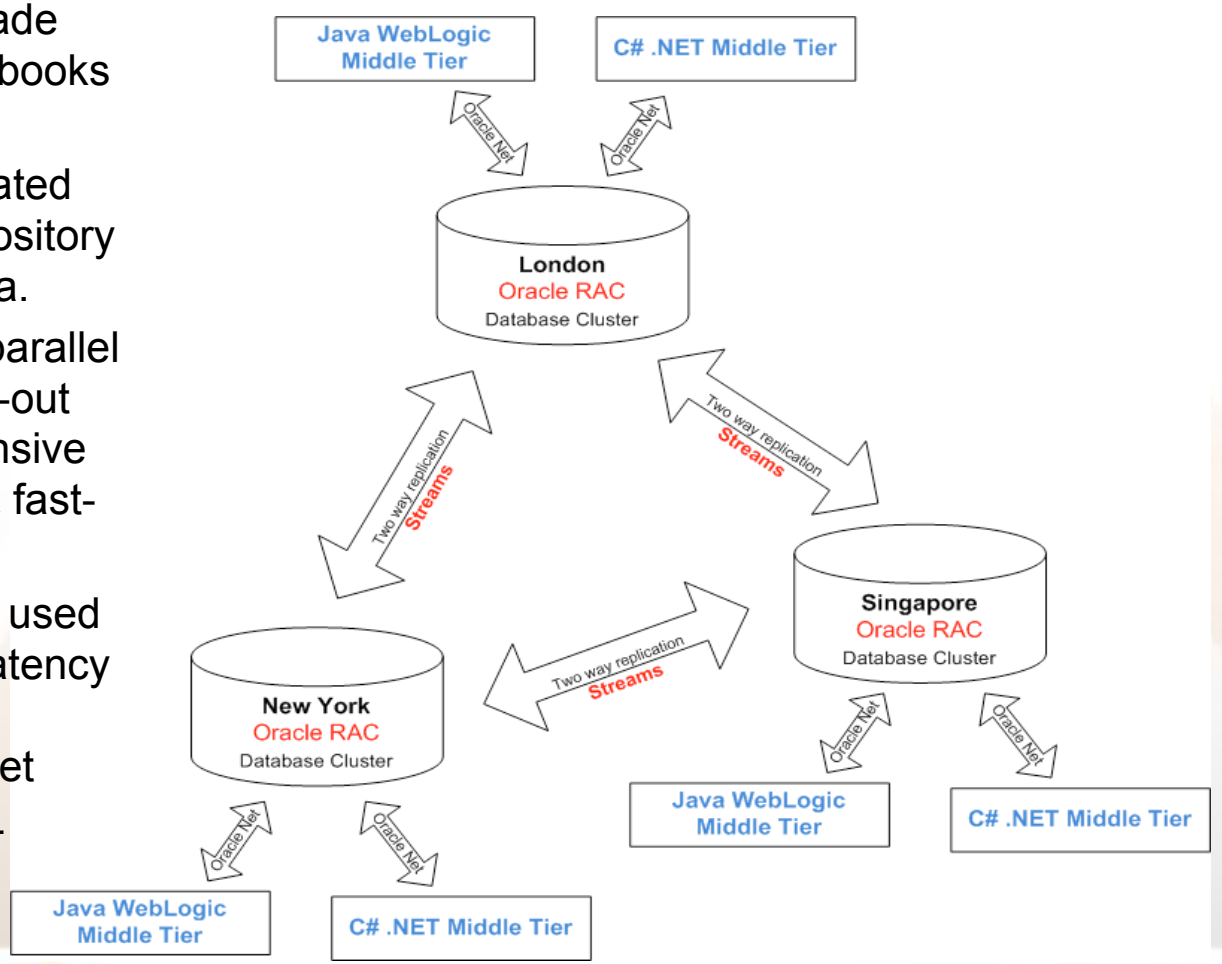
Oracle RAC/Streams - Why is it relevant?

