

ctys-configuration-Gnome(7)

Configuration of Personal CloudComputing-Workspaces

March 12, 2011

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1 Abstract

The UnifiedSessionsManager is currently first of all a command line application, but designed for the application of complex multi-vendor and multi-screen environments of physical and virtual facilities. Thus it is a sessions management utility of modern workspaces, thus basically a graphics-control application.

The lifecycle of the UnifiedSessionsManager is going to evolve to the migration towards the extension for a graphical user interface in current versions. The first step for providing an additional graphical interface is the integration of the generated cache database into the Gnome based starter application. The first application here is a simple list based starter application for intermixed hypervisors, physical machines, and additionally the combination with the functionality for native logins into OSs by provided HOSTs plugins.

Initially two basic interfaces are provided from now own. The **CREATE** list element for the start of virtual machines, and physical machines either by Wake-On-LAN or (next) by IPMI. Second the **LOGIN** list element for native logins - either into Host-OSs running on the physical machines, or GuestOSs running within virtual machines.

Both applications are implemented quite simple in order to demonstrate

- the efficient integration of the database into an automated GUI application
- the simplicity of the implementation and possible customisation
- the simplicity of the seamless integration of distributed workspaces based on heterogeneous environments set up by physical and virtual machines, both intermixed with arbitrary runtime applications.

The following steps show the blueprint for the realworld application - these are actually almost the complete resulting application steps. These are described within the following chapters with additional application examples.

The following menu is provided as a basic menu and starting point as customisation pattern for automated installation by a script.

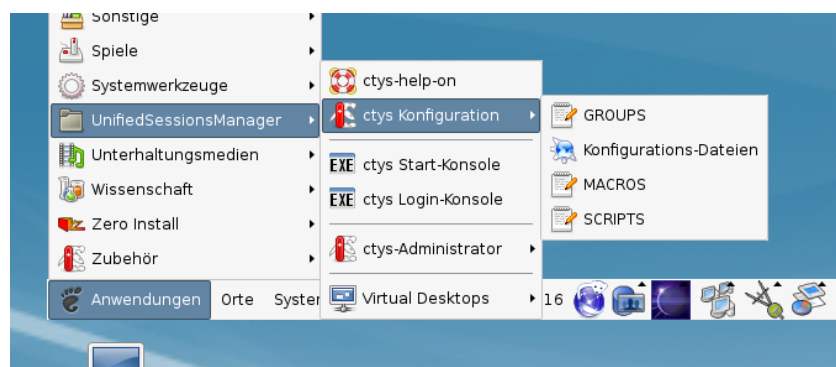


Figure 1: Gnome menu template

The next figure depicts the display of the database entries by the list 'ctys-CREATE-ALL', which contains all the complete unfiltered set of database record. The entry number '477' is selected for start, the resulting execution call is offered by the dialog box 'ctys-Selection' either for modification, or for execution by confirmation.

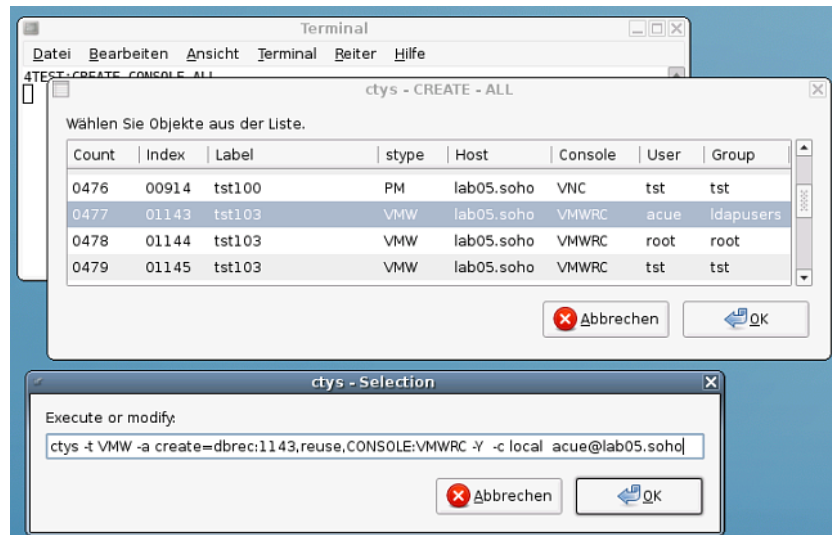


Figure 2: Gnome starter - CREATE

The internal data of the operational data storage, is integrated here by just a few lines of scripting with **zenity** into the Gnome based desktop, providing a graphical starter application. The scope of managed entities within the displayed list comprises here all supported VMs and PMs, including native logins by CLI, X11-Terminals, VNC, and RDP. Due to stored defaults, in addition to hypervisor consoles also the preconfigured native login applications could be started automatically.

This demonstrates the combination and setup of **ctys-vdbgen(1)** for automatic creation of the **cacheDB** and the **gnome-starter(1)** application for graphical presentation of the data within some minutes. The presented test environment on a medium-range machine for example contains about 350VMs used by NFS on several machines resulting in about 1400entries for VMs and PMs by multipath-access. The whole automated initial creation of the cacheDB takes some Minutes for scanning filesystems and presents than the shown graphical interface with a startup in the range of seconds for each selected VM.

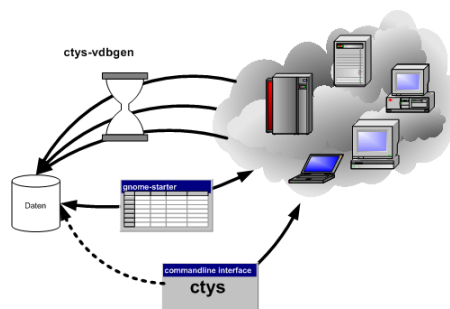


Figure 3: Database creation and application

The database contains the hypervisors KVM, QEMU, VBOX, VMW, and XEN, additionally PMs. For each entry also default login desktops or commandline applications are stored for automation of console interconnection as well as native logins - based on CLI, X11, VNC, and RDP. Additionally a first minor version of customisable menus for Gnome based desktops is integrated. These offer either for private menus, or shared common menus with a pattern for simple customisation.

The next important aspect when working with huge amounts of machines and consoles - either physical, or virtual, or just ordinary remote desktops - is the usability of the workspace on the desktop. This frequently requires the application of multiple displays.



Figure 4: Gnome Xinerama

The Xinerama mode is provided by a specific extension for logical addressing of the standard X11 functionality.

