September 2013

Databases «On the Fly»

Unravel the Cloud Potential in Oracle Enterprise Manager 12c

About me

- Rune Lilleng (36) – Oslo, Norway
- Database manager at The directorate for Labour and welfare →NAV

- Worked with Oracle products since 2000
  - Data warehouse
  - DBA
  - Exadata (2009)
  - Enterprise Manager (10,11,12)

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About NAV

Objective

- The Norwegian Labour and Welfare service (NAV) plays a broad participatory role in the world of work and society, and contributes to the financial security of the individual.
- This depends on close interaction with the user, working life, and local authorities, and a sharper focus on people with special needs in relation to the labour market and others in a challenging life situation.

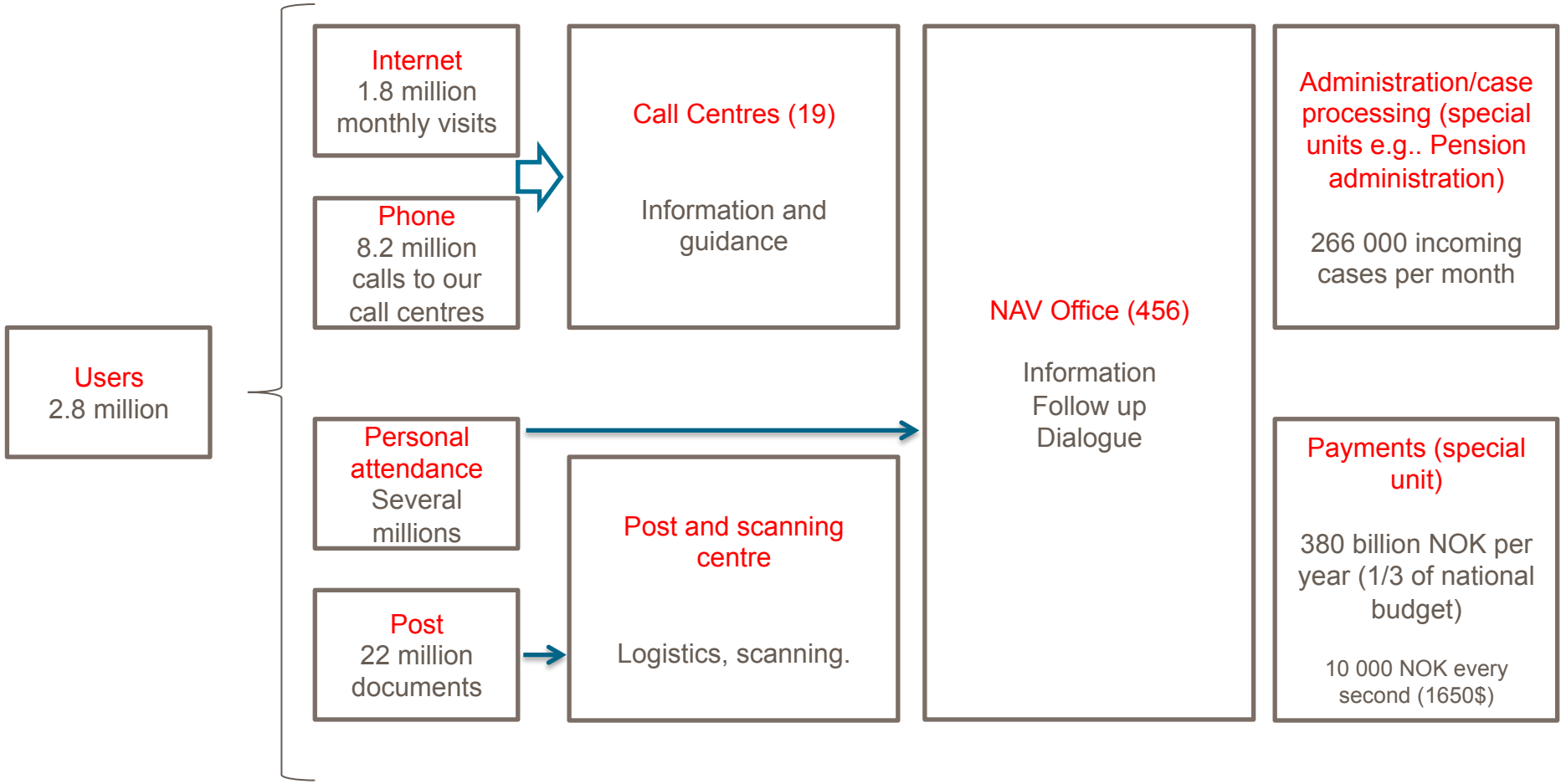
2006 Reform

- The Norwegian Labour and Welfare Administration (NAV) was established on 1 July 2006 (Labour and welfare act of 2006).
- It merged the previous National Insurance Service and employment services “aetat”. (20 000 employees).
- The primary goal of this reform was to expedite case work so that more resources could focus on our users and their specific needs (work first).

Services

- Unemployment
- Sickness benefits
- Family related benefits
- Pensions
- Financial assistance (social)
- Employment schemes
- Occupational injury
- Health services

About NAV


Users
2.8 million
Internet
1.8 million monthly visits
Phone
8.2 million calls to our call centres
Call Centres (19)
Information and guidance
Personal attendance
Several millions
Post
22 million documents
Post and scanning centre
Logistics, scanning.
NAV Office (456)
Information
Follow up
Dialogue
Administration/case processing (special units e.g.. Pension administration)
266 000 incoming cases per month
Payments (special unit)
380 billion NOK per year (1/3 of national budget)
10 000 NOK every second (1650$)

History: Multiple platforms

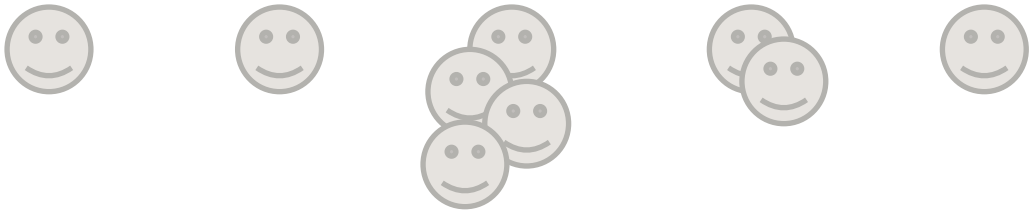
IT

The act of 2006 only focused on organizational changes, and very little was done to consolidate/change the IT platforms from the two former agencies.

5 data centers, spread all over Oslo

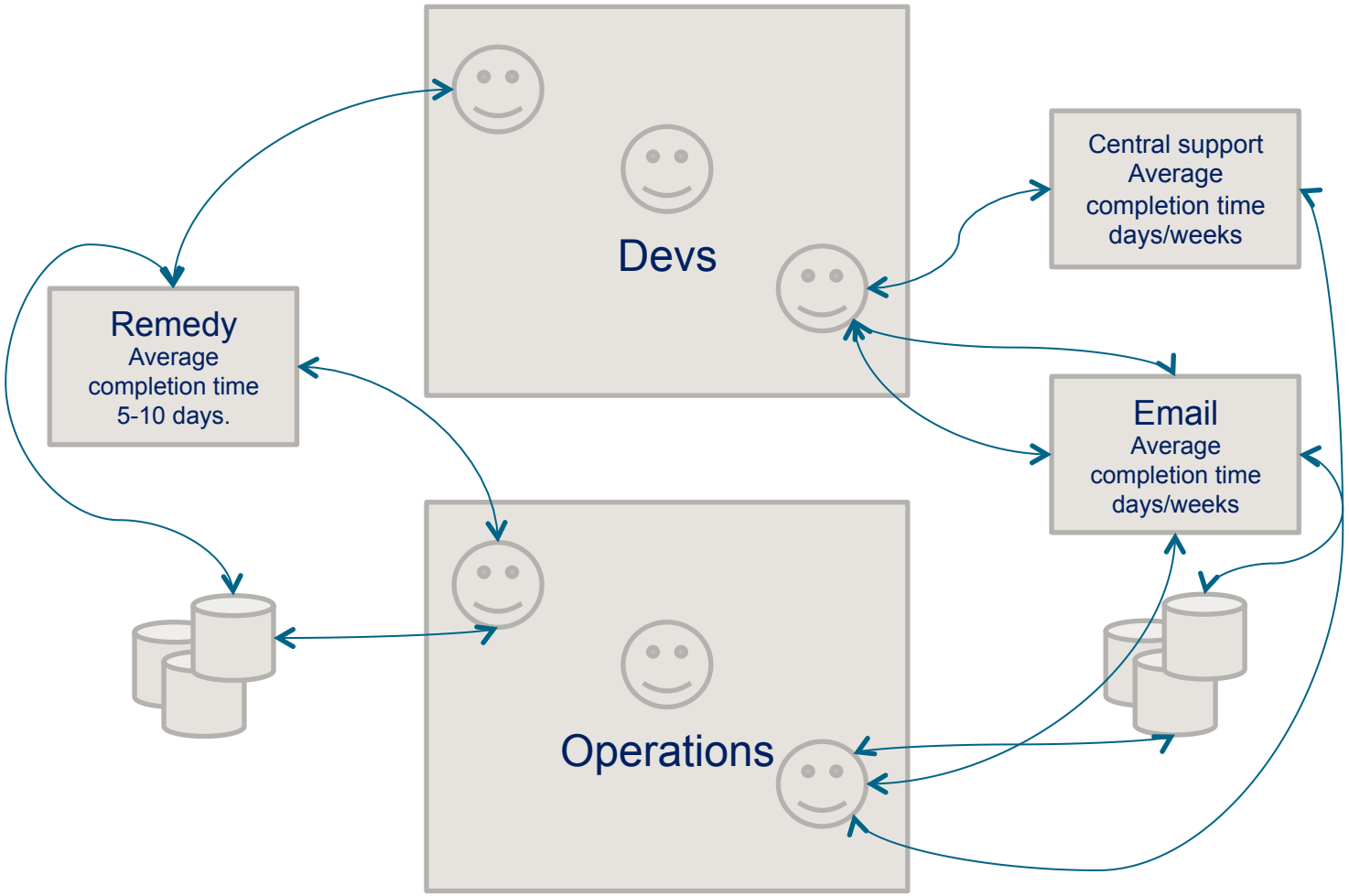
HP-UX | Solaris | Linux | z/OS | Windows

