Free software: an option for radiologists?

Software gratuito: uma opção para o radiologista?

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In the last 15 years, since the publication of the first free DICOM server/viewer – the *Central Test Node* (CTN) – in 1994, a plethora of free tools for digital radiological images visualization/storage have been made available on the web.

In an excellent article published in the present issue of **Radiologia Brasileira**, Barra et al.[1] provide a concrete notion of these applications, presenting a systematic analysis on the different DICOM viewers which, initially can run on simple radiology workstations.

However, the list of free applications is much more comprehensive, including from Hospital Information Systems (HIS) such as *Medical-BR*, a HIS with Electronic Health Record (EHR) available at the Brazilian Public Software Portal[2], to complex Picture Archiving and Communication Systems (PACS), such as *conQuest*, *PacsOne*, *OFFIS DCMTK* or even the current version of CTN (presently included in the *Linux DebianMed* package).

It is important to establish a difference between *free software* and *freeware*: the first one is available at national[2] or international[3] servers with open source codes and can be changed and improved by users upon download, besides gathering a worldwide community of developers who assure a quality standard and provide technical support. The second one is proprietary and closed source that is available for use at no cost, but that cannot be changed or adapted by users, thus its utilization may be difficult, for example, by a network administrator in a radiology clinic who wants to configure a system according to local needs. Unfortunately, many tools currently available for radiologists are freeware.

In the case of free DICOM viewers, it is important to briefly supplement the information included in the article published in the present issue of this journal with some notions on the integration between DICOM viewers and the above mentioned free applications according to the complexity of the system that one intends to utilize.

For the radiologist working in a center or hospital where computerized systems are still to be deployed, it is important to consider two applications: the PACS and the radiology workstation. The picture archiving and communication system (PACS) is the most critical application, since a failure of this system may paralyze the whole working routine in a radiology unit. The reason is that, generally, free PACS DICOM servers are equally free databanks like *mySQL*, *miniSQL* or *PostgreSQL*. Such free databank is a generic tool and has not necessary been developed for the purposes of storage and retrieval of large amounts of images, a task that requires a quite robust database to be completed. If the user is a small sized radiological center, probably almost all the free PACSs will be able to meet its needs. However if the system is being ran in the radiology unit of a large-sized hospital, the situation may become critical. Over a 18-year period working with medical images, we have had opportunities of testing innumerable solutions. In this context, *PostgreSQL* has shown to be a fortunate exception: the STT – Sistema Catarinense de Telemedicina e Telessaúde (Santa Catarina State System of Telemedicine and Telehealth) PACS[4] – currently provides results of more than 20 thousand radiological studies per month for 259 of the 293 cities in the Santa Catarina State, connecting 193 institutions that forward images to a single instance of the *CyclopsDICOMServer*, an images server developed at Universidade Federal de Santa Catarina, and that

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utilizes the *PostgreSQL* as a dedicated storage tool in the POP-SC (the internet convergence point in Santa Catarina).

On the other hand, if the purpose is to issue reports on a radiology workstation and have these reports automatically transferred to an Electronic Patient Record (EPR), the user must select a free PACS with text processing capacity, preferentially one compatible with the DICOM *Structured Report* (DICOM SR) standard, and have the automatic reports transference implemented by the supplier of the clinic IT system. For example, in order to connect the STT/SC centralized teleradiology service with the HISs deployed over the public hospitals network in the Santa Catarina State, we had to develop a solution for exchanging scheduling and reports on the network adopting the DICOM *Worklist* standard in conjunction with the consortium of HIS suppliers.

Certainly, the range of free options tends to increase over the next years. The Cyclops Group Cyclops[5], for example, is currently considering to release a generic version of PACS and of the Santa Catarina State Portal of Teleradiology at the Brazilian Public Software Portal in 2011. However, one thing is for sure, free software offers great possibilities for work and development and, provided it is appropriately utilized, may represent a huge increase in productivity with considerable reduction in costs. Notwithstanding, one must consider that, exactly because these ever-developing softwares are not commercial products, they lack standard quality guarantee and also the scheduled maintenance facilities. Thus, it is extremely important to count on the assistance of an experienced IT professional as free softwares are adopted.

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