

## **iBOX infrastructure development**

### **Existing information and Decisions made:**

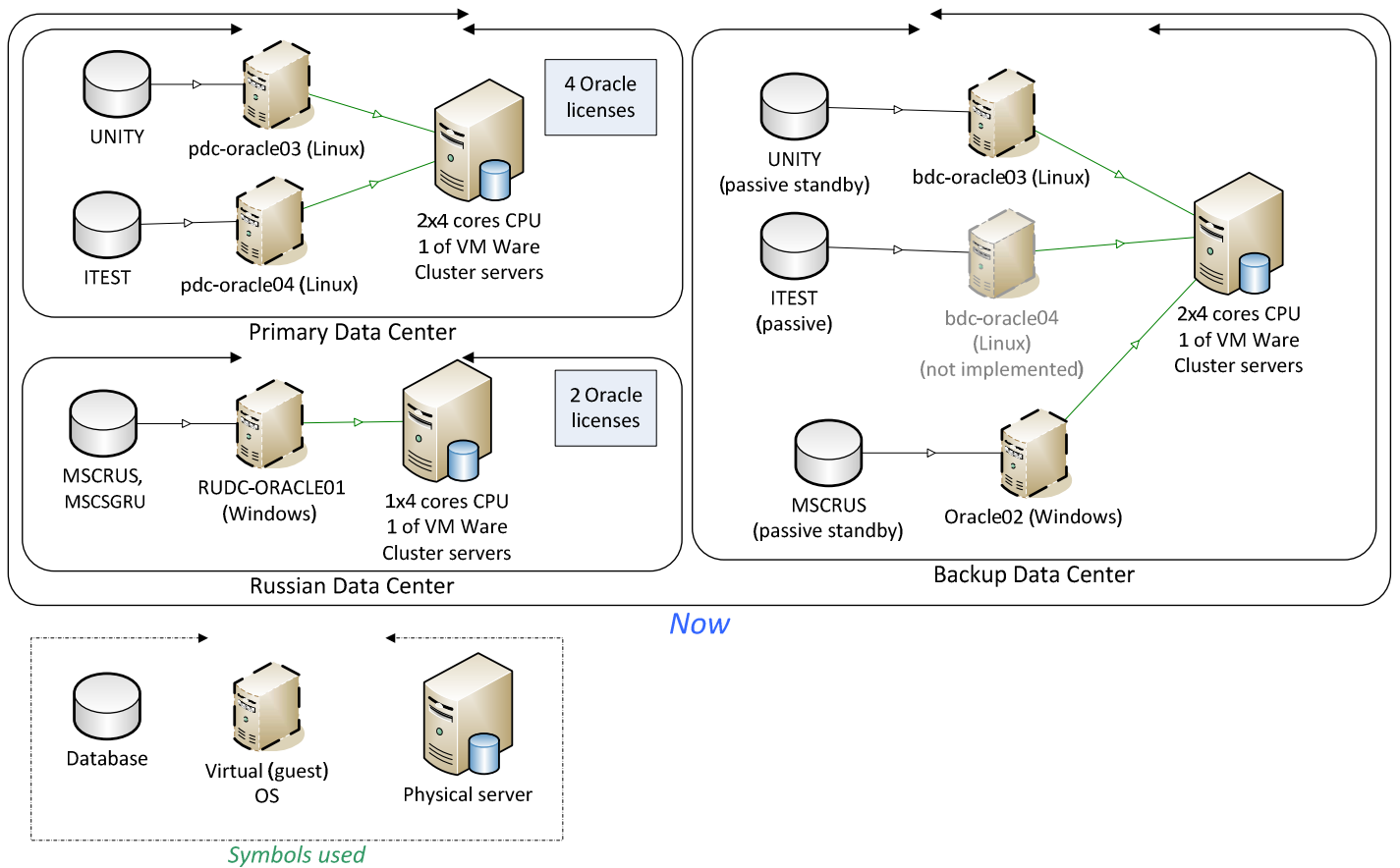
1. At present we have no real workload statistics no formula how to calculate and estimate iBox future workload for whole MSC and order final hardware suitable for good performance:
  - a. Every system have business specific.
  - b. Assumption 150 users per node (without any other info how this 150 users calculated) have no real base for proper Capacity planning (with RAC or not).
2. So we are going to split migration to iBox to 2 phases:
  - a. iBox pilot project – when we start using iBox in 1-2 agencies and collect workload statistics at Database (DB) and Operating System (OS) levels and use it to estimate resource requirements and technical architecture for iBOX with ALL other agencies.
  - b. Final phase A - other 2 (3,4) EU agencies starts using iBox – for now supposed to run for about 2 years before left agencies will migrate to iBOX
  - c. Final phase B – all other (smaller) agencies will migrate to iBOX
3. All agencies are switched to use iBOX one by one while remained still use ShipIT
  - a. This allows minimizing risks if something will not be OK (including performance) – problem will impact less number of agencies.
  - b. This will minimize impact to business – to every agency will have enough time for learning new system and implement required changes to business processes
4. From technical point of view there are no constraints/requirements to use Oracle Real Application Cluster (RAC) and/or Oracle Data Guard for providing performance, scalability or high availability. All this options (quite expensive) are just recommendations by iBOX team (as their best practice) and final decision whether to use it will be taken after Pilot phase.