- Use Case
  - We see the majority of Oracle RAC & Streams implementations in Finance to provide a consistent shared, ***globally distributed*** data-set for a high-volume ***business critical application***
- Increase Service Availability & Mitigate Platform Risk
  - Put simply, Oracle Streams enables the reliable propagation & management of data, transactions & events in a data ***stream***
  - It does this either within a single database, or from one database to another
- Increase Functionality & Flexibility
  - The data stream routes published information to subscribed destinations.
  - The result is a new feature that provides greater functionality & flexibility than traditional solutions for capturing & managing events, and sharing the events with other databases and applications.
  - As users' needs change, they can simply implement a new capability of Oracle Streams, without sacrificing existing capabilities.
  - The architecture of Oracle Streams is very flexible & it contains three basic elements: ***Capture, Staging & Consumption***

Case Study – Global Investment Bank

Current State System Architecture

- High-volume derivatives trade system with global shared books of trades.
- Utilising a clustered, replicated multi-master database repository for all derivatives trade data.
- Built on Oracle 10.2 RAC parallel cluster technology to scale-out CPU capacity to meet intensive processing requirements & fast-failover high-availability.
- Oracle Streams replication used to mitigate WAN network latency issues by providing a geographically local data-set available in each continent.



Case Study – Global Investment Bank

Current State Constraints & Gaps

- Stability & Performance Issues
  - Frequent lengthy outages in the database replication environment directly impacting service availability.
  - Significant replication backlogs (or latency issues) building up at times of increased load rendering the system effectively unusable.
- Monitoring & Manageability Issues
  - Complex architecture making day-to-day maintenance & change risky & difficult. E.g. data-schema updates, driven by application & business requirements taking weeks to be scheduled.
  - Specialised technology solution limiting number of qualified personnel to make changes.
  - Limited system monitoring (i.e. traditional 'serial console' event logging) making it difficult to establish current status & interdependencies of a globally replicated database & applications.
- Major Business Impact
  - Risk calculations & analysis performed in London led to 'stale' data for New York impacting trading positions.
  - With out-of-synch versions of the database, global middle & back office functions are seriously impacted often resulting in significant financial loss.

Case Study – Global Investment Bank

Future State Improvement & Remediation Initiatives

- ***Architectural changes***
  - Increase stability & fault-tolerance in replication environment
  - 64-bit technology to overcome 32-bit OS limitations (e.g. 4 GB memory restriction)
  - Rearchitect application & RAC interface – exploiting HA & load-balancing features
  - Migration off specialized hardware platform (Egenera) to industry standard “Tier 1” computing platform (HP).
- ***Performance improvements***
  - Network & memory tuning to increase replication throughput
  - Elimination of the Oracle “OCFS” filesystem and migration to Oracle ASM to improve database storage performance and stability
  - Improved performance performance & stability by migrating from Red Hat ES 3.2 (Linux Kernel 2.4) to SUSE SLES 9.3 (Linux Kernel 2.6) with faster CPUs.
- ***Enhanced operational tool-sets***
  - Improved facilities to manage, monitor and troubleshoot the replication environment.
  - Reduce exposure to Oracle software bugs by upgrading the database from Oracle 10.2.0.2 to Oracle 10.2.0.4.

Case Study – Global Investment Bank

Benefits Realised Through Engagement

- **Higher Levels of Service Availability & Performance**
  - Major increase in client perception (near 100% uptime)
  - Up to 100-times increase in throughput (performance) for different replication payloads.
  - Worst-case replication backlogs during peak loads reduced from 24 hours to 15 mins
- **Improved Operational Effectiveness**
  - Development of documentation, tools & processes to enable proactive BAU support.
  - Formal change management process introduced enabling rapid turn-around of application change requests (with changes now being performed by 1st & 2nd line support)
  - Implementation of bespoke web-based monitoring providing a global RAG dashboard view of the entire environment (includes key service performance metrics)
- **Increased Operational Efficiency**
  - More accurate & efficient incident management & root cause analysis
  - Downtime reduced through improved support & maintenance; a larger administration support pool available for more flexible & dynamic application changes
  - Improved availability from faster fault diagnosis & improved root cause analysis leading to significantly improved client perception
  - Greater visibility of service performance - all parties are notified & can to track the progress / current state of the environment