Different platforms



OS support was fragmented. Not professionalized, patching, security etc..

History: database provisioning



History: lack of consistency

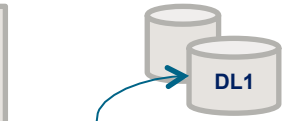
RDBMS installations were none uniform. Each DBA had different preferences. Lots of variations (and confusion).

Patching (security and fixes) were at best random. Too many platforms and different installations made this very difficult.

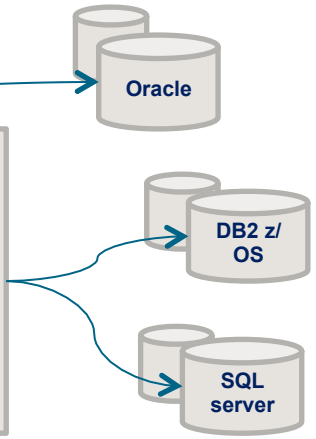
Costly to run on many, and to some extent, old platforms. Various degrees of OS support, lack of personell.

History: ageing systems

One of our most central systems saw it's first light in 1976 («Infotrygd»).
Yes, it's still running ☺



Portfolio of over 300 running applications. 12 core systems. Cobol,Forms, Java apps, .net



Unable to implement needed changes due to complexity and high costs.

MOD program (IT modernization)

As a prequel to the MOD program it was clear that we needed to consolidate and make certain strategic choices, before we could even start to talk about establishing a private cloud solution and developing new applications.

Number of data centres were reduced from 5 to 2. Network infrastructure was renewed, consolidated and simplified.

Strategic operating system of choice became Linux. All running apps and databases have been migrated to Linux (except old legacy systems running on mainframe)

Strategic database platform of choice became Oracle. On-going job migrating databases from DB2 to Oracle.

Jboss, and to some extent WAS selected as strategic j2ee platforms.

MOD: NAV 2.0

2012 – 2018 ++

Development of new systems, that are highly adaptable. «Future proof»

Self Service

Mass migration of users from traditional services, to online solutions.

400 external developers /architects

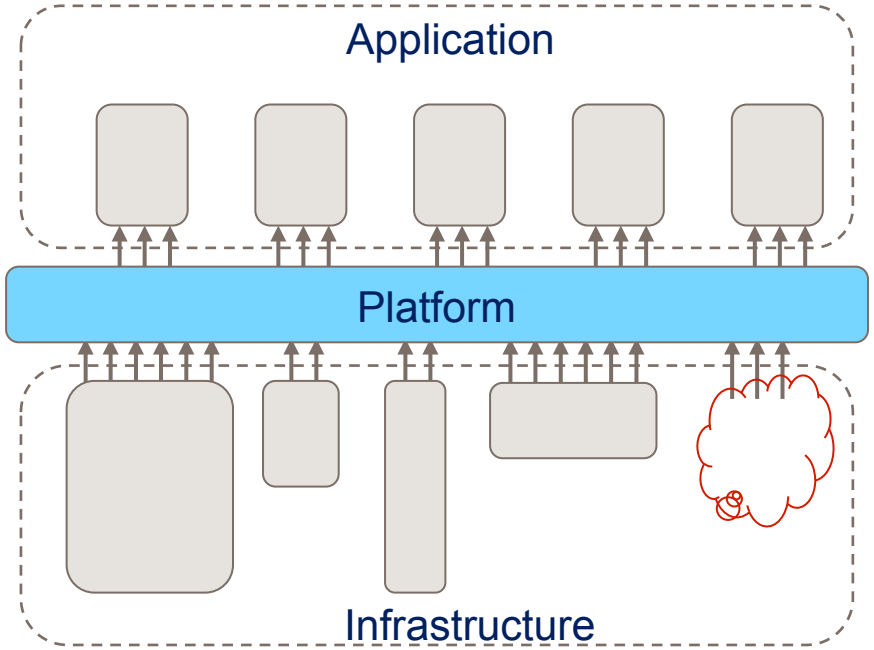
Modular Core Systems

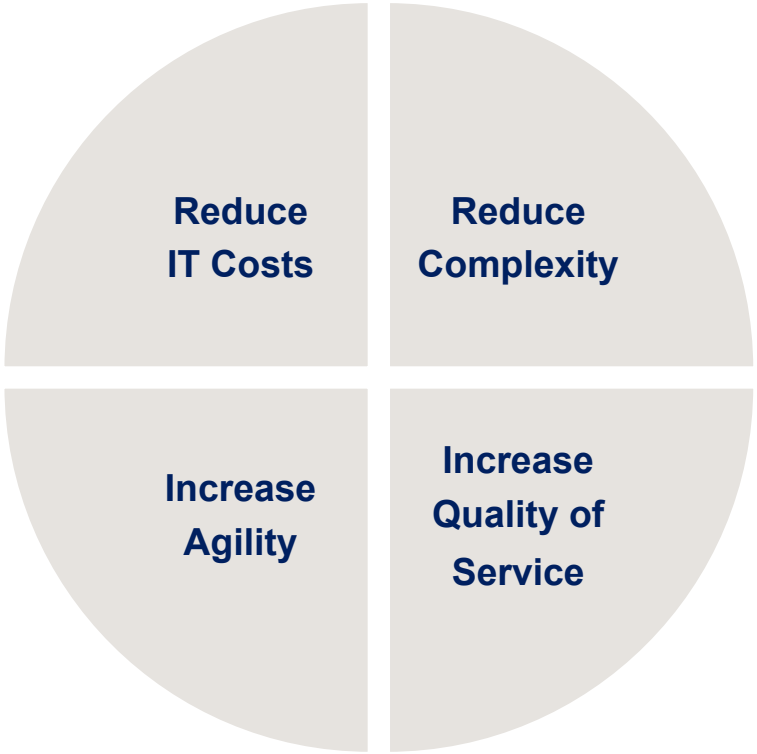
Faster adaptation of changing laws and regulations. Higher degree of flexibility.

Flexible cloud infrastructure

Uniform, standaradized platforms with a short time to delivery.

Why cloud?





In order to meet the demands from MOD, establishing a private cloud, quickly emerged as the only viable option.

Implementation

Funding was approved late Q1 2012

Mission: establish a private database cloud within 01.October.2012

1. Testing
2. Establish infrastructure
3. Config privs and defining pre-req. in EM12c
4. Create Self-Service-Portal
5. Config Chargeback (Showback)
6. Production!!