At present moment we are using home made scripts and network configuration to have offline physical StandBy database at Backup Data Centre (BDC). This is enough to provide required availability (per now – minimum downtime up to 2 hours is allowed). Similar solution could be applied to iBOX database too.
5. For Pilot phase existing hardware will be used (Blade server with 2\*4 Core CPU - old management server which now is not in active use and existing systems can be relocated).
6. Pilot phase should go for at most 90 days to keep in order licensing limits while we really will use more CPU then licences obtained (Note: we have not official Oracle approval for this yet!).
7. During pilot phase – all servers in production will be duplicated by virtual servers in Backup Data Centre (this will save money+time).
8. If project will decide to upgrade to 10g/11g for ShipIT database - we should prepare test scenario to test iBOX 10g+ database running on Linux OS in virtual server under VM Ware.

9. While agencies will migrate to iBox (one by one) resource usage in iBOX system will increase, but in ShipIT will decrease. All agencies migration will take more than 90 days, so we have to licence iBOX server CPU as well as ShipIT.
- a. To minimize amount of required Oracle licences – ShipIT database will migrate to new physical server with 2\*2-Core CPU (= 4 Cores, which for Intel (non-Itanium) platform require 2 CPU Oracle licences) – which is enough for current workload (all agencies)
  - b. It will be possible to physically switch off one CPU when 90 days for transition phase licences will expire and we have to minimize total number of licences (and CPU cores) in use.
  - c. It is decided to do such migration before iBOX deployments starts (so in 2011)
    - i. If we will experience any problems on new hardware – more experts (DBA, developers, MSC) will be available for fix or improvements.
    - ii. To allow to concentrate on iBOX actions and minimize switching to ShipIT support.
  - d. For this purpose – new server (2\*2-Core CPU instead of present 2\*4-Core CPU) is ordered for use by ShipIT.
  - e. There are two options exists for new server:
    - i. Linux OS will be installed to physical server without use of virtualisation solution and run both UNITY (production) and ITEST (testing) in the same environment. This is not good from security and probable concurrency for resources, but will eliminate virtualisation management overhead.
    - ii. Linux OS for each database (UNITY and ITEST) will be installed as guest OS under VM Ware as we have now. This allows to limit testing environment to avoid significant impact on production.
- Last Update:** We found no suitable solution to isolate ITEST from UNITY (main risk is: resources usage concurrency) in present version of RDBMS. So we still use VM Ware and have two virtual servers with Linux on board.
- f. Until we end the transition phase (90 days) and ShipIT should migrate to new server, new server can be used for ShipIT DB test of upgrade to 10g/11g and/or usage of Cost Based Optimizer (CBO):
    - i. We may go to 10g/11g + CBO for many reasons including support, performance, new features, security.
    - ii. It is good opportunity to test all this on real hardware will be used for production
    - iii. We should take care of non-licensing is limited to 10 days (240 hours) in a year.