Service Lifecycle – Database Services

Example Monitoring Capability - Hobbit

Monitoring - Hobbit Open Source Project

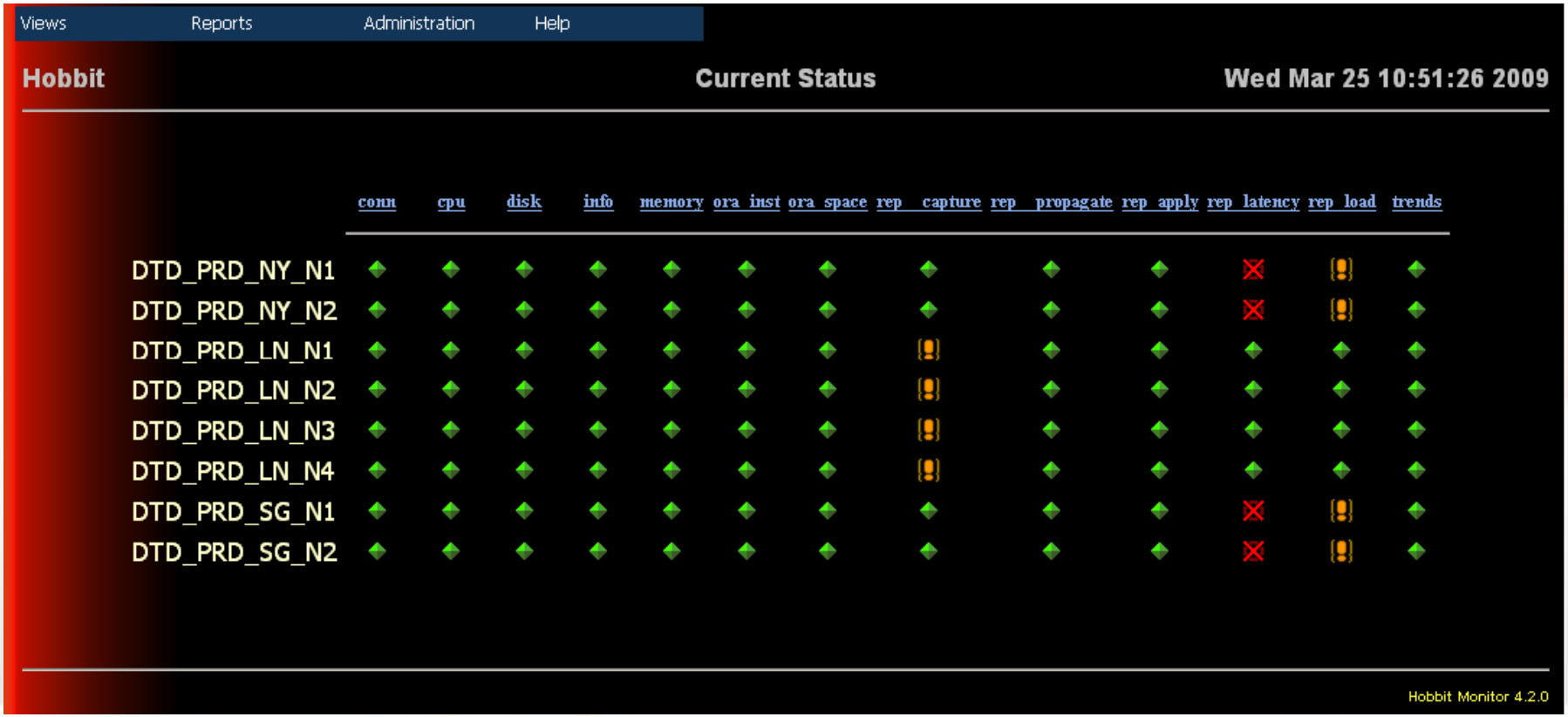
- Hobbit is an externally developed piece of Open-Source software.
- The Open-Source project is in the process of re-naming the Hobbit application “Xymon”.
- Hobbit is a complete rewrite of the more well-known monitoring product Big Brother (previously also Open Source, now owned by Quest)
- Hobbit has many performance, scalability and functionality enhancements not available in the original open-source Big Brother.

