

# LivEPICS® An EPICS Linux Live CD NAGIOS equipped.

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## INTRODUCTION

EPICS [1] is a software tool-kit originally developed at Los Alamos National Laboratory and Argonne National Laboratory for the control of accelerators and large experiments. Since the version R3.14.1, released in 2002, EPICS was ported to different hardware and software environments and now it is available for many kinds of processors and operating systems. Despite the installation of EPICS is usually done by a well proven set of automatic procedures, its configuration is not always straightforward for a beginner. To help a new user to get familiar with EPICS tools without installing them on the hard disk, we developed a Linux based live CD that includes most of the EPICS features. LivEPICS (© copyright under GNU General Public License) [2] is a bootable CD, which contains a pre-configured EPICS development environment. After booting, the user can access all the utilities required to create a simple control application; at the end of the session he can save his application on a USB mass storage device. The first release was delivered in 2005 and obtained good feedback from the EPICS collaboration. Therefore, we decided to create a second release which was completely rebuilt using a different Linux distribution (Fedora Core 5). This second release contains interesting documents for use by students undertaking EPICS training. The desktop is based on KDE 3.5, with OpenOffice 2.0. Students can use the Firefox personal toolbar folder to access a large number of offline documents. The documents explain in detail the use of the base and extensions software available. The CD contains: EPICS base 3.14.9, Asyn 4.6, VDCT 2.5, Probe 1.1.4.0, Alarm Handler 1.2.20 and MEDM 3.0.4beta7.

## NAGIOS

Nagios is a configurable service monitor designed to inform you of network problems before your clients, end-users or managers do. It has been designed to run under Linux, but works fine under most \*NIX variants as well. The monitoring daemon runs intermittent checks on hosts and services you specify using external "plugins" which return status information to Nagios. When problems are encountered, the daemon can send notifications out to administrative contacts in a variety of different ways (email, instant message, SMS, etc.). Current status information, historical logs, and reports can all be accessed via a web browser. The positive feedback received from the collaboration after the first release has motivated us to prepare a second version. This one is more user-friendly and contains an updated Linux distribution.

LivEPICS contains a Nagios server pre-configured to monitor the standard Epics "example" application. It shows how the check\_caget plugin[6] can be used to monitor the process variable and how to set up the necessary service to Nagios. This minimal configuration can be adjusted to suit various needs by modifying the set up files in /etc/nagios.

## COFFEE APPLICATION

To make possible a hands-on EPICS training using the hardware available on all PCs, a Coffee application has been included in the /home/adios. The name comes from an old how-to paper [7] where it is described how to "make a coffee" using Linux. With this application we can make a coffee using EPICS, that means reading and writing to and from the PC standard parallel port. This solution helps to demonstrate how EPICS works from the field level to the graphical user interface.

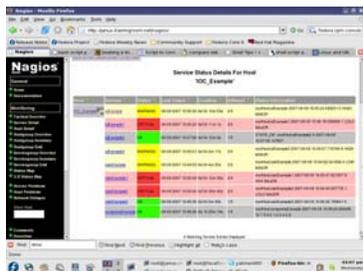


FIG. 1: LivEPICS with NAGIOS

## LivEPICS.fc5.Nagios v.1.0.iso

www.lnl.infn.it/~epics

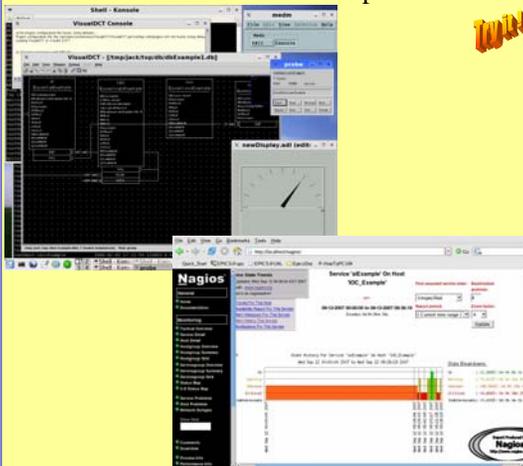


FIG. 2 : This figure gives an idea about LivEPICS GUI

The use of this software is subject to the terms of the EPICS Open licence, available at <http://www.aps.anl.gov/epics/license/open.php>.

- Manual present into the CD:
- EPICS\_README
  - Know Problems
  - Release Note
  - Application Developer Guide
  - IOC Application Builder
  - Record Reference
  - Channel Access
  - Channel Access Protocol
  - Asyn 4.3 Documentation
  - VisualDCT
  - Medm
  - MSI
  - Alarm Handler
  - State Notation Language

## REFERENCES

- [1] EPICS official web site: <http://www.aps.anl.gov/epics/distributions/index.php>.
- [2] M. Giacchini, PCaPAC Workshop poster, Newport News, VA USA, October 2006, <http://conferences.jlab.org/pcapac/talks/poster/Giacchini.pdf>.
- [3] R.Sabjan et al., "Visual DCT - EPICS Databases can be Fun", PCaPAC 2002, Frascati, Italy, October 2002
- [4] RedHat Fedora Core site:<http://fedora.redhat.com>
- [5] N.Richtiges et al., ADIOS web site: <http://os.cqu.edu.au/adios>
- [6] M.Giacchini check\_caget.sh, Nagios exchange web site: <http://nagiosexchange.org>
- [7] F. Georgatos, Coffee Making: <http://ldp.org/HOWTO/Coffee.html>

## LivEPICS FEATURES

The first release was delivered in 2005 and obtained good feedback from the EPICS collaboration. Therefore, we decided to create a second release which was completely rebuilt using a different Linux distribution (Fedora Core 5). This second release contains interesting documents requested by EPICS community for use by students undertaking class course, introductory documents and manuals: Application Developer Guide, IOC Application Building, Record Reference Manual, Channel Access Manual, Channel Access Protocol, State Notation Language Manual.

The desktop is based on KDE 3.5, with OpenOffice 2.0. Students can use the Firefox personal toolbar folder to access a large number of offline documents. The documents explain in detail the use of the base and extensions software available. The CD contains: EPICS base 3.14.9, Asyn 4.6, VDCT 2.5, Probe 1.1.4.0, Alarm Handler 1.2.20 and MEDM 3.0.4beta7.

LivEPICS has the complete functionality to develop a small control system, but it is mainly intended for training classes or to monitor and supervise an EPICS network.

### The goal of LivEPICS is:

- Allows to use EPICS without installation on the hard disk.
- Automatic setup of environment variables to compile and test new applications from scratch.
- Includes the basic tools (MEDM, VDCT, etc.) with the related documentation
- Allows to minimal real test using "coffee" application

The iocBaseApplication (the utility that creates the directory structure necessary to develop an application) can be launched immediately after the boot. The OPI tool included in the CD is MEDM (Motif Editor and Display Manager), the alarm manager is AH (Alarm Handler) while the IOC database configuration tool is VDCT[3] (provided by Cosylab). The Channel Access Probe is available to test the status of a record on the network. Asyn and MSI packages allow to create device support applications and medium-sized EPICS DataBases. The CD includes the following documents: Application Developer Guide, IOC Application Building, Record Reference Manual, Channel Access Manual, Channel Access Protocol, State Notation Language Manual.



FIG. 3: LivEPICS with NAGIOS 2D Map

## CONCLUSIONS

The positive feedback received from the EPICS collaboration after the first release has motivated us to make a second version. This one is more user-friendly and contains an updated Linux distribution. The usage of ADIOS has saved a lot of time in developing the CD and has opened a new and interesting collaboration opportunity.