## Present TA

For now we have the following Technical Architecture (without external interfaces):



Now

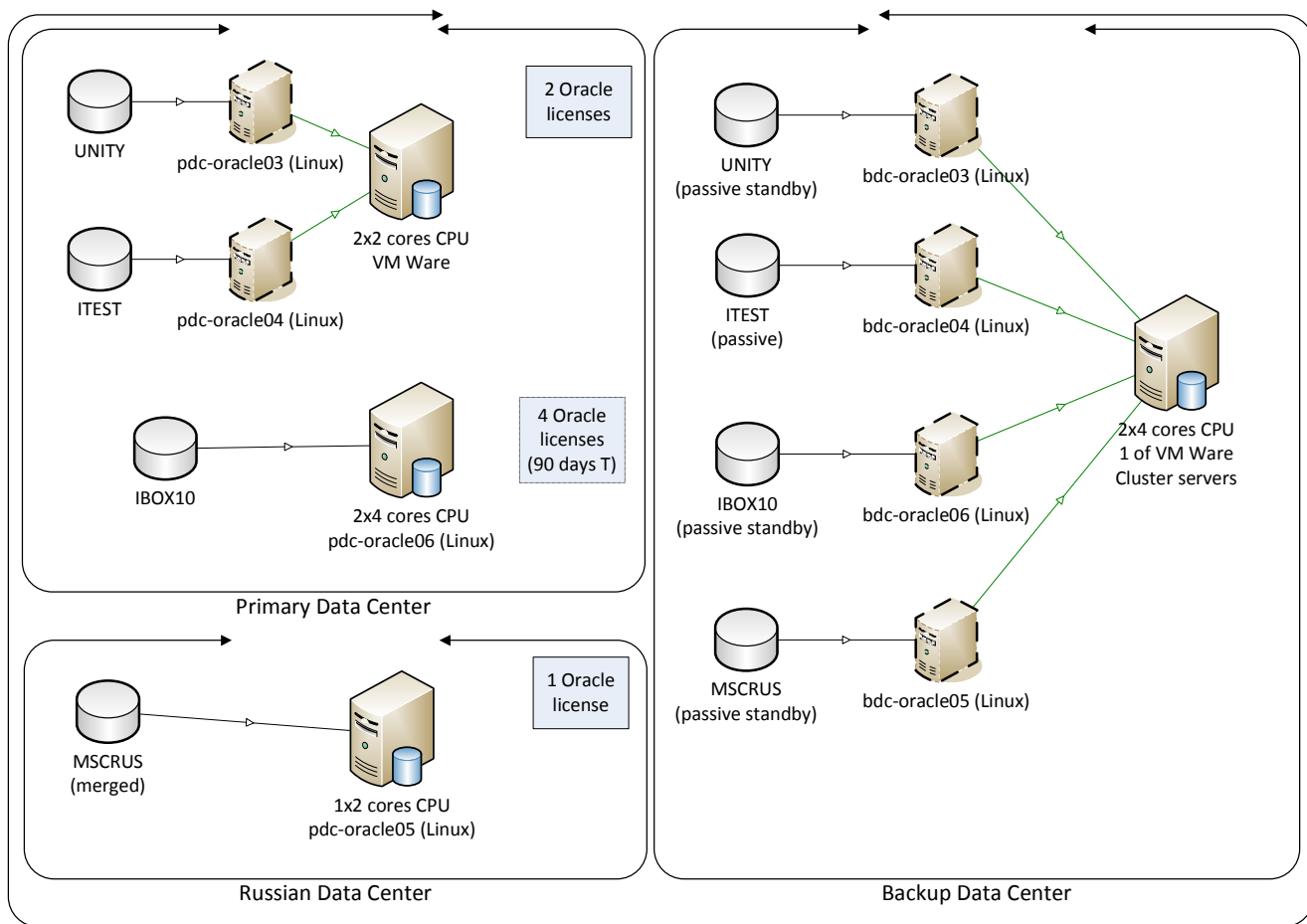
## iBOX Pilot phase

### Step 0 – Preparation for iBOX implementation (dates – from: ???.?.2011 to: ???.?.2011 )

iBOX	ShipIT
<p><b>Prepare iBOX environment for 1<sup>st</sup> Agency</b></p> <ol style="list-style-type: none"> <li>1) Buy 16GB ram to existing 2 CPU blade will be used for iBOX Pilot (MSC)</li> <li>2) Deploy Linux (MSC, DBA)</li> <li>3) Deploy Oracle (+ one-node RAC if required) (IBOX)</li> <li>4) Deploy client (full set of working forms and reports – we should test all possible configuration issues, including NLS) (MSC,DBA,iBOX)</li> <li>5) Deploy other servers – reporting server, forms/web server according to iBOX instructions (MSC,DBA,iBOX)</li> <li>6) Do data transfer/conversion from ShipIT if required (iBOX,MSC,DBA,EBIT)</li> <li>7) Configure and test backup and recovery (MSC,DBA)</li> <li>8) Design and test DRP (MSC,DBA) (with/without Oracle DataGuard)</li> <li>9) Do users education (MSC, iBOX)</li> <li>10) Do all possible tests of iBOX app (MSC, iBOX, DBA)</li> </ol>	<p><b>A) MSCNOVO + MSCRUS merge and migration to Linux</b></p> <ol style="list-style-type: none"> <li>1) Order new server (1*2 CPU) (MSC)</li> <li>2) Test Merge MSCSGRU with MSCRUS on Windows (DBA,EBIT, MSC)</li> <li>3) Production Merge MSCSGRU with MSCRUS on Windows (DBA,EBIT, MSC)</li> <li>4) Deploy Linux + Oracle (MSC, DBA) after new server will arrive.