The previous examples are just performed by a mouse-click - within seconds - no longer by painful manual execution or enduring custom-scripts development.

2 Overview

REMARK: This part and related specific utilities are temporary pre-releases for demonstration of first draft graphical integration due to requests. Thus these are in alpha-state, and are planned to be replaced by a graphical application in future versions.

The current version supports the manual integration of ctys into menu entries of any X11 based desktop. This document describes the manual setup of ctys based menu entries for Gnome desktops.

The additional standard Gnome utility required for GUI based start of VMs is **zenity**, which offers an easy-to-use minimalistic graphical interface particularly for list-elements. This simply could be called from a shell script and returns the selected data. Another **zenity** widget e.g. provides a text-box for modification and confirmation of the current call.

3 Gnome - Automated menu Creation with Templates

The following menu is provided as a pattern to be installed either as a private, or as a shared menu. The configuration files and install scripts are installed within the directory **\$HOME/.ctys/xdg.d**.

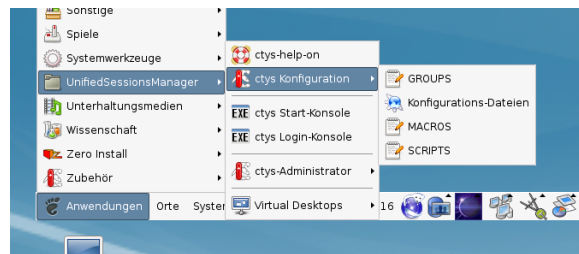


Figure 5: Gnome menu template

The private installation is performed by **ctys-xdg --menu-create**, whereas the shared installation is performed by the script **ctys-xdg --menu-create --menu-shared**. The shared installation is stored within the common system directories and therefore requires root permissions. For the private installation the user permissions are sufficient.

The private base directories used are the standard directories as defined by the **Desktop Menu Specification-1.0** from **freedesktop.org**. These are **\$HOME/.config**, **\$HOME/.icons**, **\$HOME/.local/share/applications**, and **\$HOME/.local/share/desktop-directories**.

The following description offers a simple and fast setup of the predefined menus by just one script-call. But the whole process could be performed manually by the property menus too as described within the specific chapters.

3.1 Gnome - Private and Shared menus

Gnome offers facilities for the creation of custom menus, which could be either setup individually within a private environment, or as a shared menu for all users on a specific machine. The resulting functional possibilities are basically similar, thus the intention of usage and flexibility is the major aspect for the design choice.

Whereas the resulting functionality is quite similar, the physical storage of the configuration information is obviously different. The common shared menu entries for the machine are stored within the system directories, with write operations requiring root permissions. The private environments are stored commonly within individual subdirectories of the specific user, thus frequently are visible just for the owner.

The configuration decision here is to use the custom files for static setups as defined by Gnome, even though some configuration with toolsets for runtime dynamic configuration might be applicable. Nevertheless, due

to the continuous automatic synchronisation of the Gnome desktop with its configuration files, some - almost unlimited - runtime dynamic is available inherently by default.

The applied directory structures are designed and named in order to minimize the deviation between the shared and private variant.

3.2 Private menus

3.2.1 Customization-Hook - gnome-applications.menu

The menu structure of Gnome is defined by a basically tree based data structure, which is defined by XML syntax within a nested file structure. The configuration syntax is a powerful set of language elements particularly offering for file and directory based inclusion configuration data extension. This is extended by means of decisive syntax elements for suppression, additional, exclusive, and non-exclusive extension of present menu configuration data.

The UnifiedSessionsManager menus are hooked-in into the configuration file:

```
$HOME/.config/menus/gnome-applications.menu
```

This is done by the entry

```
<MergeFile>applications-merged/ctys-UnifiedSessionsManager.menu</MergeFile>
```

The entry is located within the file for example as depicted in the following figure, where the file itself is contained within a subdirectory 'applications-merged' and addressed by a relative path:

```
<!DOCTYPE Menu
  PUBLIC '-//freedesktop//DTD Menu 1.0//EN'
  'http://standards.freedesktop.org/menu-spec/menu-1.0.dtd'>
<Menu>
  <Name>Applications</Name>
  <MergeFile type="parent">/etc/xdg/menus/gnome-applications.menu</MergeFile>

  <!-- *** HOOK-START *** -->

  <MergeFile>applications-merged/ctys-UnifiedSessionsManager.menu</MergeFile>

  <!-- *** HOOK-END *** -->

  <Menu>
    <Name>alacarte-made</Name>
    <Directory>alacarte-made.directory</Directory>
    <Include>
      <Filename>alacarte-made.desktop</Filename>
    </Include>

    ...
    ...
    ...
```

The file is actually located within the pathname:

```
$HOME/.config/menus/applications-merged/ctys-UnifiedSessionsManager.menu
```

The menu definition is hereby assembled by the following file types in accordance to the standard Gnome and Common Desktop definitions:

- **menu**
The structure definition for the directory tree including hooks for node description by directory-files and desktop-files.
- **directory**
Contains the attributes for specific tree-nodes of the directory tree, which includes particularly the Native Language Support - NLS - for the representation.
- **desktop**
Contains the attributes for specific leaf-nodes of the directory tree, which includes the Native Language Support - NLS - for the representation, and particularly additional information for the resulting execution call of the application.
- **graphical element**
This represents the represented icons in various formats.

