



Université Nazi BONI

Laboratoire d'Analyse de Mathématique Discrète et Informatique (LAMDI)

Équipe de Recherche Informatique pour le Développement Durable (ERI2D)

Mini-Symposium de Recherche en Informatique – Bobo-Dioulasso, Novembre 2018

Résumés des travaux

Résumé 1 :

Title : An enhanced Moodle-based Learning Management System to account for low bandwidths.

Authors : Tiguiane Yélérou, Borlli Michel Jonas Somé, Wilfried Kiélem

University Nazi BONI,

Email : tyelemou@univ-bobo.bf, sborlli@gmail.com, wad_kielem@yahoo.fr

Abstract : Since 2012, at Nazi BONI University (NBU), as in many other universities in West Africa, academic years overlap. In large classes (more than 1000 students), the lack of on-site teachers and classrooms to run several tutorial groups in parallel means that pedagogical activities of an academic year go on for more than 18 months. Integration of ICT in education can contribute significantly to solving the problem. We propose a technical solution that takes into account the narrowness of the bandwidth of Internet access (actually 2 Mbps).

We strengthen the capacities of the NBU in IT resources and optimize their use. In this sense, we are making the intranet functional where Learning Management System (LMS) servers can be accessed with a throughput of at least 10 Mbps from all university sites, including university residences. Optimal exploitation techniques of the Internet resource have been applied. We have conducted a thorough analysis of the causes of slow loading of pedagogical resources and learning activities and we propose technical solutions to alleviate the LMS Moodle. Thereby, on average, we managed to halve the loading time of this platform's resources. Even actors in areas with only 2G technology can interact with the platform.

Keywords : Learning Management System, Moodle re-engineering, context of narrowness bandwidth.

Résumé 2 :

Title : Prospect of Reduction of the GreenHouse Gas Emission by ICT in Africa

Authors : Telesphore TIENDREBEOGO, University Nazi BONI

Email : telesphor_1@yahoo.fr

Abstract : In recent year, reducing global warming is becoming one of the most challenging research topics in Information and Communication Technologies (ICTs) because of the overwhelming utilization of electronic devices and of petroleum products.

Current solutions mainly focus on energy efficiency for saving power consumption by virtual machine consolidation on one hand, and on the other hand, by the minimization of the consumption of petroleum products through Teleservices. The latter that must be used via data center whose we try to reduce energy consumption.

In this paper, we propose a dynamic consolidation method of virtual machines (VMs) using the alive migration and the switching of nodes idle and allowing to the suppliers of Cloud to optimize the use of the resource and to reduce the energy consumption. Furthermore, we show how Teleservices can participate in the reduction of the emissions of greenhouse gases in Africa.

Keywords : Global Warming, ICT, Petroleum products, Data center, Consolidation, Teleservices, Carbone Dioxide, Virtual machine.

Projet 3 :

Title : Evaluation d'un système de certification électronique des causes médicales de décès au CHU Souro Sanou de Bobo-Dioulasso à l'aide du coefficient Kappa.

Authors : Seydou Golo Barro¹, JC Dufour², P Staccini³,

1. Université Nazi BONI, Email : seydou_golo@yahoo.fr

2. SESSTIM UMR 912, AMU ,

3. Université de Nice.

Abstract : Un système électronique d'enregistrement des causes médicales de décès a été développé et expérimenté au CHUSS de Bobo-Dioulasso en 2015. Le travail avait pour objectif d'étudier la qualité et la reproductivité du système par la méthode d'analyse de concordance, en mesurant le degré d'accord entre le médecin certificateur (juge A) et le médecin expert (juge B) dans la détermination de la cause initiale du décès.

Les experts étaient des médecins spécialistes sélectionnés par tirage au sort et formés à la démarche de certification des causes de décès au même titre que les médecins certificateurs habituels. Les informations ont été collectées à partir d'un échantillon de 115 dossiers de patients décédés en 2016, choisis de façon aléatoire et dont la certification de routine avait déjà été effectuée. Nous avons utilisé la grille de lecture de Landis et Koch et la concordance entre "juge A" et "juge B" a été analysée à l'aide du coefficient de Kappa de Cohen.

Les résultats de l'évaluation ont montré un accord de concordance «Très bon» entre Expert et certificateur avec un $K = 0,917$ [0.856 - 0.963]. Cet accord est passé «Médiocre» ($K = 0,327$ [0.247-0.419]) lorsque l'on utilise le logiciel codeur recommandé par l'OMS.

