

DMAS Advisory Committee Report *and Response*
DRAFT
March 16/2009|April 21, 2009

This report was largely based on contributions made by the DMAS committee
Responses to the committee questions and recommendations are in *italicized blue*

DMAS Advisory Committee Meeting Members

Present (Advisory Board)

Bill St. Arnaud, Chief Research Officer, CANARIE, (Chair)
Bruce Spencer - Research Officer, Internet Logic, NRC Institute for Information Technology
Eric Tsang - Associate Director, Business Development, Communication Research Centre
Pierre Quesnel - Head, Systems and Networks Management, NRC Canada Institute for
Scientific and Technical Information

Those present from UVic

Martin Taylor - President & CEO, Ocean Networks Canada
Benoît Pirenne – Associate Director, Information Technology, NEPTUNE Canada
Mairi Best - Associate Director, Science, NEPTUNE Canada
Eric Guillemot - Manager, Software Development
Murray Leslie - Data Quality Control Specialist
Nic Scott – NEPTUNE Critical Systems Manager
Adrian Round – VENUS Project Manager

Overview

On December 10, 2009, the NEPTUNE DMAS committee was convened to review progress of the DMAS project and to discuss future options and issues with respect to security, commercialization, quality control and developing interfaces to Web 2.0 services and applications.

Overall the committee was impressed with the progress made on the DMAS system and NEPTUNE staff were able to address satisfactorily issues and concerns raised at the previous DMAS meeting.

Most of the discussion focused on security and future directions for DMAS with respect to commercialization and the recent CECR award and future funding prospects.

Specific Comments and Observations

1. The committee expressed concern about the ongoing operational costs at \$13m per year and the fact that funding runs out in 2010. Long term staff support for DMAS is estimated to be around 10 persons. The committee felt that this was the number one challenge facing NEPTUNE.

DMAS agrees with the comment made. Several scenarios have been put forward by the DMAS management. The minimalist, maintenance-only scheme calls for 3.5 FTE in the development area, 1 FTE in software QA and a complement of 4 operation staff on an on-going basis. This will only permit the maintenance of the existing system as installed. The committee should rest assured that, following the advice of the granting agencies and councils, we are continuously seeking novel avenues to secure not only the minimal staff complement but also to further our development capabilities so as to allow NEPTUNE Canada and VENUS to remain at the forefront of global scientific excellence. Those initiative in the management area include continued applications to funding agencies as well as involvement in commercial partnerships with the help and support of Ocean Networks Canada.

2. One suggestion made by the committee is that Ocean Networks Canada, in charge of the management of VENUS and NEPTUNE Canada, try to get out of CFI/NSERC funding process and negotiate directly with Industry Canada and become a special agency (4th pillar?) like CANARIE, STDC, AECL, ARC, etc and receive direct funding for ocean cable observatories. NEPTUNE Canada and VENUS are quite unique, and the first in the world, with the potential to create many industry and research spinoffs. Their infrastructure will be critical in understanding ocean-atmospheric issues with respect to climate change etc. To be treated like every other research project seeking funds from NSERC/CFI undermines their significance to Canada.

The ONC management agrees with this point of view and is following that direction but has to do so with the support of the granting councils.

3. The committee expressed some concerns about a business continuity plan, especially in the event of a major earthquake or tsunami from Cascadia fault. Although there is backup data stored at Herzberg the committee felt that plans should be made to have business continuity facilities and data backup at a much more distant location. NEPTUNE staff agreed to follow up with CISTI on their business continuity plan.

DMAS is grateful with Pierre Quesnel's CISTI continuity plan. We are currently pursuing actively the selection of a disaster recovery/backup site in the framework of our business continuity plan. Negotiations are currently on-going with WestGrid to get data hosting at the University of Saskatchewan and sufficient funds have been set aside to select an independent host, (a "GreenIT"-certified data centre) should the WestGrid route not be feasible. The secondary site should be in place by the time NEPTUNE Canada data starts to flow.

4. The committee members welcomed the idea of a small portable DMAS that could be used in other application areas and research initiatives. It might provide a small source of revenue.

We are indeed preparing to further develop and potentially embed it in commercial applications. See also the comment below under recommendation 7.

5. In terms of security the committee had a number of questions and concerns. NEPTUNE Canada staff said a security audit was done to Navy standards, but the committee asks if the recommendations of this audit been implemented? The committee also pointed out that security is not a snapshot done at software release but a continuous process along the entire path from coding, through testing,

configuration and deployment. While the software QC and version control seemed well done, the committee expressed concerns that not enough QC was being implemented at the configuration and deployment stage with the ability to do roll backs, automated check lists, etc. Also the committee raised concerns about QC testing in operation such as common attack profiles like buffer overflow , etc

The recommendations of the audit that took place at the time of the VENUS Data Diversion Switch (DDS) installation have been implemented. Another such audit will take place this summer at the occasion of the installation of NEPTUNE Canada's DDS at the shore station. Clearly, the Navy would not like us to leave a system open if they have concerns with it, so our intention is to implement any significant recommendations immediately and proceed next with other suggestions. On the QA/QC questions, DMAS will endeavour to include more security-related tests in our routine regression tests.