3.2.2 Custom menu - ctys-UnifiedSessionsManager.menu

The hooked-in file contains the current version the whole structure definition of the ctys-menu-hierarchy as single standalone structure-definition file. The menu **UnifiedSessionsManager** is here included **as a sub-menu** of the **Applications** menu.

```
<!DOCTYPE Menu PUBLIC "-//freedesktop//DTD Menu 1.0//EN"
"http://www.freedesktop.org/standards/menu-spec/menu-1.0.dtd">
<!-- Do not edit manually - generated and managed by xdg-desktop-menu -->
<Menu>
  <Name>Applications</Name>

  <AppDir>/homen/acue/.gnome/ctys/applications/</AppDir>
  <DirectoryDir>/homen/acue/.gnome/ctys/desktop-directories/</DirectoryDir>

  <Menu>
    <Name>UnifiedSessionsManager</Name>
    <Directory>ctys-UnifiedSessionsManager.directory</Directory>
    <Include>
      <Filename>ctys-help.desktop</Filename>
      <Filename>ctys-CREATE-CONSOLE.desktop</Filename>
      <Filename>ctys-LOGIN-CONSOLE.desktop</Filename>
    </Include>

    <Layout>
      <Merge type="all"/>
      <Filename>ctys-help.desktop</Filename>
      <Menuname>ctys-admin</Menuname>
      <Merge type="menus"/>
      <Merge type="files"/>
      <Separator/>
      <Filename>ctys-CREATE-CONSOLE.desktop</Filename>
      <Filename>ctys-LOGIN-CONSOLE.desktop</Filename>
      <Separator/>
      <Menuname>Sysadmin</Menuname>
      <Separator/>
      <Menuname>Desktops</Menuname>
    </Layout>

    <Menu>
      <Name>Sysadmin</Name>
```



```

        <Directory>ctys-Administrator.directory</Directory>

        <Menu>
        <Name>hosts</Name>
        <Directory>ctys-hosts.directory</Directory>
        <Include>
            <Filename>ctys-localhost.desktop</Filename>
        </Include>
        </Menu>

        <Directory>ctys-Administrator.directory</Directory>
        <Include>
            <Filename>ctys-root-term-localhost.desktop</Filename>
        </Include>
        </Menu>

        <Menu>
        <Name>Desktops</Name>
        <Directory>ctys-Desktops.directory</Directory>

        <Menu>
        <Name>hosts</Name>
        <Directory>ctys-hosts.directory</Directory>
        <Include>
            <Filename>ctys-localhost.desktop</Filename>
        </Include>
        </Menu>

        <Directory>ctys-Desktops.directory</Directory>
        <Include>
            <Filename>ctys-localhost.desktop</Filename>
        </Include>
        </Menu>

        <Menu>
        <Name>ctys-admin</Name>
        <Directory>ctys-admin.directory</Directory>
        <Include>
            <Filename>ctys-CONFIG.desktop</Filename>
            <Filename>ctys-GROUPS.desktop</Filename>
            <Filename>ctys-MACROS.desktop</Filename>
            <Filename>ctys-SCRIPTS.desktop</Filename>
        </Include>
        </Menu>

    </Menu>
</Menu>

```

3.2.3 Custom desktop-directories

The following entry depicts as an example representation the data for the entry node of the **configuration submenu** for the **UnifiedSessionsManager** itself.

[Desktop Entry]

```

Name=ctys configuration
Name[de]=ctys Konfiguration
Name[en_GB]=ctys configuration
Comment=Configuration Files
Comment[de_DE]=Konfigurations Dateien
Comment[en_GB]=Configuration Files
Type=Directory
Icon=applications-utilities
Encoding=UTF-8

```

3.2.4 Custom applications

The following entry depicts as an example representation the data for the entry node of the configuration for the **gnome-starter(1)** with **CREATE**. submenu for the UnifiedSessionsManager itself.

```

[Desktop Entry]
Type=Application
Version=1.0
Encoding=UTF-8
Name=ctys Create Console
Comment=ctys Create Console
Name[en_CA]=ctys Create Console
Name[en_GB]=ctys Create Console
Name[de_DE]=ctys Start-Konsole
Comment[de]=ctys Start-Konsole
#Possible absolute PATH:
# Exec=/homen/acue/utills/gnome-starter CREATE CONSOLE ALL
Exec=gnome-starter CREATE CONSOLE ALL
#Possible absolute PATH:
# Icon=/opt/i4p/patches/icons/misc-collection/ctys-exe.svg
#Possible absolute PATH:
# ~/.icons
Icon=ctys-exe
Terminal=true
Categories=System;

```

3.2.5 Custom pixmaps

The pixmaps could be stored within several directories in multiple formats and resolution. The current choice for the UnifiedSessionsManager is **svg** and stored in a **pixmap**s directory coallocated with the directories **applications** and **desktop-directories** in accordance to the standard sub-structure of **/usr/shared** directory tree. This simplifies the common installation procedure for private and shared installs.

3.3 Shared menus

The share instalation is basically the same, the deviation is basically just within the root nodes for installation. The **applications**, **desktop-directories**, and **pixmap**s directories are allocated within the **/usr/shared** directory tree.

The **applications-merged** files are just copied into the **/etc/xdg/menus/applications-merged** subdirectory. Due to present inclusion of all files within this directory no file-patch is required in this case.

4 Gnome - Basic Manual menu Creation

The first step is to open the dialog box for the menu entries by mouse context menu by right-mouse-click.

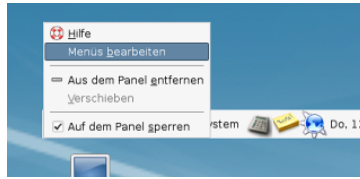


Figure 6: Manual Gnome menu creation - Open context

The dialogue box enables the creation and setting of submenus and entries.

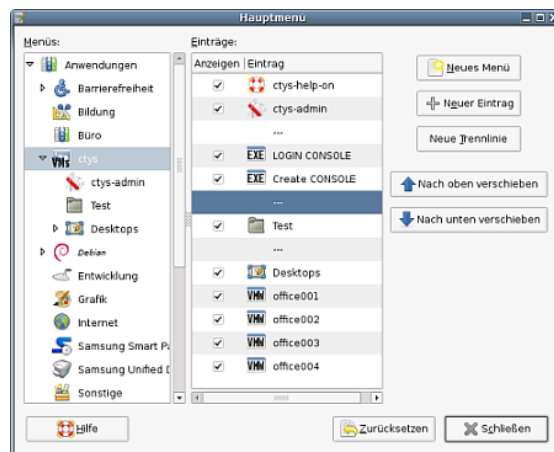


Figure 7: Manual Gnome menu creation - Dialogue

4.1 Entries for Scripts

A script is a shell executable, which could contain ctys calls intermixed with native shell calls. Thus this is particularly suitable for desktops containing various local applications. The setup of a script is quite easy due to simple syntax as well as by tool support with configurable standard editors. The following example shows the 'manuals01.sh' entry for the creation of the complete desktop for editing the manuals of ctys.