Hobbit DBA Implementation

- Provides DBAs and Application Teams with a **shared central view** of the status of their database environments.
- Provides a **global overview** of real-time events as well as a drill-in to **view historic events, event duration** and **availability metrics**.
- Basic OS resource and customised **trending** capabilities are also provided.
- **Customised replication monitoring** developed in-house for business specific databases.
- Enables a **self-service** approach AD teams: allows UAT and Dev databases to be monitored without flooding the production monitoring consoles with alerts.
- Non-critical warnings allow **pro-active & pre-emptive maintenance**.

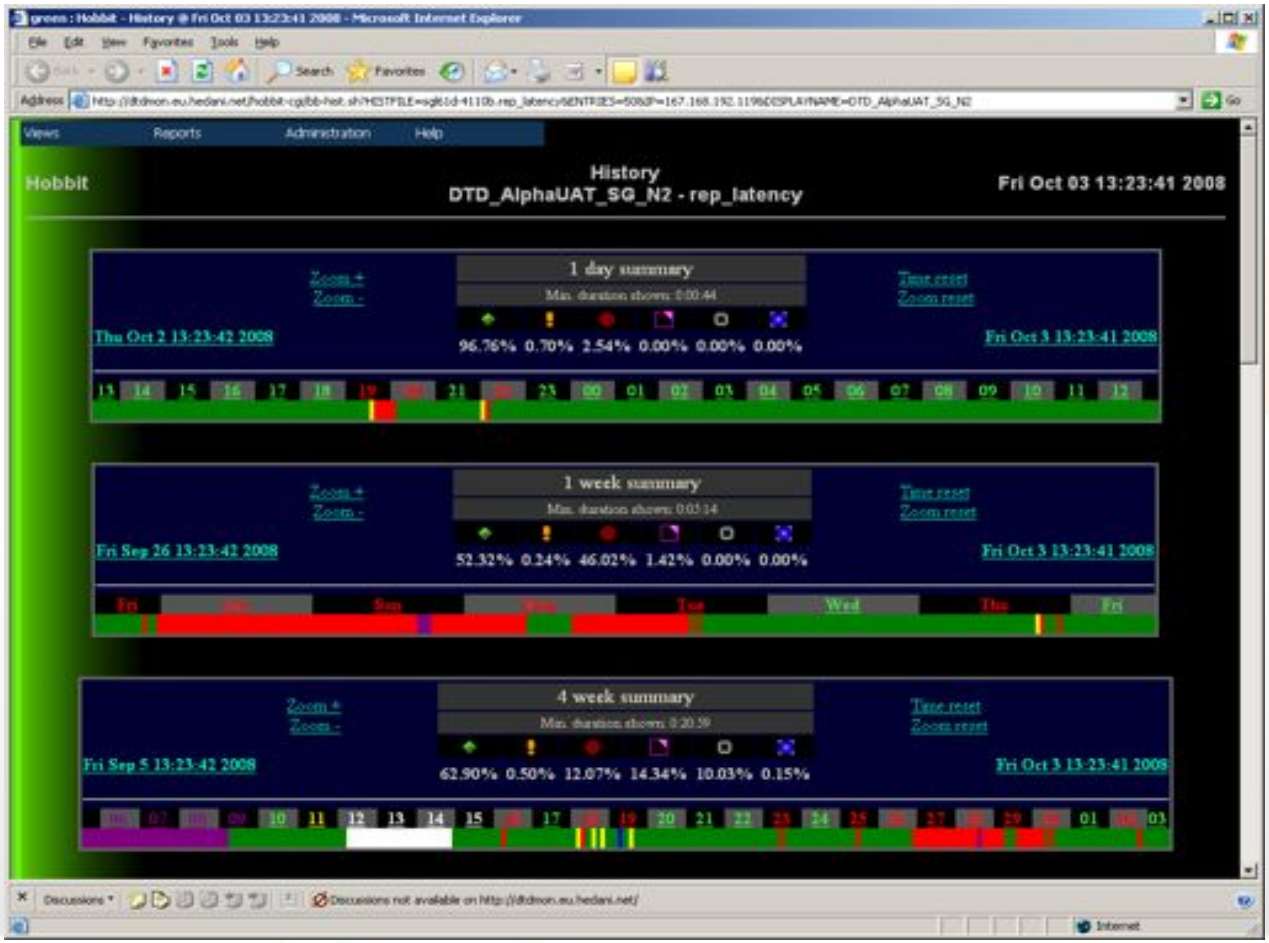
Example Screenshot - Main Events