L'analyse de la concordance semble une technique efficace dans les études de reproductibilité et de concordance de méthode de mesure. Elle pourrait être recommandée dans l'évaluation de la qualité des soins dans nos hôpitaux.

Projet 4 :

Title : Toward an integrated framework for multi-dimensional and multi-scale simulation of agro-ecosystem

Authors : Mahamadou Belem, Université Nazi Boni, Bobo-Dioulasso, Burkina Faso

Email : mahamadou.belem@gmail.com

Abstract : This paper provides the description of the first step of development of an integrated platform for agro-ecosystem simulation. Specifically, this study intends to provide a framework for an explicit representation of social, economic, biophysical and political dimensions of agricultural at different scales of analysis using the component-based simulation approach. Firstly, a meta-model for model integration has been proposed. Secondly a conceptual model for agro-ecosystem representation has been proposed. Based on that and the meta-model, an integrated framework for models integration has been developed using a component-based simulation approach. The OpenMi and Mimosa platforms have been used for that. Finally, an integrated framework for agro-ecosystem simulation has been developed. A case study showed the effectiveness of the framework to simulate the agro-ecosystem at different scales.

Keywords : Integrated Assessment Modeling; Component-based simulation; Multi-scale; Agro-ecosystem

Projet 5 :

Title : Low-cost IoT solutions for agricultures fish farmers in Africa: a case study from Burkina Faso

Authors : Gildas ZOUGMORE, Malo SADOUANOUAN,
Université Nazi Boni, Bobo-Dioulasso, Burkina Faso
Email : teegwend@gmail.com , sadouanouan@yahoo.fr

Abstract : In this paper, we share our experience of the deployment of a sensor network. This sensor network was deployed at the Aquaculture and Aquatic Biodiversity Research Unit (URABAQ) at NAZI BONI University. The deployed sensors - permanently monitor the pH, dissolved oxygen and water temperature of a clarias (a fish species) hatchery - measure the soil moisture of banana and papaya fields - and finally measure the meteorological parameters (wind speed, air humidity, rainfall, sunshine ...) of the laboratory site. The hatchery parameters collected make it possible to control the mortality of fry (sending of SMS alerts, twitter, facebook in case of exceeding the threshold of certain parameters). The soil moisture collected will optimize the watering of the fields by the water rich in fertilizers produced by the fish of the aquacultural ponds. Finally, the weather parameters will make it possible to determine the correlations between the weather parameters and the production of the banana and papaya fields.

The data collected is sent on a cloud platform through a gateway equipped with a LoRa antenna and a 3G MoDem. The sensors communicate with a radio wave to the gateway using also LoRa technology. These energy-efficient sensors are equipped with a solar power supply and a LoRa radio antenna that can transmit 15 km in rural areas.

Keywords : IoT; LoRa Technology; cloud platform.

Projet 6 :

Title : Impact of ZRP zone radius value on wireless network performance

Authors : Tiguiane Yélémou¹ , Boureima Zerbo² , Mesmin Toundé Dandjinou¹ , Oumarou Sié²

1. University Nazi BONI, Email : tyelemou@univ-bobo.bf, dandjimes@yahoo.fr
2. University Ouaga 1 Pr Joseph KI-ZERBO, Email : bzerbo@gmail.com,
oumarou.sie@gmail.com

Abstract : In this paper, we highlight the impact of the routing load on the performance of ad hoc wireless networks. Specifically, we analyze Zone Routing Protocol (ZRP) routing load and the impact of zone radius value on this protocol performance.

First, we show that performance parameters curves such as routing overhead, Packet Delivery Ratio and End-to-End Delay don't evaluate monotonously according to zone radius value. In our test context, we note optimal values for routing overhead and Packet Delivery Ratio (PDR) when $R=3$. For delay, minimal values are observed when $R=1$ and $R=4$.

Second, we study this hybrid protocol routing overhead according to network density and compare it to pure on-demand and table-driven routing approaches. Contrary to that is largely presented, in realistic wave propagation model context, taking into account obstacles and their effects such as multi-path one, proactive routing approach performs better than reactive one. In fact, in lossy link context, route request and route error packets broadcasted are significant. In dense network, ZRP, due to its multitude control packets, performs the worst for routing overhead and packet delivery ratio (PDR) parameters.

Keywords : Wireless networks, routing algorithm, Zone Routing Protocol, zone radius, realistic simulation conditions.