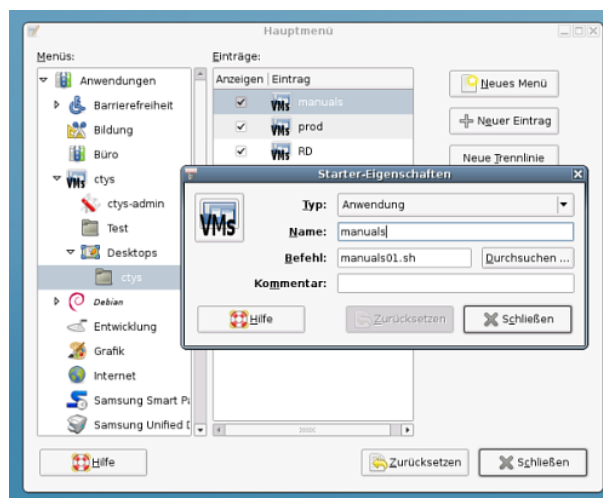


Figure 8: Script Entries

The setup is given as:

```
manuals01.sh
```

Where the content is:

```
#!/bin/bash

#
#Prepare environment
#
. $(dirname ${0})/common.sh

#
#Start environment
#
if [ "$1" != "SETENV" ];then
    gnome-terminal --geometry=$(getGeometry -g 180x20+0+0:A10) \
        --working-directory="$DOC_BLD_ROOT" \
        --title="DOC_BLD_ROOT" -x $0 SETENV&

    gnome-terminal --geometry=$(getGeometry -g 180x10+0+350:A10) \
        --working-directory="$DOC_BLD_ROOT" \
        --title="DOC_BLD-01" -x $0 SETENV&

    gnome-terminal --geometry=$(getGeometry -g 180x10+0+550:A10) \
        --working-directory="$DOC_BLD_ROOT" \
        --title="DOC_BLD-02" -x $0 SETENV&

    gnome-terminal --geometry=$(getGeometry -g 180x10+0+750:A10) \
        --working-directory="$DOC_BLD_ROOT" \
        --title="DOC_BLD-03" -x $0 SETENV&

    nautilus --geometry=$(getGeometry -g 1280x700+0+0:A20) $DOC_ALL&

    konq\u\eror --geometry=$(getGeometry -g 1280x1048+0+0:A31) \
        $DOC_ALL_EN $DOC_ALL_DE&

    konq\u\eror --geometry=$(getGeometry -g 1280x1048+0+0:A30) \
        $DOC_LIST_EN&

    konq\u\eror --geometry=$(getGeometry -g 1280x1048+0+0:A00) \
        $DOC_BLD_ROOT $DOC_BLD_EN $DOC_BLD_DE &

    cd $BLD_ROOT && ctys desktops/dev/ctys/manuals01
else
    #
    #Set environment
    #
    if [ -z "$CTYS_ENVSET" ];then
        export CTYS_ENVSET=1
    fi
fi
exec bash -i
fi
exit 0
```

The result is depicted in the following figure.

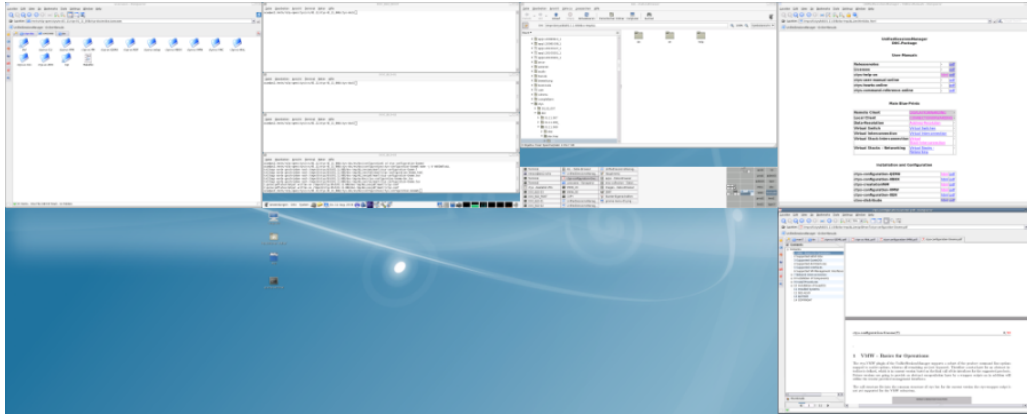


Figure 9: Script Entries - Resulting Desktop

4.2 Entries for GROUPs

GROUPs are sets of hosts and virtual machines for ctys only. This are particularly suitable for desktops build up by remote applications only, including remote desktops and consoles. The setup of groups allows for various specific parameters for each connection and executed desktop. In addition an overall task control is setup for a GROUP, which also could be setup by reusable modular includes for various purposes. The setup of a GROUP called by 'ctys' could be created in the same manner as script entries. The following example shows the 'ctys admin/admin0' group entry for the creation of the complete desktop for administration of some servers.

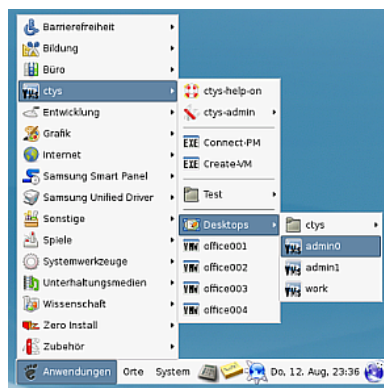


Figure 10: GROUP Entries - menu Entries

The menu entry could be setup as following, in this example:

```
/homen/acue/bin/ctys admin/admin0
```

With the content of the GROUP:

```
# -*- mode: conf; -*-
#
#This groups contains all machines in the management group of the
#server group.
#
#
#fileserv - CentOS-5.4 - VMware-Server
root@delphi'( -t vnc -a create=1:DELPHI,reuse -g 1268x994:A00:ALL -b 1,2)'
```

```
#
#backup-server - CentOS-5.4
root@olymp'( -t vnc -a create=reuse,l:OLYMP -g 1268x964:A10:ALL -b 1,2)'

#
#database-server - CentOS-5.4 - KVM
root@app1'( -t vnc -a create=reuse,l:APP1 -g 1268x994:A01:ALL -b 1,2)'

#
#CUDA-server - CentOS-5.4 - KVM
root@app2'( -t vnc -a create=reuse,l:APP2 -g 1268x994:A21:ALL -b 1,2)'
```

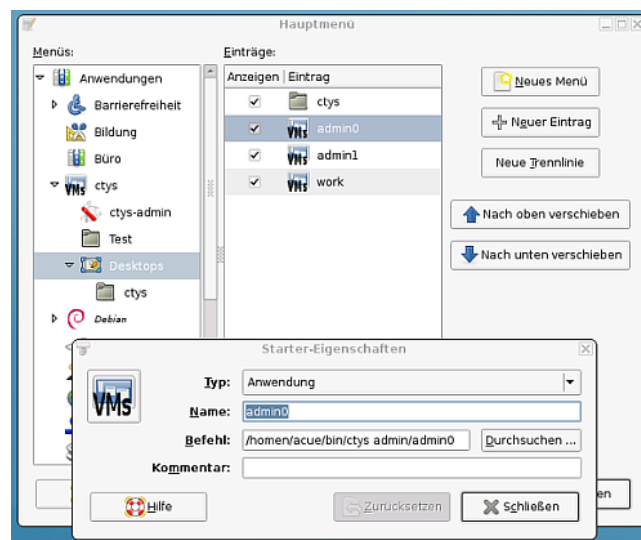


Figure 11: GROUP Entries

The result is depicted in the following figure.