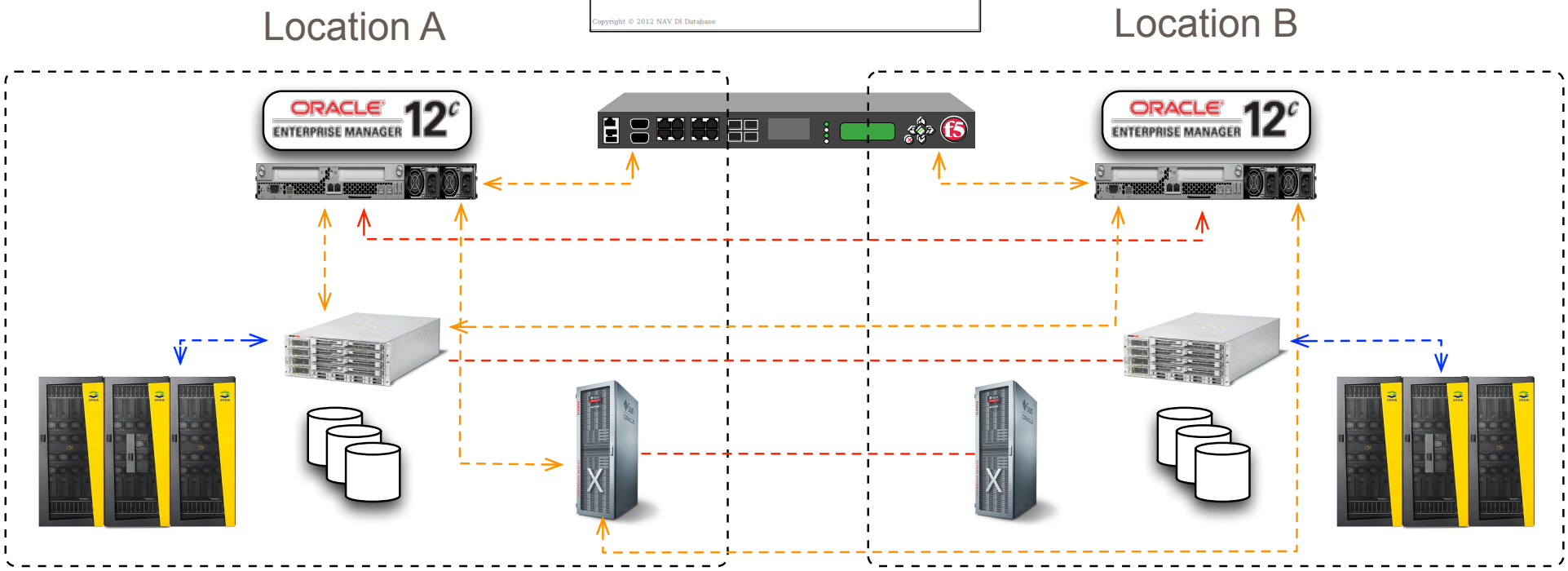
Implementation: testing

- Simple EM12c installation on in-house server
- Configure minimum in EM12c with existing db-servers
- Created a Self-Service-Portal
- Internals ordered some databases via portal
- Testing took us 8 weeks to complete (april/may)

Implementation: establish infrastructure

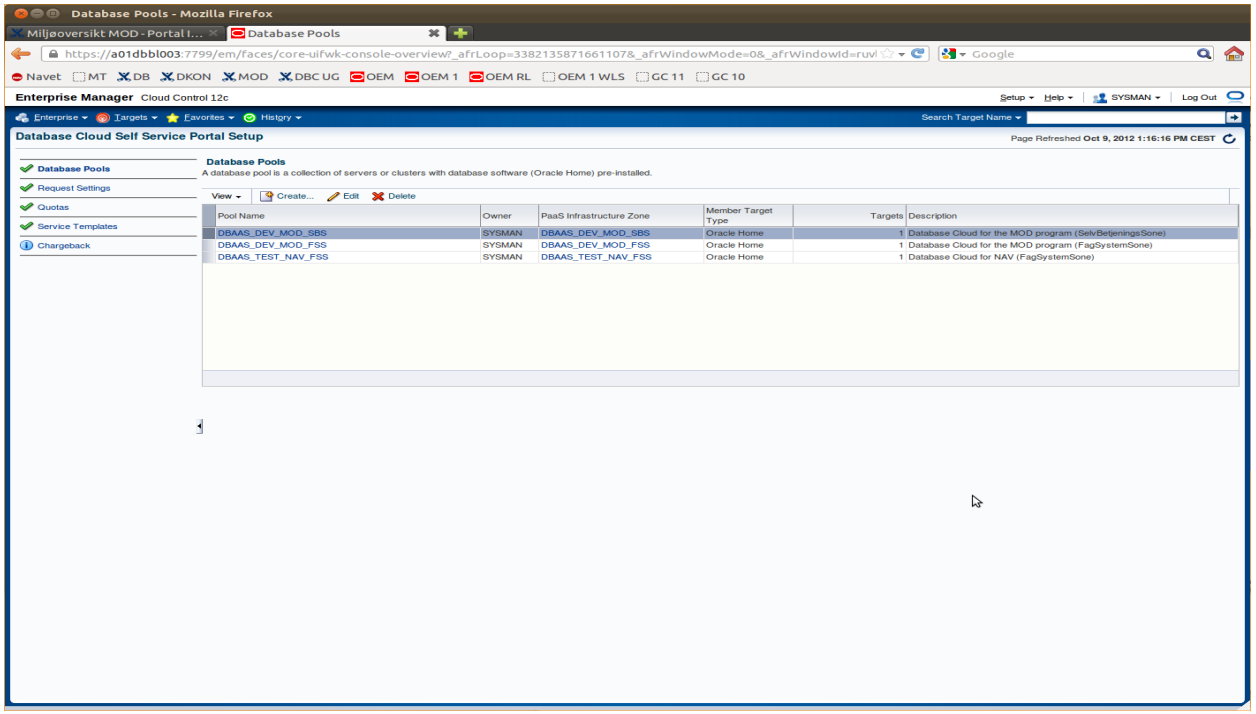
- Decide on HW infrastructure/server platform
  - Most of our existing infrastructure was near end of life, or SW was running on platforms no longer within our strategic choices.
  - Cloud runs on Sun Server X2-8 (8) w/HP 3PAR storage, Oracle Exadata (4 x ½ racks) all running Oracle Linux
- EM12c High Avalibility level 3
  - OMS in active/active configuration. Repository database is using RAC + data guard.
- Install OMS and load balancer (big-ip)
- Configure Software Library and open ports to MOS

Implementation: EM infrastructure

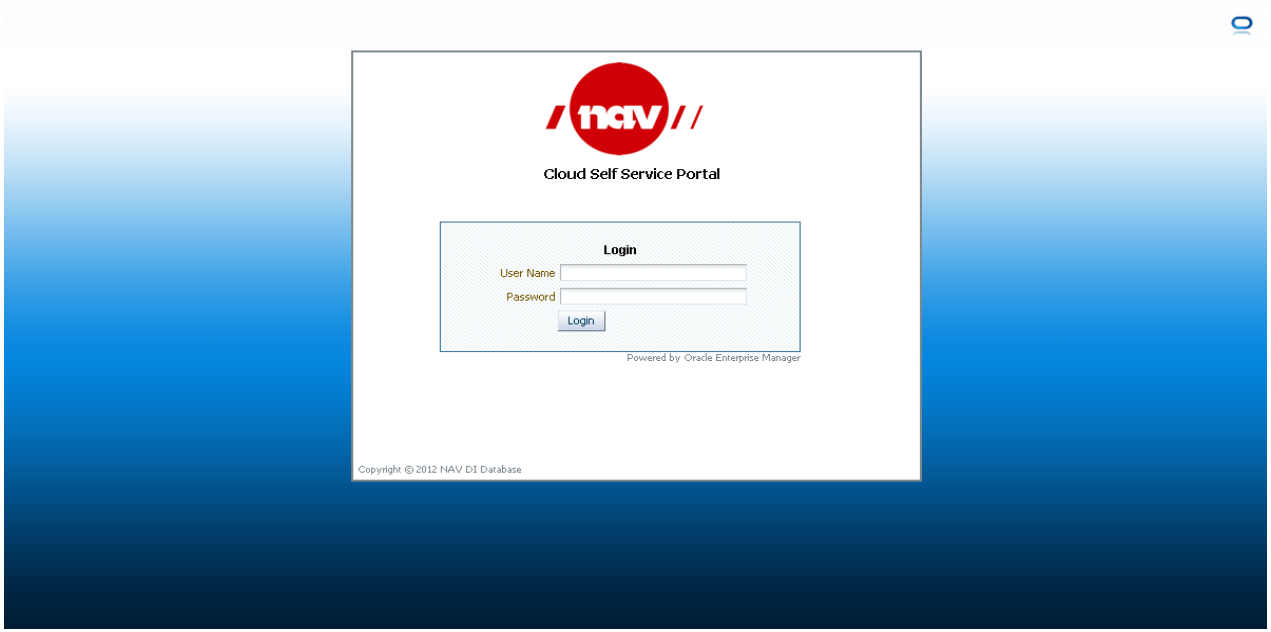


Implementation: configuration

- Config privilege delegation for db-servers
- User admin
  - Cloud Admins
  - End User Role and End users
- Create Database Zone/Pools
  - Pools from 12.1.0.2
- Configure Request and Quotas settings
- Create service templates.
  - Deployment Procedure

