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| Director, Radiocommunication Bureau |
| the radiocommunication bureau and cloud computing |

# ****1 Background****

**Cloud computing is the current emerging computing paradigm, Internet-based, where shared resources, software and information are provided on demand.** Cloud computing speeds and streamlines application deployment without upfront capital costs for servers and storage. For this reason, many enterprises, governments and network/service providers are now considering adopting cloud computing to provide more efficient and cost effective network services.

The UN system strategic framework for more harmonized, efficient, green and economical ICTs, approved in New York in August 2013 mentions that Cloud Computing has the potential to assist UN agencies in achieving continued innovation, enhance integration and interoperability, driving efficiency and effectiveness and practicing lean ICT through best practices. In particular it is mentioned that “*cloud Software-as-a-Service, Infrastructure-as-a-Service, and Platform-as-a-Service offerings can provide immediate benefits to harmonization as well as cost containment”.*

# ****2 BR computing needs****

The BR focused in the past years on acquiring experience in the development and usage of distributed computing techniques for the following reasons:

• The need to prepare for future events (e.g. Regional/Worldwide Radiocommunication Conferences) which may require very high computing power and capabilities[[1]](#footnote-1).

• The need to speed up calculations during BR regular activity in order to meet its statutory obligations for daily processing of space and terrestrial radio service notices.

• The will to offer more and more online services to the membership[[2]](#footnote-2).

Along those lines, the BR proposed to the ITU Information and Communication Technology Committee (ICTC) a pilot-project to investigate the potentials of Cloud Computing. The ICTC approved on November 2011 the BR project, which lasted from September 2012 to December 2013.

# 3 BR pilot-project in Cloud Computing

The main goal of the project was to study the challenges of integrating ITU’s on-premises computing facilities with cloud resources, with particular considerations for scalability, data confidentiality and security issues, in cooperation with the ITU IS Department.

The BR team investigated in particular to what extent the security and confidentiality of data handled by the BR may be affected by cloud computing if it were to be used, and what sort of data handled by the BR may be suitable for such computing, taken in consideration the high degree of sensitivity of some of these data associated to membership spectrum rights.

To spread the knowledge across the organization a project team was established comprising BR staff which use different software tools. Being able to run such diverse software on the cloud leveraged this expertise at the organization level.

The project explored all Cloud Computing service models: Infrastructure-as-a-Service (IaaS), Platform-as-a-Service (PaaS) and Software-as-a-Service (SaaS).

The architecture design of BR pilot solutions was driven by the will to satisfy the following needs identified during system analysis:

***• Security and confidentiality***: data protection as good as current protection in the ITU infrastructure and compliance with current IS security settings.

***• Availability***: at least as good as the availability of the ITU infrastructure.

***• Performance***: peak workload can be managed more efficiently comparing to the limited resources available on-premises.

***• Usability***: the system can be deployed and removed in a simple way. System scalability can be achieved through changes in configuration information. The system can be fully automated and made transparent to the end-user, who does not need to have specific knowledge of Cloud Computing for operating the system.

The BR team experimented with the GE06L coordination examination (PaaS) and the propagation prediction calculations using Recommendation ITU-R P.1812 (IaaS and PaaS) implementing hybrid architectures, where cloud resources are integrated with on-premises resources hosting sensitive data.

The BR team also experimented with power flux-density calculation, used in the Space Services Department to evaluate the compatibility between services in the planned and non-planned bands, in a “pure cloud” IaaS solution.

The quality targets of the above-mentioned implemented systems have been analysed and are considered satisfactory. The systems have been constructed without the need to modify the existing ITU infrastructure and security settings.

# 4 Conclusion

Given the growing importance and pervasiveness of Cloud Computing and the ever more complex BR computing needs, it is necessary that enough knowledge and expertise on the use of this technique be developed.

RAG is invited to provide advice on the approach adopted by the BR on this subject.

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1. For example, during the RRC-06, the BR had to deploy a 100 PC farm and use the EGEE Grid in a [joint venture](http://arxiv.org/abs/0906.2143) with CERN. [↑](#footnote-ref-1)
2. The BR is already offering online tools for broadcasting services ([eBCD 2.0](http://www.itu.int/ITU-R/terrestrial/broadcast/software/eBCD/PortalBroadcastingServices.pdf)) [↑](#footnote-ref-2)