- View an entire application estate on one screen with RAG event states
- Example; Replication Latency (`rep_latency`) - critical in remote locations
  - Cause is probably load from LN (`rep_load` Warning).



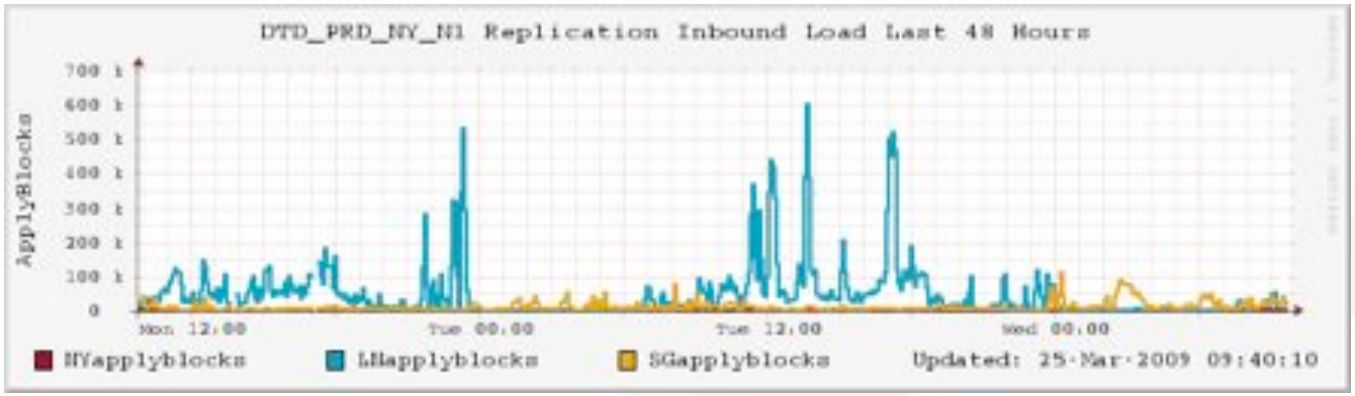
Example Screenshot - Event History

Drill into each event for history of RAG events and duration



Example Screenshot – Custom Trends

- For DTD, the `rep_load` event has been customized to provide replication throughput trends as below:



- Data and generated graphs are near “real-time” (within the last five minutes) and not like the static daily graphs typically provided via ORCA.
- Zoom in for detail and click on graph to view timespans for
  - Past 48 hours
  - Past 12 days
  - Past 48 days
  - Past 576 days