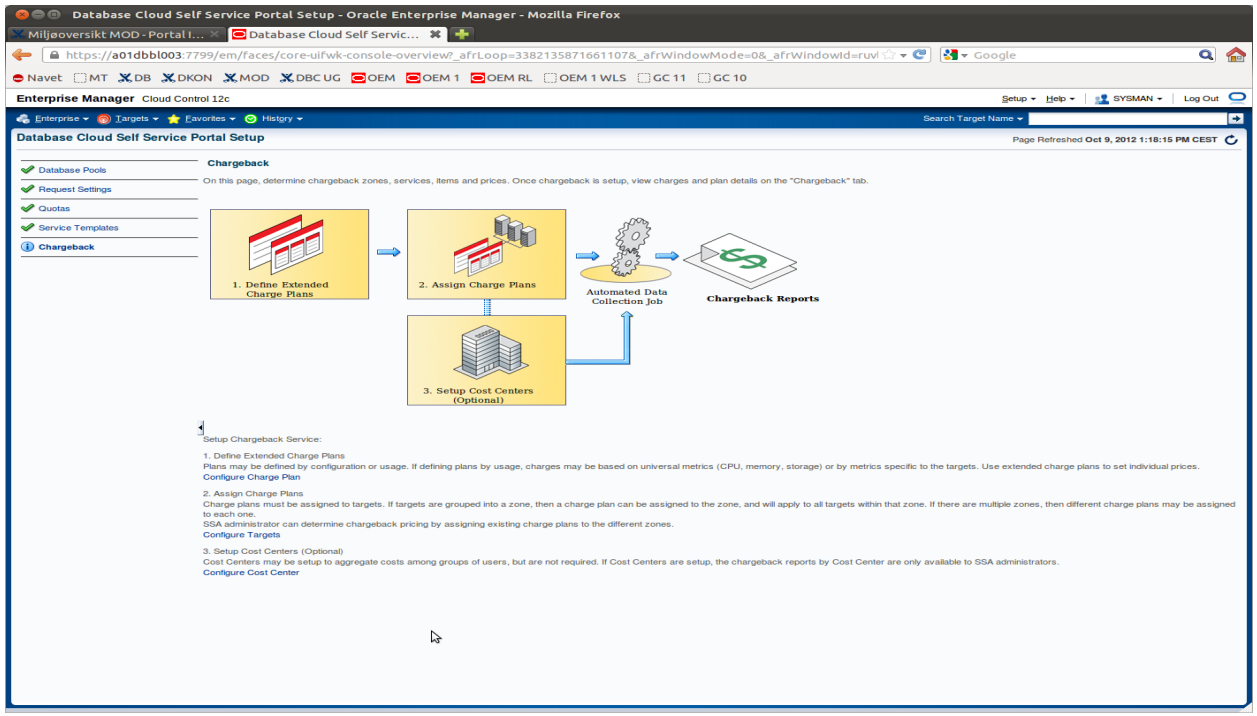


Implementation: configure portal



Implementation: Define charge plans

- Defining a Chargeplan
- Defining Cost centres
- Assign Charge plan and cost centre to Targets (DB Pools)



Delivered to production 01.10.2012

Experiences: how to?

Tell 400+ devs that they have to create and manage their own databases?

Meet with dev team leaders in advance

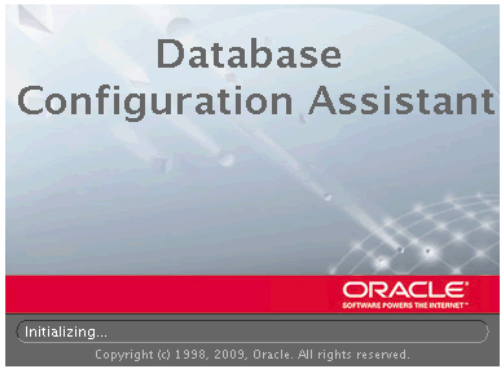
To decide whom to give access to the cloud interface

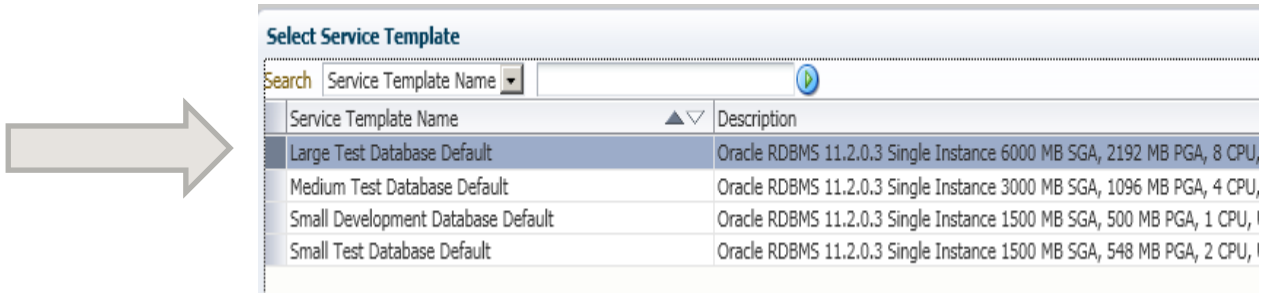
Close all old provisioning queues from day one!

Write an online «how to»