</li> <li>5) Test MSCRUS migration to Linux (DBA,EBIT, MSC) (exp+imp)</li> <li>6) Do MSCRUS migration to Linux (DBA,EBIT, MSC)</li> </ol> <p><b>B) UNITY + ITEST migration to new server</b></p> <ol style="list-style-type: none"> <li>1) Prepare for migration <ol style="list-style-type: none"> <li>a. Order new server (2*2 CPU) for ShipIT UNITY + ITEST db (MSC)</li> <li>b. Setup VM Ware</li> <li>c. Setup Linux + Oracle (MSC, DBA) + migrate test database (ITEST) (DBA)</li> <li>or</li> <li>d. Migrate existing virtual server (pdc-oracle04) to new host by VM Ware tools (MSC)</li> </ol> </li> <li>2) Test ShipIT on new server (MSC, EBIT)</li> <li>3) Migrate ShipIT production on new server (MSC,DBA,EBIT) <ol style="list-style-type: none"> <li>a. Migrate production db to new server</li> <li>b. Monitor performance, tune code.</li> </ol> </li> </ol>

#### Optional components can be used at this step:

1. Install and use or not use Oracle RAC option for iBOX
  - a. Selva recommend it – at least to install before go Pilot of 1<sup>st</sup> agencies, additional installation and re-configuration with live database in-place may raise problems: DB/OS downtime/restart may be required for Oracle Clustering software installation (if something missed on server prepare phase on any onther unexpected problems may arise).
  - b. Extra cost: Oracle RAC licenses
2. Make use of Oracle Data Guard instead of custom scripts to provide StandBy database in BDC.
  - a. Probably more stable and convenient + have support from Oracle
  - b. Extra Costs:
    - i. StandBy Database should be licensed (because it should be always up in mount mode)
    - ii. DataGuard software should be licensed