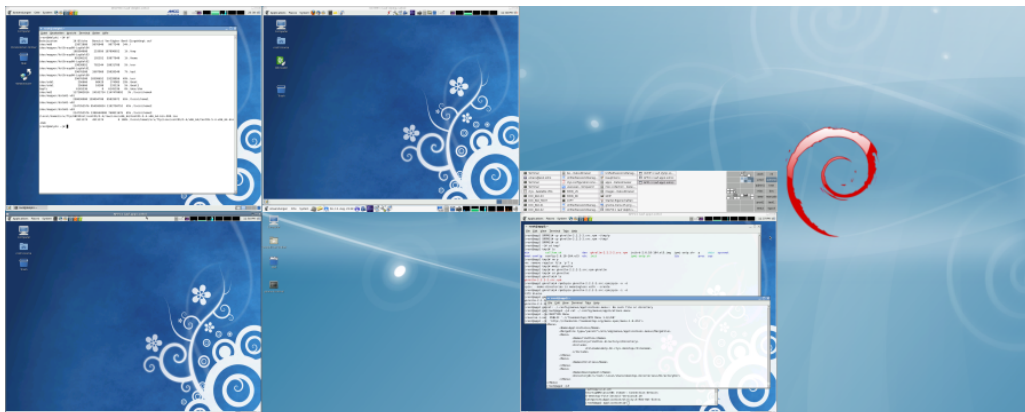


Figure 12: GROUP Entries - Resulting Desktop

4.3 ctys-help-on

The online help menu could be basically created with any tool from the package. The usage is:

```
ctys -H html=base
```

or

```
ctys -H html=doc
```

This opens a browser with the provided help file 'doc.html'. The preconfigured browser is konqueror by default for now, when not available firefox is used. Any browser could be customized by the user.

The script could be integrated into Gnome by just configuring a menu item and using the call for opening a (now still) draft online help by html and pdf files. Additionally the commandline interface man pages are available.

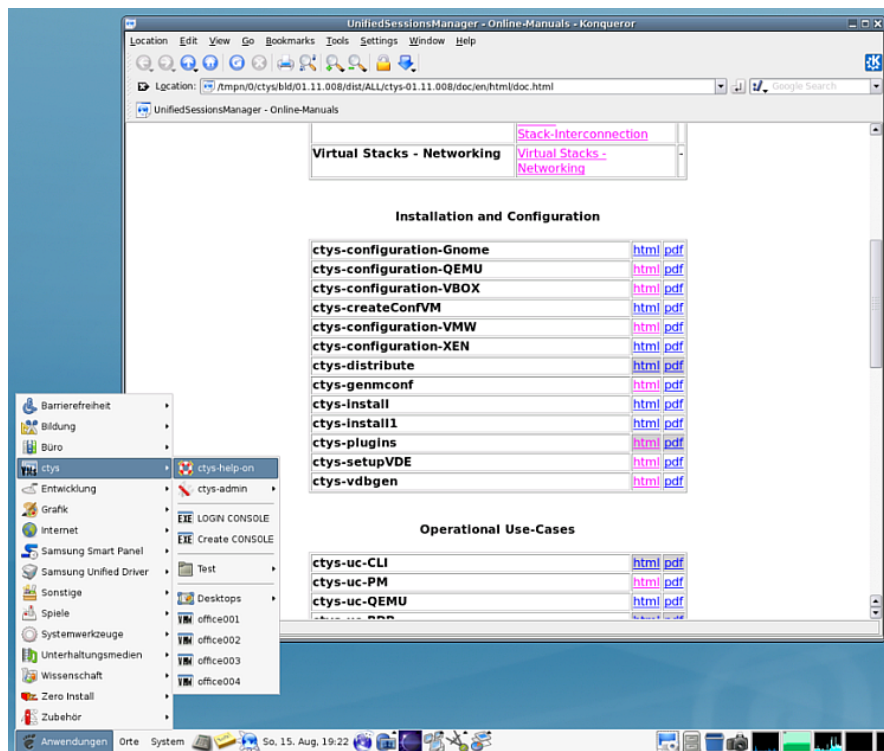


Figure 13: ctys-help-on - Online Help

4.4 GROUPS

The GROUPS objects are represented by files containing multiple host entries. These could be edited by a preconfigured editor with the following call, which could be used within menu entries.

```
ctys-groups -e
```

The started editor or filebrowser opens by default all configured directories within the CTYS_GROUPS_PATH. The preconfigured default is the Emacs editor, if not present vi, vim, konqueror, or nautilus are called. The user can customize any browser or filemanager as required.

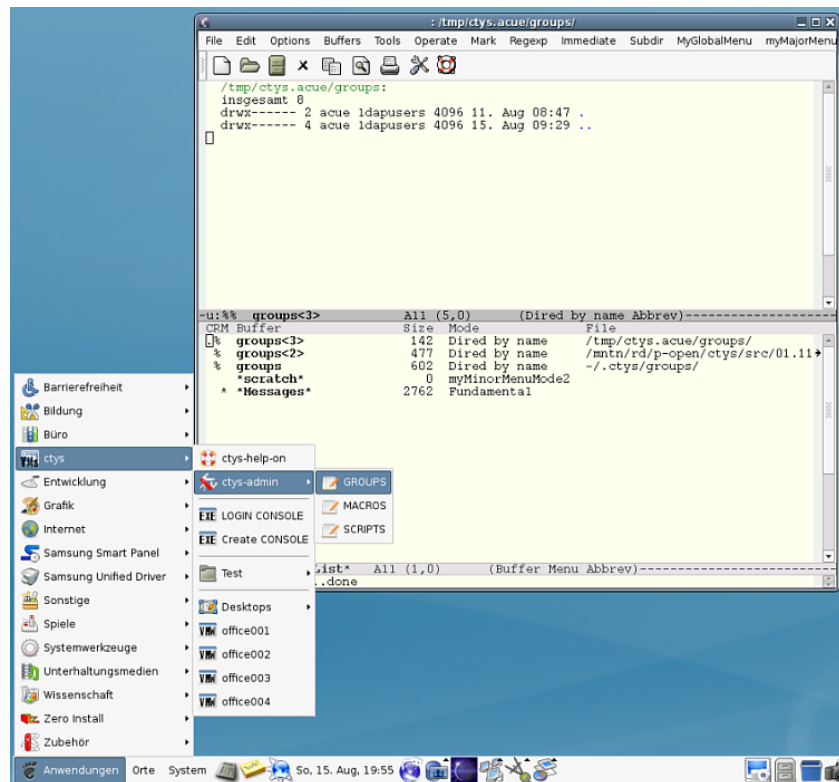


Figure 14: GROUPS - Emacs editor

This could be varied call-by-call e.g. by

```
CTYS_GROUPSEDIT=konqueror ctys-groups -e
```