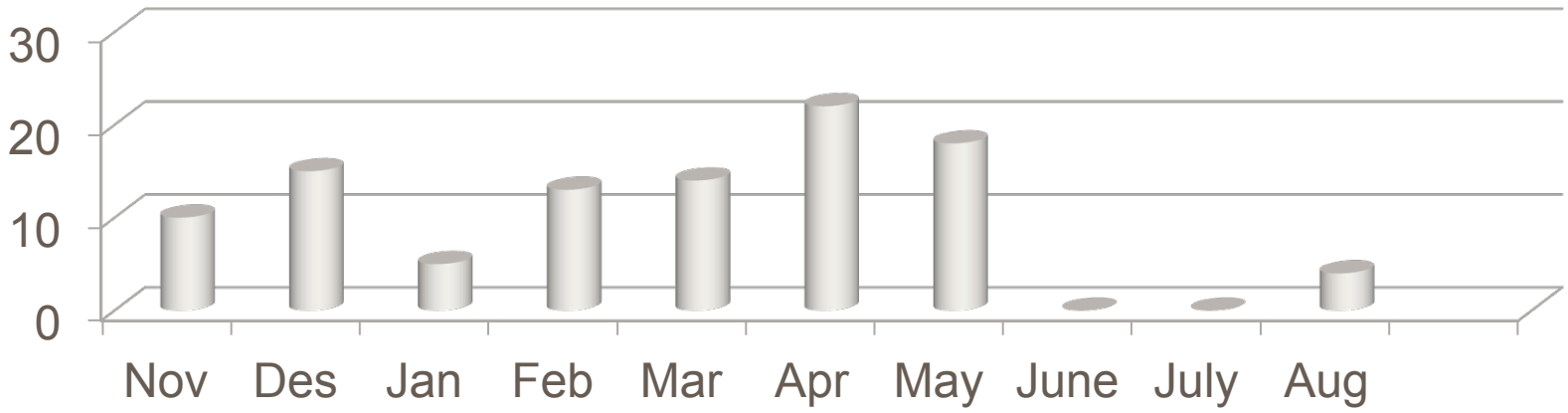
Redirect all requests to this wiki

Experiences: development/trends





No. of instances



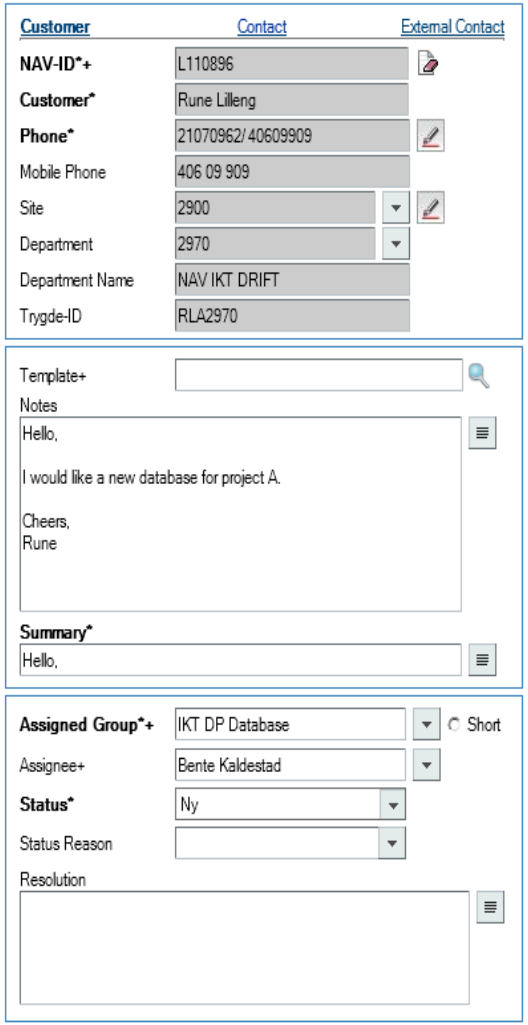
Experiences: provisioning time (past)

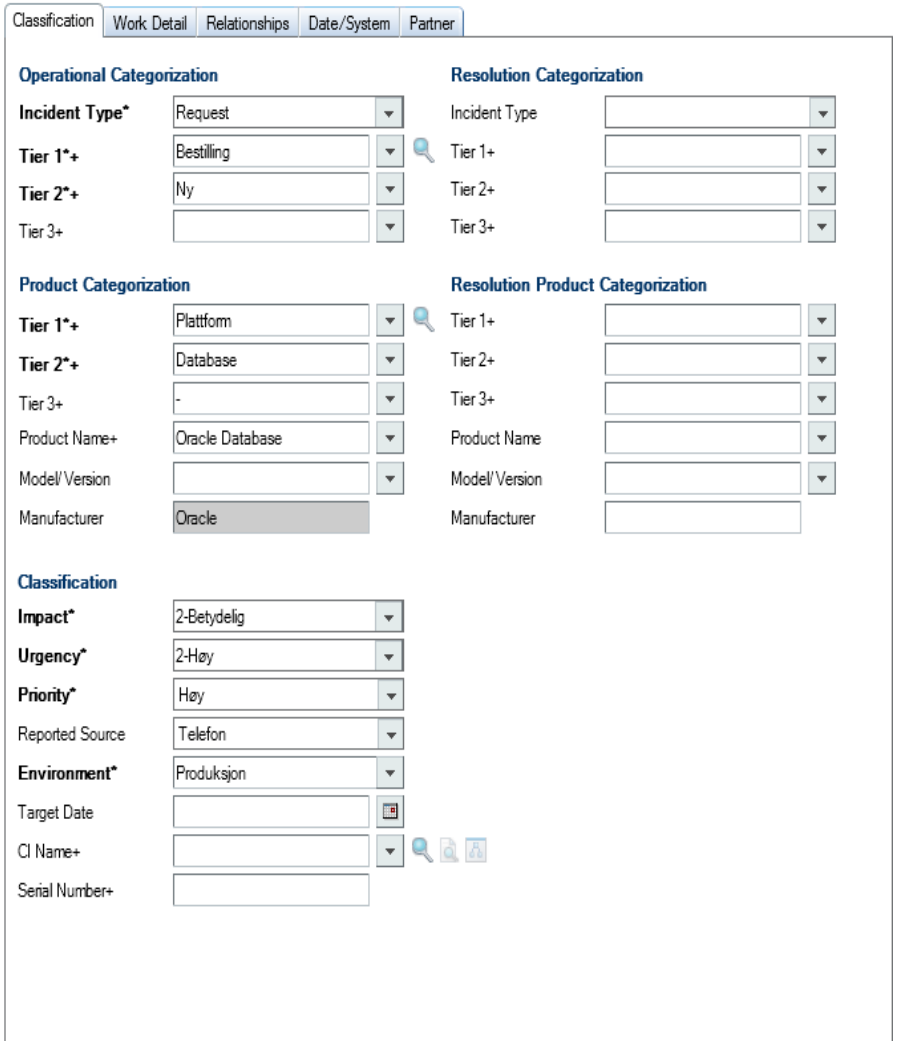
Old order form.
Average time before first response 1-3 days.

Minimum of required information (80%). Leading to Ping-Pong conversations about what they really need.
2-5 days.