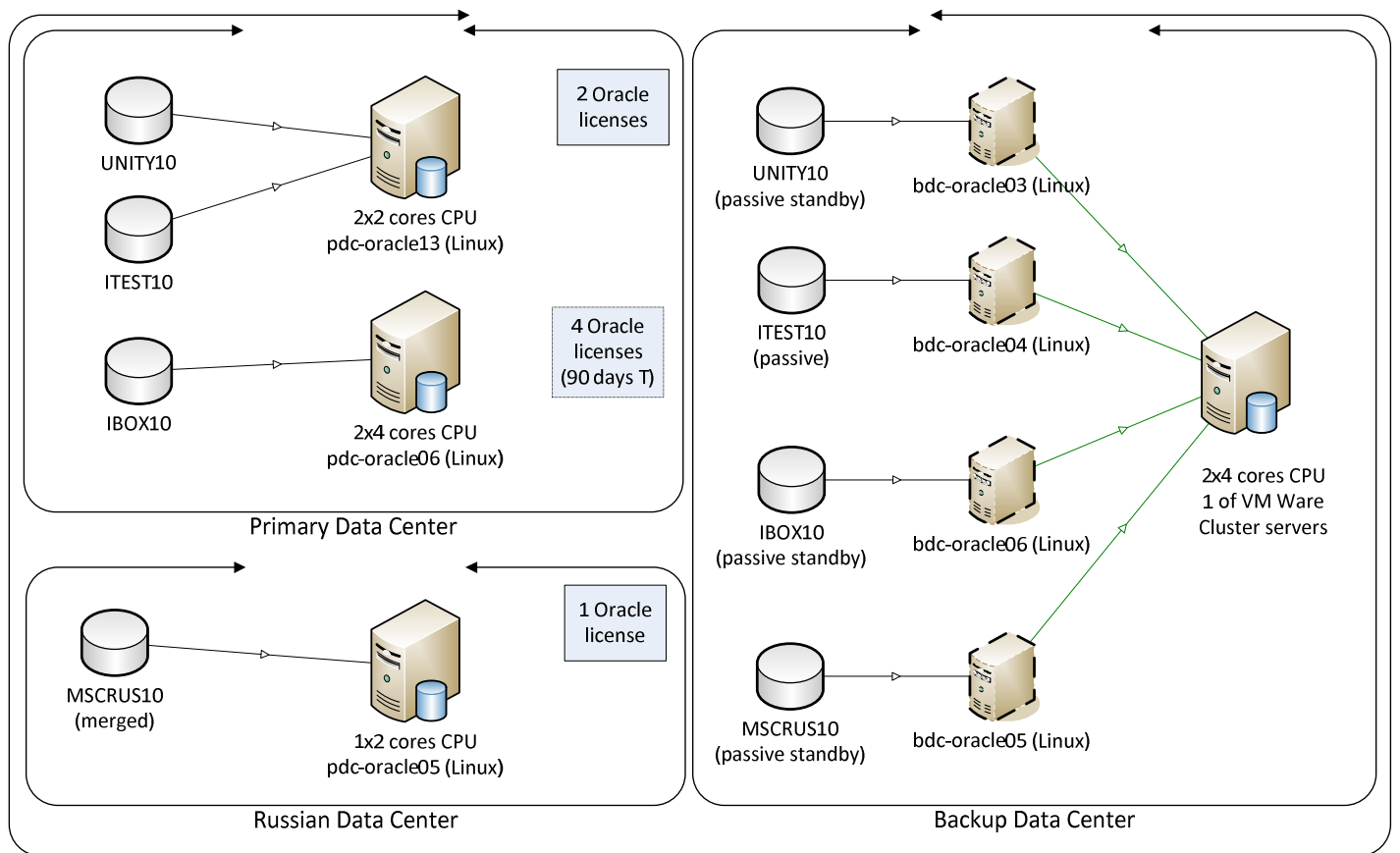
*iBox Pilot – option 1 (ShipIT-9i+vm)*

There are still options for ShiptIT after migration to the new server:

- Use of Cost Based Optimizer (RBO still used in ShipIT)
- Upgrade UNITY, ITEST, MSCRUS databases up to 10g version (11g not supported for Forms 6i)

These decisions are out of iBOX project scope, but should be taken into account:

- will require additional action plan and proper testing (DBA, EBIT, MSC)
- should be planned for time period before or after Pilot phase of iBOX
- Possible TA for this case is shown on schema:



*iBox Pilot – option 2 (ShipIT-10g+noVM)*

## Step 1 – Pilot start with 1<sup>st</sup> agency (dates – from: ???.?.2012 to: ???.?.2012 )

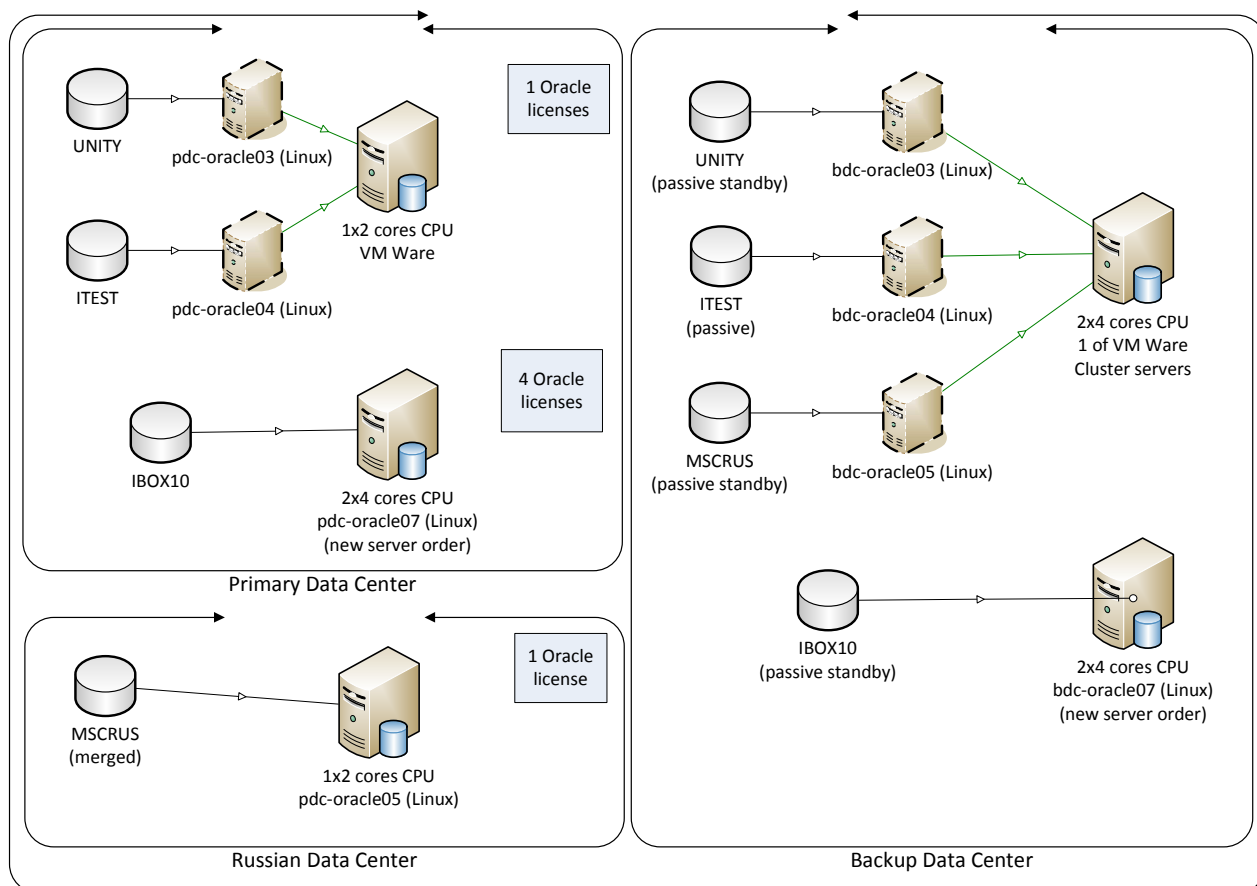
iBOX	ShipIT
<ol style="list-style-type: none"> <li>1) Migrate 1st agency to iBox (MSC, iBOX, DBA)</li> <li>2) Gather performance statistics trying to perform all business operations (DBA, MSC)</li> </ol>	<ol style="list-style-type: none"> <li>1) Collect workload changes information to evaluate agency impact</li> </ol>