6. The committee was pleased with the work being developed on various Web 2.0 tools etc, but encouraged NEPTUNE staff to work on gadgets that plug into other Web 2.0 platforms, rather than building their own web 2.0 platform. For example NEPTUNE gadgets for Google Ocean will probably attract for more business to NEPTUNE, than trying to get users to come directly to a NEPTUNE 2.0 platform. There are also many web 2.0 platforms being built for science and education where NEPTUNE could build and install gadgets.

We are exploring ideas that would involve applications for the iPhone/iTouch platform or for sites such as Facebook to expose our functionality.

7. The committee discussed development using Agile approach and noted that is seen as too rigid due to increased code complexity and that code is compiled as one large application inhibiting modular development. It was noted that startup companies often encounter this issue as product matures and grows. It is probably too late in the development to change the DMAS architecture, but if staff at some future time had an opportunity to re-build from scratch this would be the recommended approach.

The development methodology is based on the Agile approach that has been adapted, as it is often the case, to the specific needs of the NEPTUNE project. This adaptation was necessary due to the small number, the lack of availability and the reluctance of "customers" to commit to requirements early on in a project that has never been attempted before.

The DMAS software architecture is a multi-tier architecture with a clear separation between layers. The DMAS software is written mainly in Java and uses as much as possible available libraries to speed up development time. While still a complex application, the DMAS software code base is relatively small with less than 2500 code files. This relatively small size code base seems to indicate that the point at which it is necessary to break up in multiple sub-projects/modules has not been reached.

In the future, the DMAS team will re-architect the entire system to better address the requirements of specific user communities for full feature standalone observatories. In this all-in-one system, the data acquisition and web based observatory management would be bundled together while all processing and distribution would be moved to the cloud. We believe this would be the perfect opportunity to follow your recommendation and improve the modularity of our system.

8. For data mining and indexing: Please have a look at the CISTI Lab Web site (http://lab.cisti-icist.nrc-cnrc.gc.ca/cistilabswiki/index.php/Synthese_Recommender)
9. The committee had a couple of questions of the applicability of NEPTUNE technology and expertise in terms of deploying telecom networks in the arctic and using the Wally sniffer robot for gas exploration. If nothing else NEPTUNE should at least promote itself in these areas in terms of its impact on broader commercialization opportunities.

This activity is currently on-going with reasonable chances of success. We will probably be able to report on this prospect at a subsequent DMAS Advisory Committee meeting.

10. There was a lot of discussion about commercialization and the award of the CECR funding in partnership with IBM. The committee still re-iterated its concerns about the distraction of commercialization of DMAS, but the committee was of the opinion that IBM partnership might allow NEPTUNE to market the DMAS to other cable observatories around the world, particularly OOI in the USA.

Conversations with IBM have been on-going since the DAC meeting took place last December. At the time of this writing, IBM have made it clear that they are not interested in the use or integration of DMAS technologies in their products but would rather have ONC/NEPTUNE/VENUS/DMAS use the InfoSphere Streams product (the new name of System S). A possible application field that was identified here was the use of IBM's iMars automatic video feature detection. This free software is integrated into System S and can be trained to recognize objects that would appear in the field of view of underwater cameras. IBM are expecting to contribute the "adapters" that would feed our video data into System S and would expect ONC to contribute the funds necessary to support the resource-intensive training of this software. ONC would benefit by getting an adapted version of the IBM video detection software and IBM would benefit from the training set that would have been developed.

Note: Following the committee meeting Bill St Arnaud had follow on discussions with IBM and Martin Taylor about some potential commercialization models. One possibility that was suggested is to allow forking of data from the various instruments and sensors and send the forked data stream to IBM System S. IBM Systems S could also be deployed on a follow the wind/follow the sun infrastructure which would make the initiative eligible to apply to CANARIE's Green IT pilot and Big Green initiative within IBM. This would allow parallel development of both DMAS and System S. Users of NEPTUNE would be encouraged to use either DMAS or System S for data acquisition and analysis. Also the System S may allow for a much more distributed and modular SOA architecture less dependent on ESB

Conversations with IBM in this area have indicated that in the current business climate, IBM have ample data centre capacity in Canada and are not planning to immediately invest in new data centre. So they may try to improve the efficiency of their existing compute power but not necessarily reduce their overall carbon footprint.