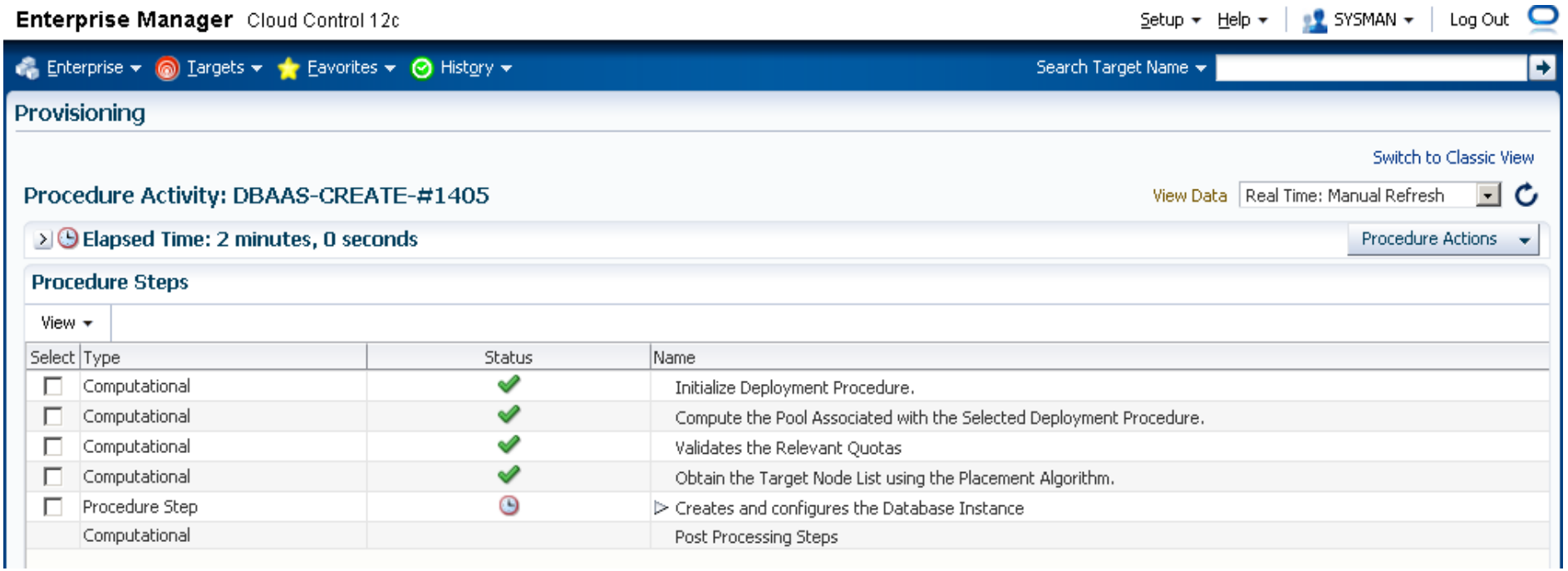
Resolving cost issues:
0 – 14 days

Total average from «frist contact» to delivery
6.8 days





Experiences: provisioning time

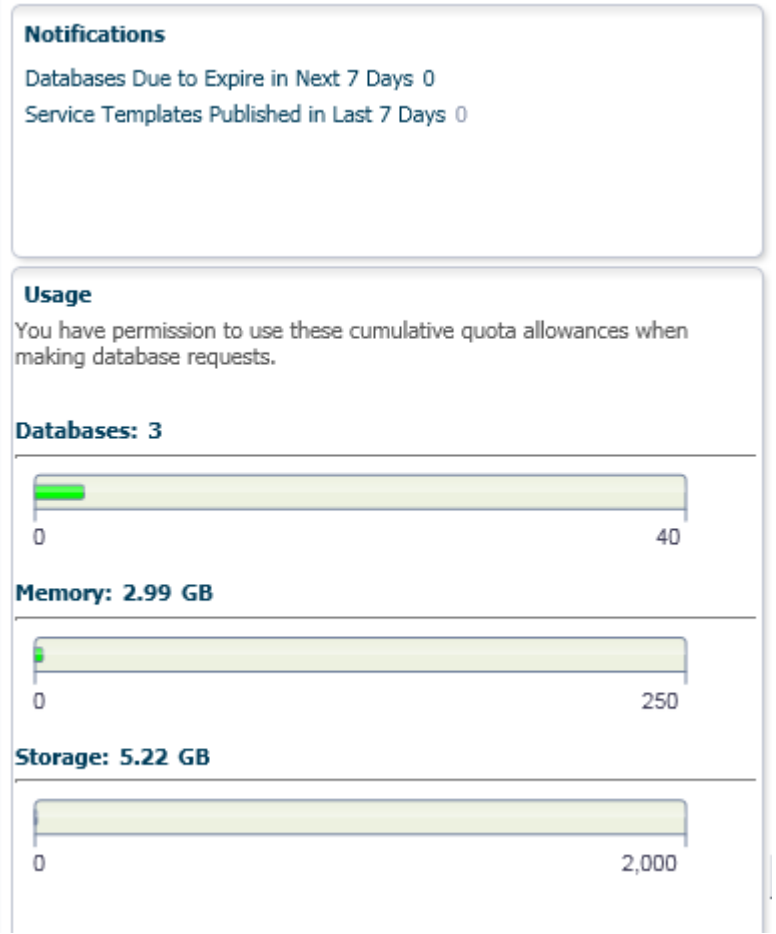


18 minutes

Experiences: configuration basket

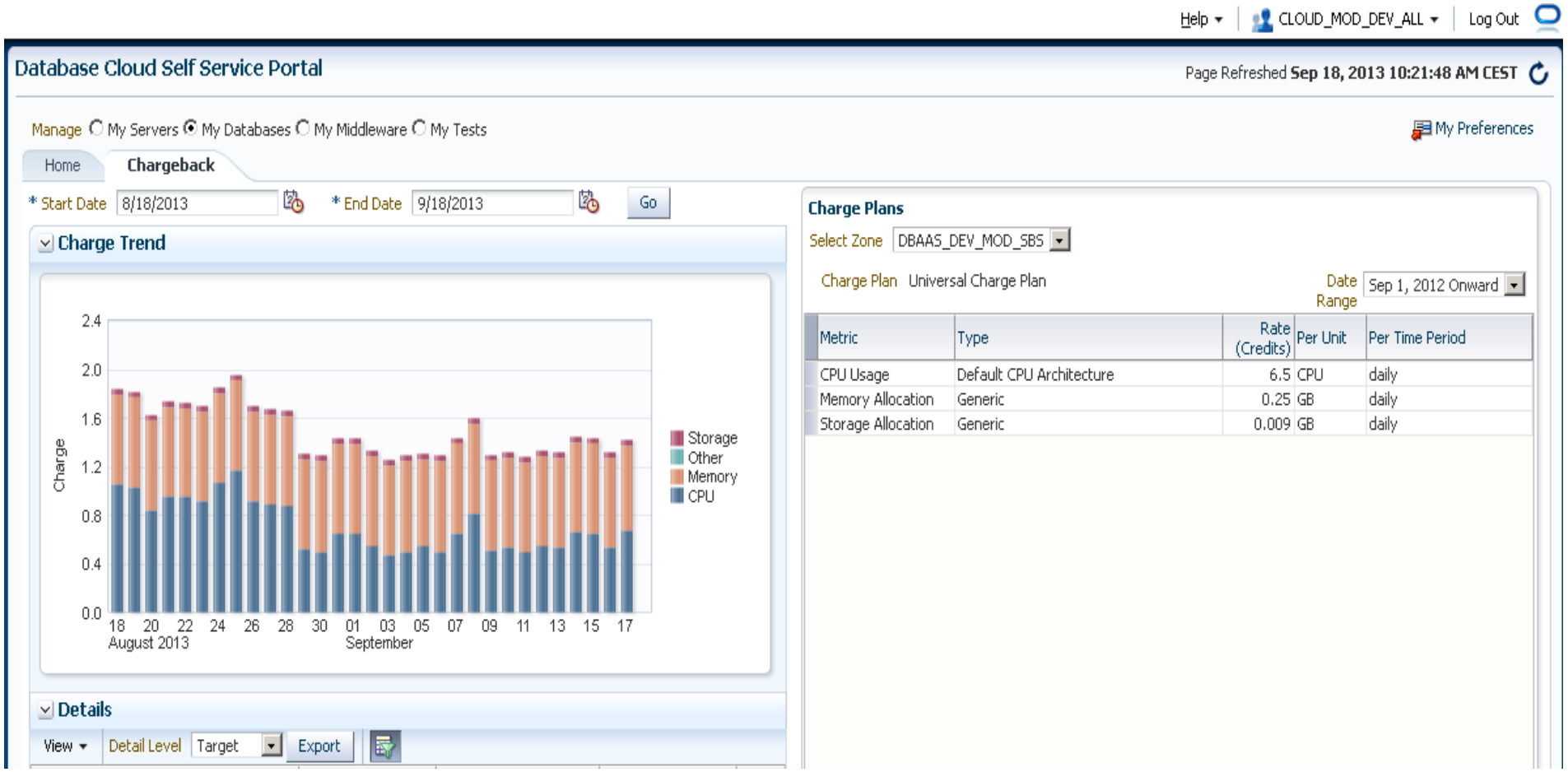
- Limited number of options
  - Small (1.5GB SGA, 2 cores, UTF8, text, jvm, xml) (80%)
  - Medium (3 GB SGA, 4 cores) (15%)
  - Large (6 GB SGA, 8 cores) (5%)
  - Network zone (internal / external)
- Since 01.10.2012 we've had 8 requests to perform modifications to created databases
  - 5 were increase cpu for simple load testing
  - 3 were denied
- Clear constraints on resource consumption
  - Implemented into EM12c (automatic quota validation).
  - Users are encouraged to set an expiration date on environments.

Experiences: costs



- **Absolute limits**
  - Initial investment gives them a fixed amount of resources (cpu/ storage/memory).
- **Funding for additional resources is now targeted at the actual divisions/groups consuming them.**
  - Rather than bloating Operations' budget every year ☺

Experiences: cloud chargeback



Experiences: standardization

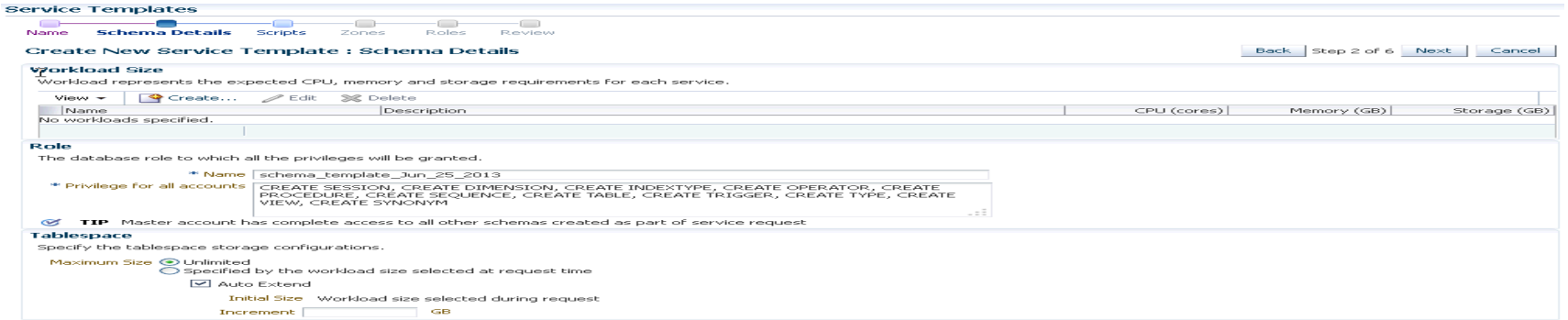
- **Old implementations varied greatly**
  - Different character sets
  - Different database options installed
    - Potential licencing nightmare
  - Too many Oracle installations per server (not all according to OFA)
  - Various degrees of patching (if any).
  - Lack of documentation

- **Uniform installation**
  - All databases are created equally!
    - It's no longer in the hands of a specific DBA.
  - Simplified documentation
  - Consolidation and uniform installations makes patching radically less challenging and time consuming.