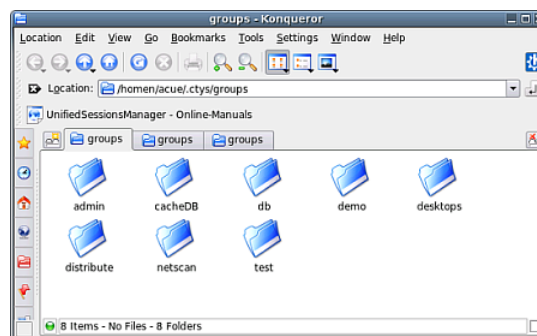


Figure 15: GROUPS - konqueror browser with tabs

4.5 MACROS

The MACROS are represented by files containing the set of definitions to be applied. These could be edited by a preconfigured editor with the following call, which could be used within menu entries.

```
ctys-macros -e
```

The started editor or filebrowser opens by default all configured directories within the CTYS_MACROS_PATH. The preconfigured default is the Emacs editor, if not present vi, vim, konqueror, or nautilus are called. The user can customize any browser or filemanager as required.

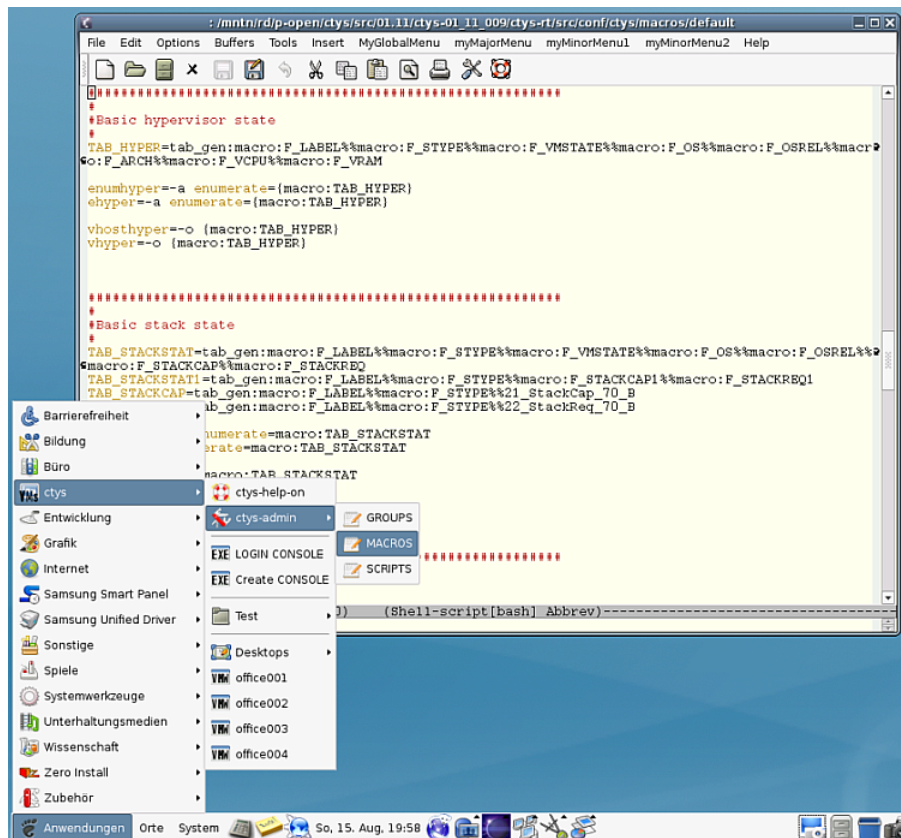


Figure 16: MACROS - Emacs editor

4.6 SCRIPTS

The SCRIPTS are contained in within the defined search path CTYS_SCRIPTS_PATH similar to the systems PATH variable. These could be edited by a preconfigured editor with the following call, which could be used within menu entries.

ctys-scripts -e

The started editor or filebrowser opens by default all configured directories within the CTYS_SCRIPTS_PATH. The preconfigured default is the Emacs editor, if not present vi, vim, konqueror, or nautilus are called. The user can customize any browser or filemanager as required.