## Step 2 – Pilot continue with 2<sup>nd</sup> agency (dates – from: ???.?.2012 to: ???.?.2012 )

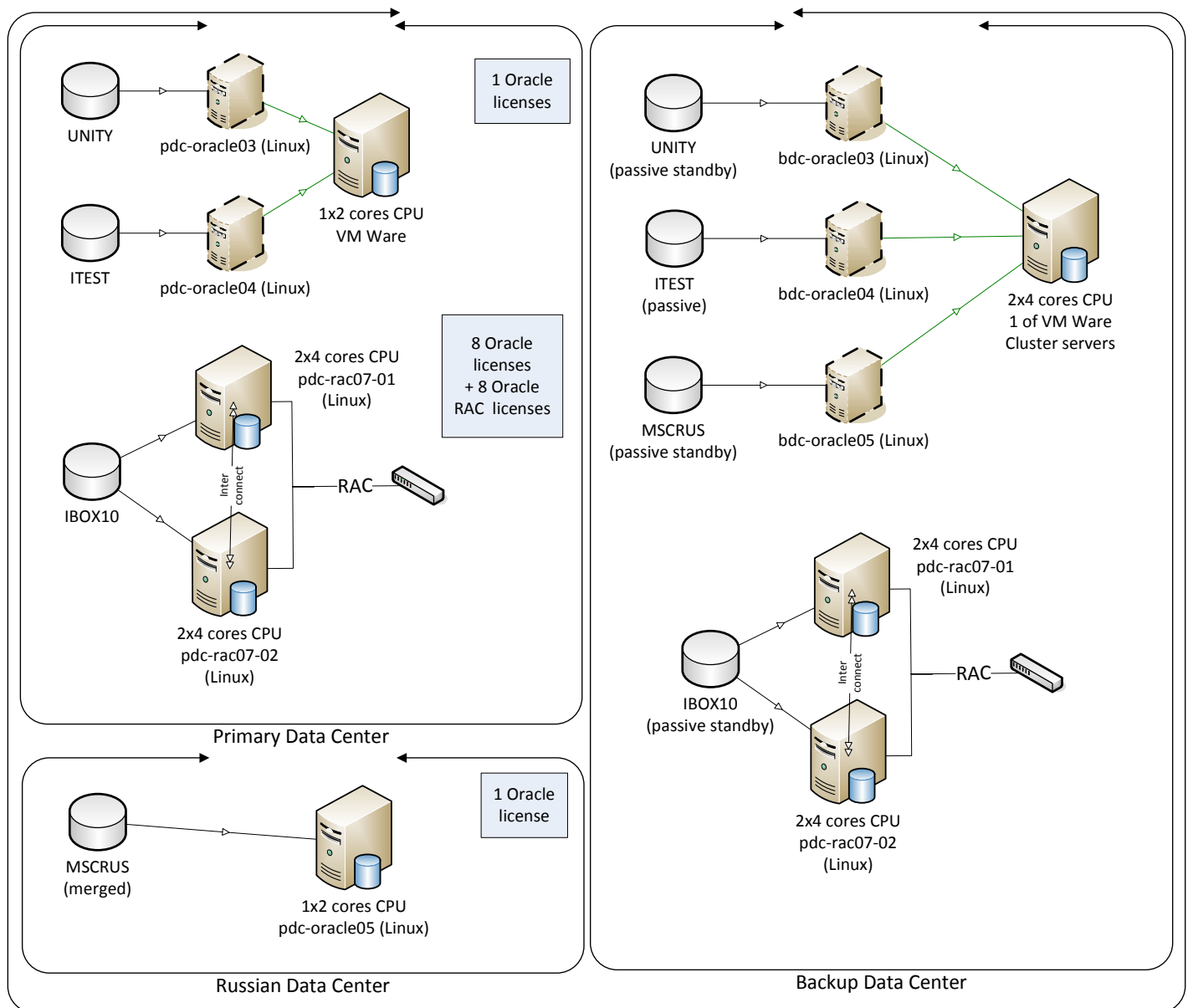
<ol style="list-style-type: none"> <li>1) Migrate 2nd agency to iBox (MSC, iBOX, DBA)</li> <li>2) Gather performance statistics trying to perform all business operations (DBA, MSC)</li> <li>3) Calculate/estimate how many CPU, RAM do we need and timeline for servers and licenses purchasing (decide cash flow) (DBA, MSC)</li> </ol>	<ol style="list-style-type: none"> <li>1) Collect workload changes information to evaluate agency impact</li> <li>2) Evaluate CPU capacity required for remaining agencies</li> <li>3) Switch off 1 of 2 CPU if 1*2 Core CPU capacity will be enough</li> </ol>
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- We should in some way to evaluate each agency relative impact to workload/performance to calculate/estimate required CPU+RAM:
  - For Agencies left on ShipIT system to be able reduce number of CPU used
  - For iBOX (with 4 agencies migrated) to order HW and develop TA for next 2 years
  - For iBOX (with all agencies migrated) to order HW and develop TA for next years.
- Depending on workload and performance information obtained during Pilot phase of migration to iBOX – further technical architecture and hardware required will be designed.
- As well as milestones when 3<sup>rd</sup> and 4<sup>th</sup> European agencies will go to iBOX.

After end of this steps possible TA options are shown on schemas below. Other options also possible and final solution will be designed based on Pilot phase results (from stability and performance point of view).



iBox Final – option 1 (no-RAC)



*iBox Final – option 2 (2 nodes RAC)*

To select the right final TA the following factors should be taken into consideration:

- Required and provided Availability
- Required and provided Performance
- Scalability requirements - ability if required to add capacity to the system by just adding new resources (servers, or just components: RAM, CPU, Network interface, etc.)
- Cost of hardware required
- Cost of software required (at once and as annual technical support fee)
- Setup costs (including installation, setup, backup/recovery setup + tests, DRP tests, monitoring setup)
- Technical experts (MSC, DBA, IBOX) availability and costs of maintenance and support.
- Other factors/costs

20.10.2011

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