In pilot : Schema as a service

- **Schema as a service**
  - Available since release 2
  - Even higher degree of consolidation density

- **More options**
  - Reference schemas (metadata and actual schema content)
    - Very valuable, once the devs move into a stage where they require actual data.
    - Saves our DBAs from all those tedious export/import jobs.
  - Empty schemas



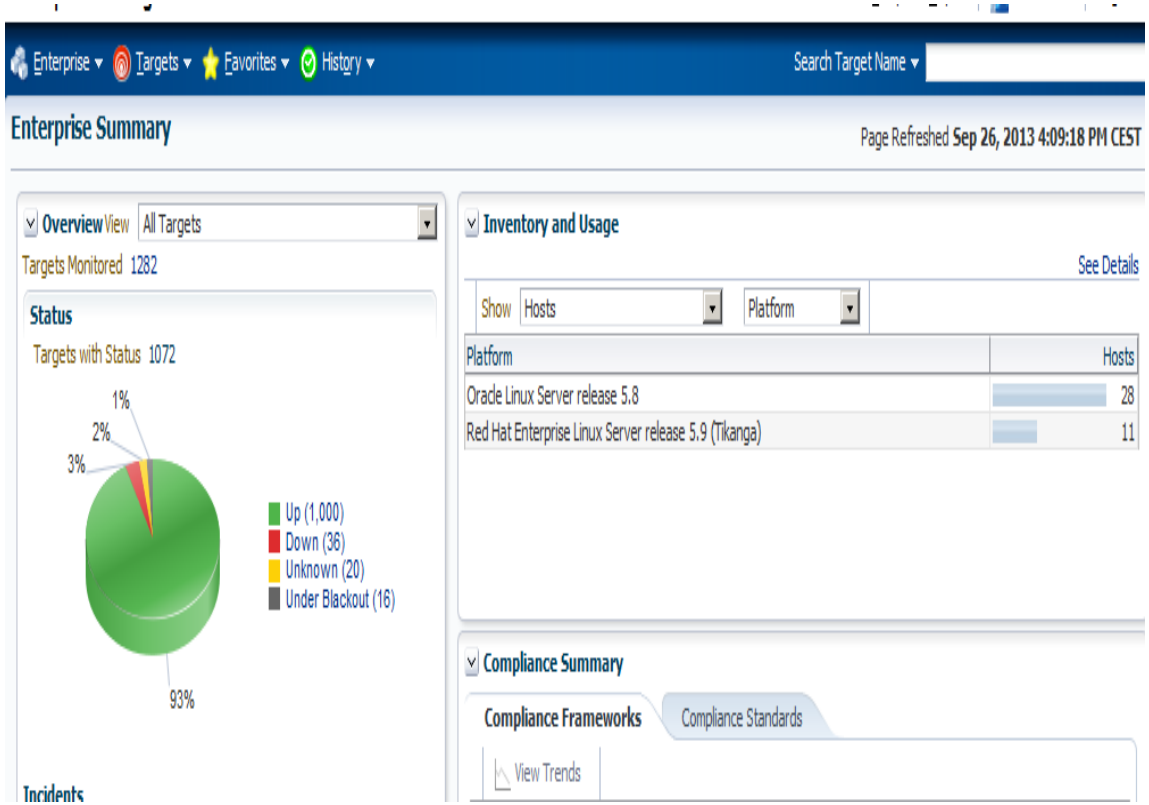
Change of focus

- Time previously spent on provisioning and data movement is now put to better use

  - **Running backup and restore tests**
  - **Assist dev teams with performance tuning**
  - **Applying patches and performing upgrades**
  - **Early on involvement in new projects**

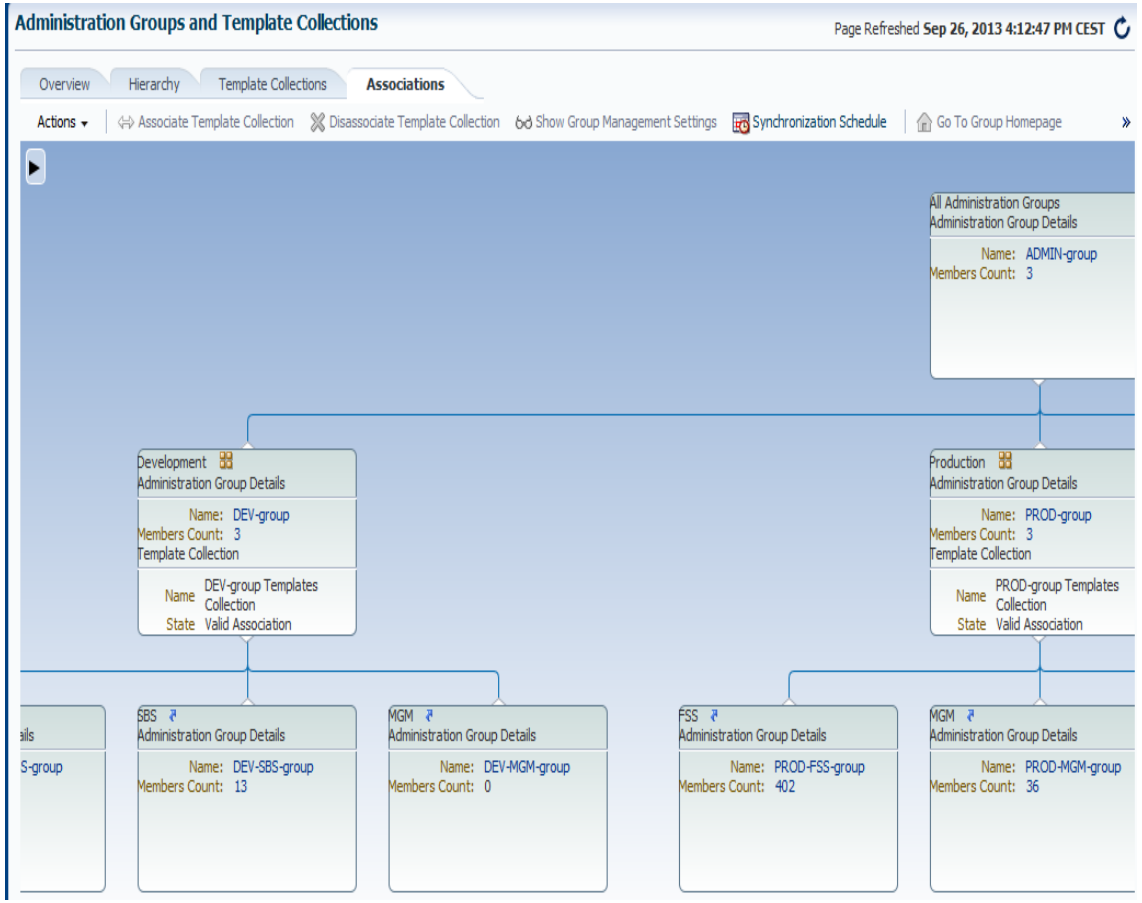
Monitoring & notifications

- EM is used to monitor all components
  - Servers
  - Exadata
  - Databases
  - Storage
  - Listeners
  - Applications
  - Jobs
- Integrated with central support systems (Remedy, HP insight manager)