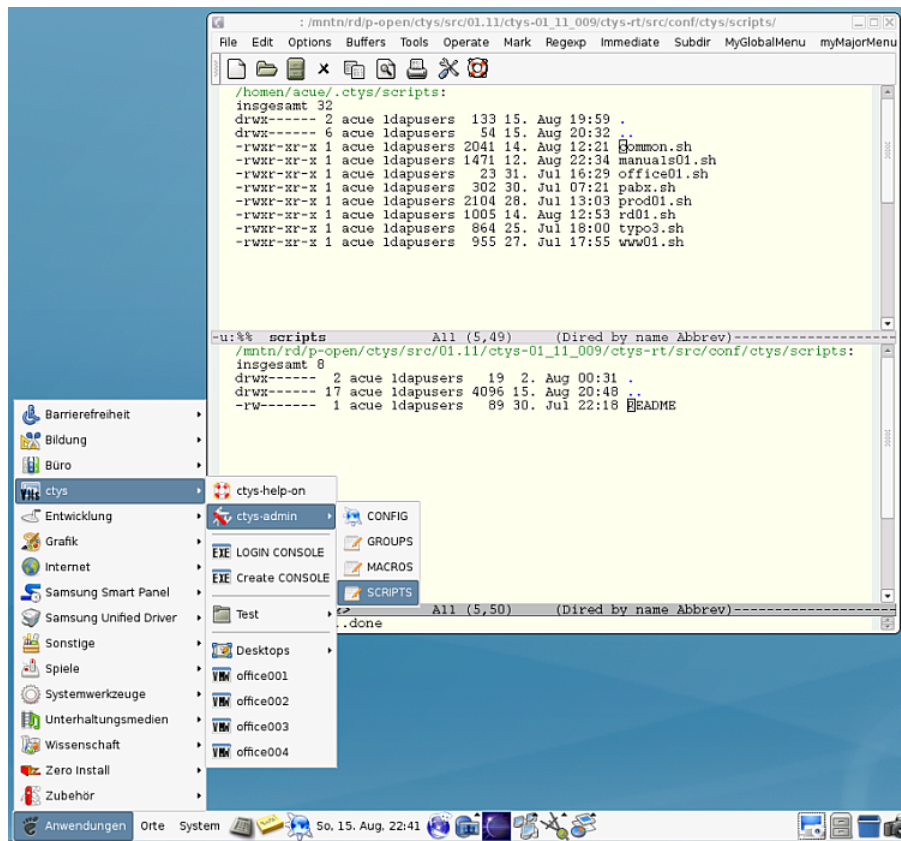


Figure 17: SCRIPTS - Emacs editor

This could be varied call-by-call e.g. by

CTYS_SCRIPTEDIT=konqueror ctys-scripts -e

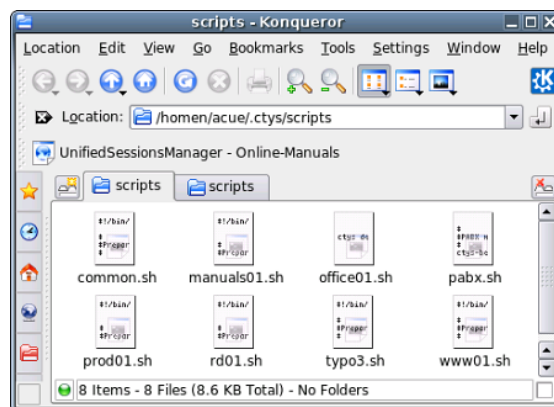


Figure 18: SCRIPTS - konqueror browser with tabs

4.7 CONFIGURATION

The configuration files could be browsed by **konqueror** with the following call:

```
ctys-config -e
```

The started editor or filebrowser opens by default all configured directories within the standard paths. The preconfigured default is the Emacs editor, if not present vi, vim, konqueror, or nautilus are called. The user can customize any browser or filemanager as required.

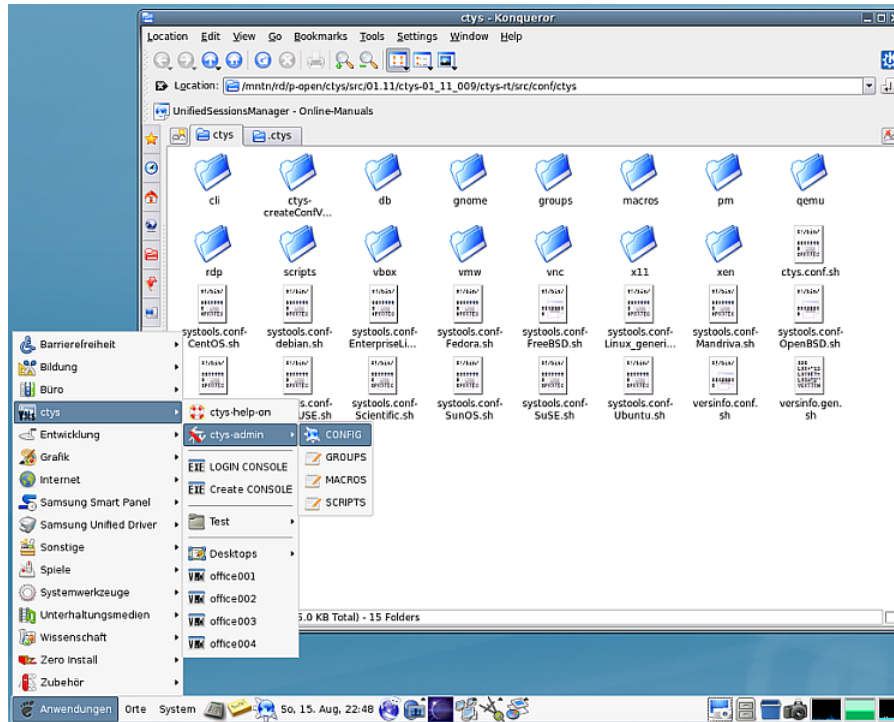


Figure 19: CONFIGURATION - konqueror browser

5 Graphical VM and PM Starter

The following example shows the configuration of a graphical starter based on **zenity**.

This is based on some pre-requirements in order to work. The main requirement is the presence of a cacheDB, which could be generated by the utility **ctys-vdbgen(1)**, for further information refer to the man pages of the tool. The second requirement is the static definition of the call parameters of the start call, which relies on the defaults of each plugin. These could be modified by the related configuration files, but may suffice the basic initial creation and reconnection(by REUSE) for each VM.

This works for all supported hypervisors due to the unique interface for all - providing basic features for each. Additional parameters such as the screen position and windows size are not provided for current version.

It is recommended to set the type of the menu entry to 'Start application in terminal' because some user interaction may be required. For example in case of SSH first time connection the new key has to be confirmed.

5.1 gnome-starter

The temporary utility **gnome-starter** accepts the parameters **PM**, **VM**, and **LIST**. The parameter PM sets the start of a PM login by usage of VNC, this also restricts the displayed choice-list to PMs only and additionally assures that the displayed records are unique each. The parameter VM works similar for VMs, where only VMs, but of all supported types are displayed. Due to the generic standard-interface and appropriate defaults delivered, each could be started in the same manner.

The standard call syntax for selection of subsets from the database is

```
gnome-starter <ACTION> <TARGET-TYPE> <SCOPE>
```

ACTION could be CREATE, LOGIN, or LIST. TARGET-TYPE is CONSOLE. SCOPE could be ALL, VM, or PM.

The current version does support for native access UNIX systems only. Thus even though guest systems could contain any OS supported by the hypervisor are successfully collected into the database, the selection in the starter for LOGIN actions may fail for non-supported systems. Specific parameters e.g. for individual screen positions are not provided by this version.

5.2 CREATE - PM and VM Starter

The PM starter could be configured in the same manner as any menu item. The required call is

```
gnome-starter CREATE CONSOLE PM
```

The generated standard call is:

```
ctys -t <type> \
-a create=dbrec:<database-index>,reuse,CONSOLE:<current-default> \
-Y -c local <username>@<hostname>
```

This opens now 2 windows, the **zenity** list window and in addition a terminal window.