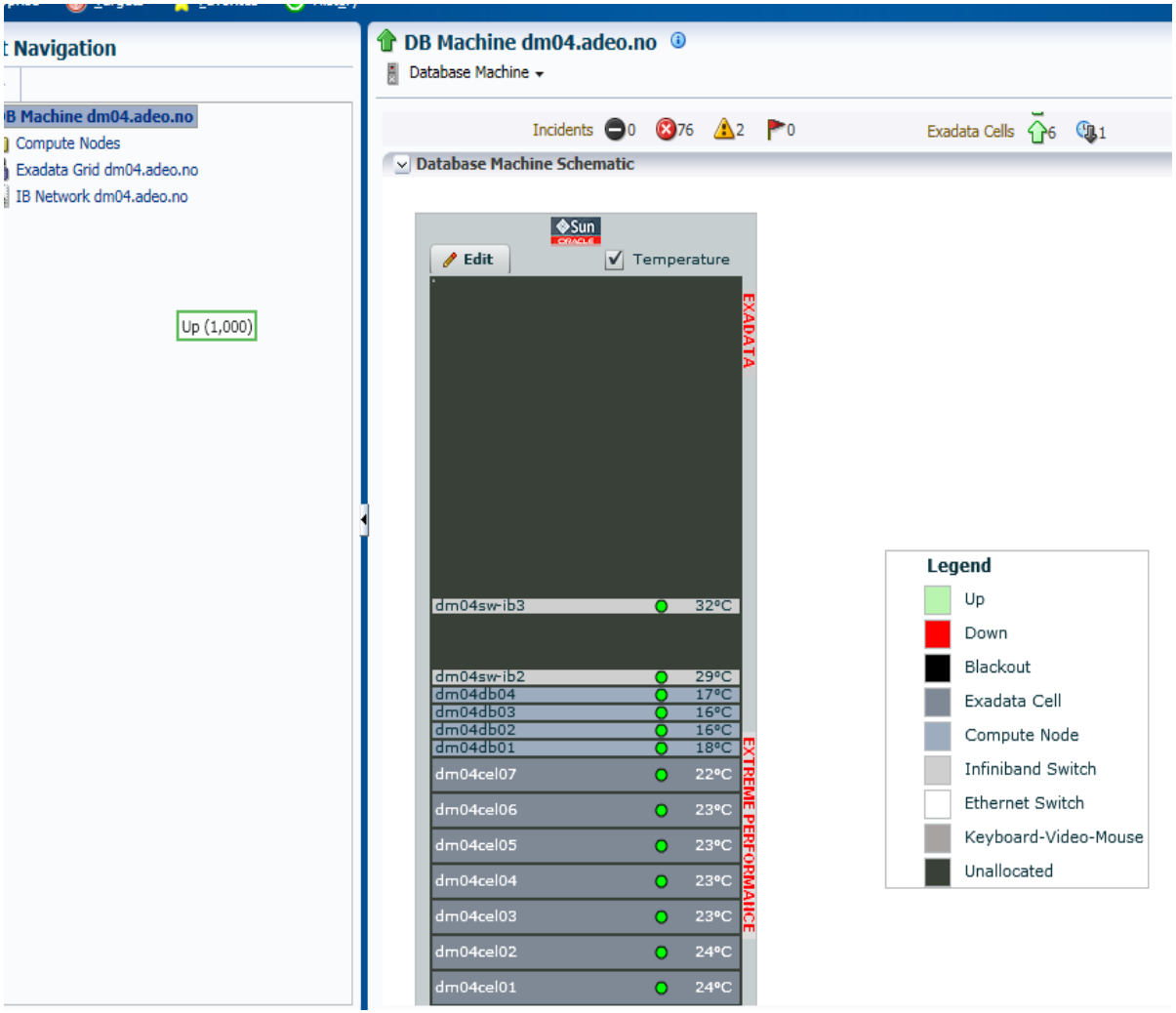
Monitoring & notifications

- Vast improvements and ease of use from previous EM versions
  - Administration groups
  - Monitoring templates
  - Template collections
- Central setup, automatic configuration for new components
  - Add required config and a target enrols itself into correct group.



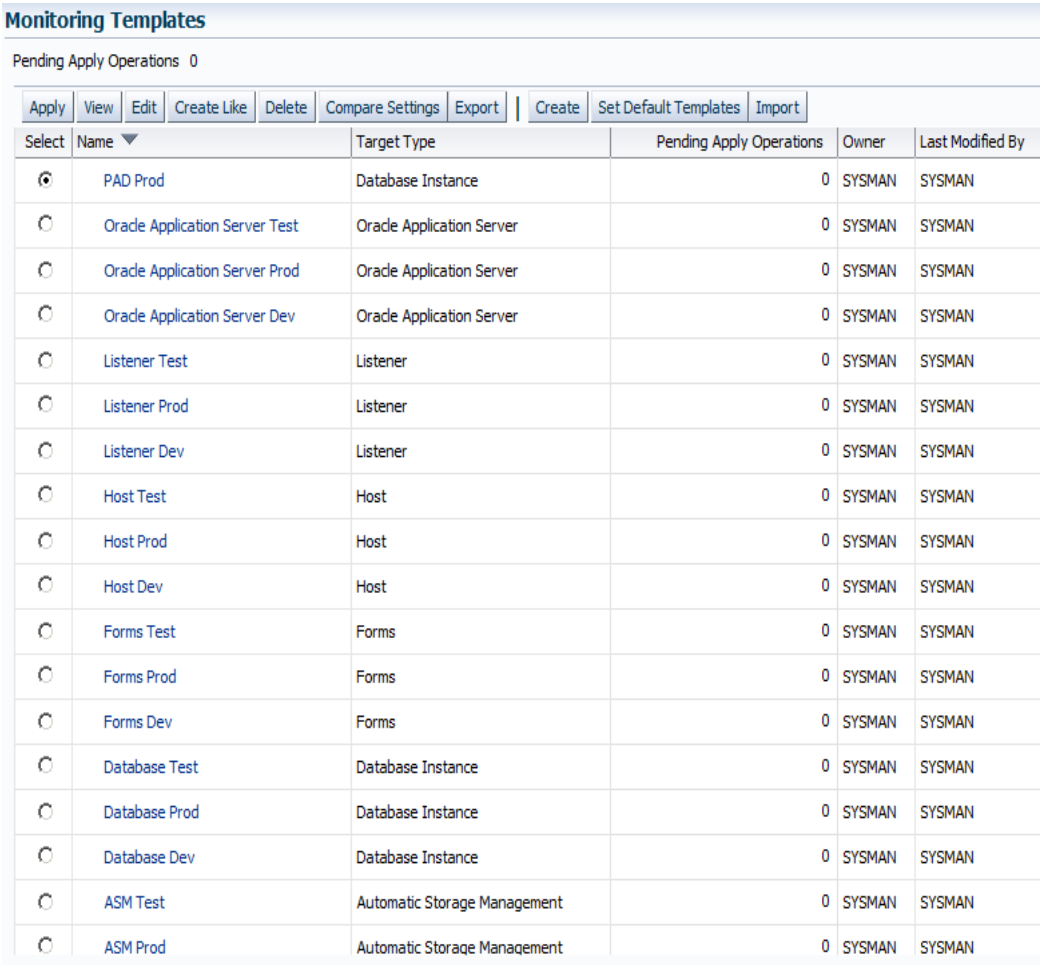
Engineered systems

- Central administration
- Performance monitoring
- Components check



Administration

- Database administration
- ASM
- Applications
- Jobs
  - Backups
  - Scripts



Monitoring Templates

Pending Apply Operations 0

Apply | View | Edit | Create Like | Delete | Compare Settings | Export | Create | Set Default Templates | Import

Select	Name	Target Type	Pending Apply Operations	Owner	Last Modified By
◉	PAD Prod	Database Instance	0	SYSMAN	SYSMAN
○	Oracle Application Server Test	Oracle Application Server	0	SYSMAN	SYSMAN
○	Oracle Application Server Prod	Oracle Application Server	0	SYSMAN	SYSMAN
○	Oracle Application Server Dev	Oracle Application Server	0	SYSMAN	SYSMAN
○	Listener Test	Listener	0	SYSMAN	SYSMAN
○	Listener Prod	Listener	0	SYSMAN	SYSMAN
○	Listener Dev	Listener	0	SYSMAN	SYSMAN
○	Host Test	Host	0	SYSMAN	SYSMAN
○	Host Prod	Host	0	SYSMAN	SYSMAN
○	Host Dev	Host	0	SYSMAN	SYSMAN
○	Forms Test	Forms	0	SYSMAN	SYSMAN
○	Forms Prod	Forms	0	SYSMAN	SYSMAN
○	Forms Dev	Forms	0	SYSMAN	SYSMAN
○	Database Test	Database Instance	0	SYSMAN	SYSMAN
○	Database Prod	Database Instance	0	SYSMAN	SYSMAN
○	Database Dev	Database Instance	0	SYSMAN	SYSMAN
○	ASM Test	Automatic Storage Management	0	SYSMAN	SYSMAN
○	ASM Prod	Automatic Storage Management	0	SYSMAN	SYSMAN

Future

- What we have done for the developers we will also do for ourselves ☺
  - November 2013 all production databases will be cloud generated.

- Work further with the charge plan, adding more variables (electricity, housing).
- Integrate BI Publisher (for added reporting options)
- Upgrade to release 3

Q & A