ATTENTION: The terminal window is required in cases, where user interaction is required. In some cases the system may even hang in an non-reachable console dialog, when a terminal is missing.

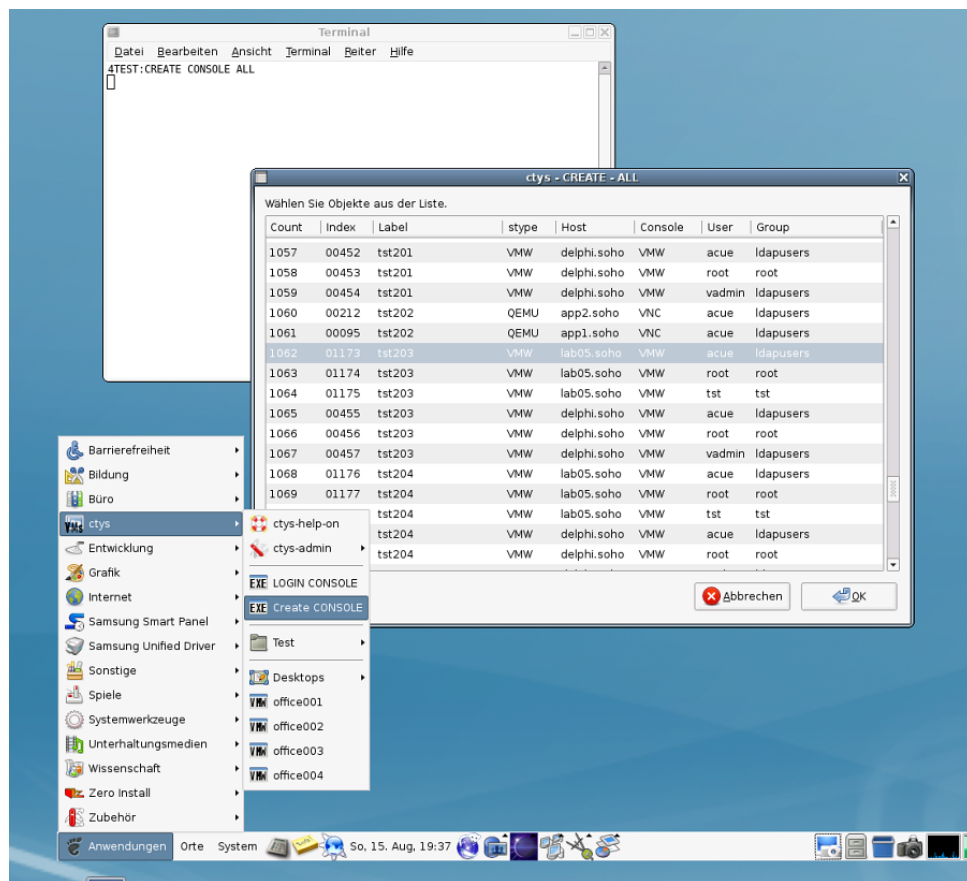


Figure 20: Gnome starter menu

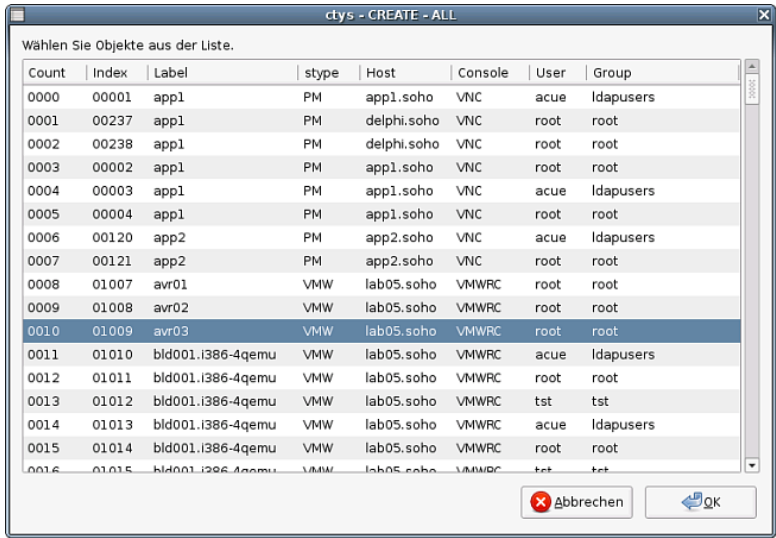


Figure 21: Gnome starter

After a specific entry is selected a second window is opened for call confirmation. This text-box allows for modification of the generated call if required. The confirmation of this second window starts the entry.

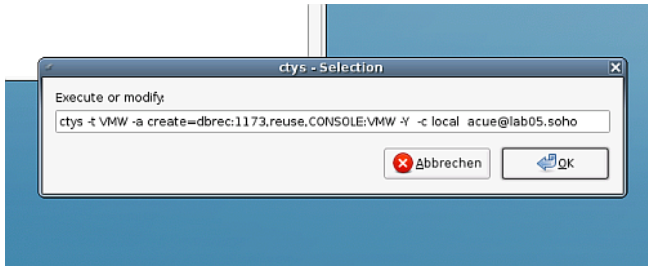


Figure 22: Call confirmation

The requested user interaction is here to confirm new host entry for OpenSSH.

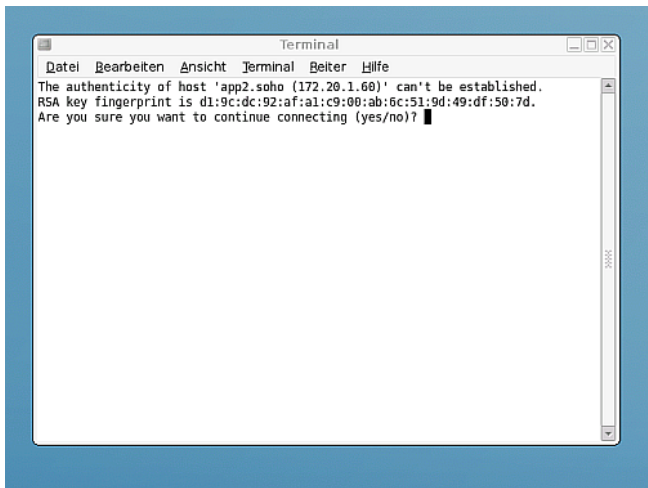


Figure 23: Gnome starter - SSH-Confirmation

The result is depicted in the following figure.

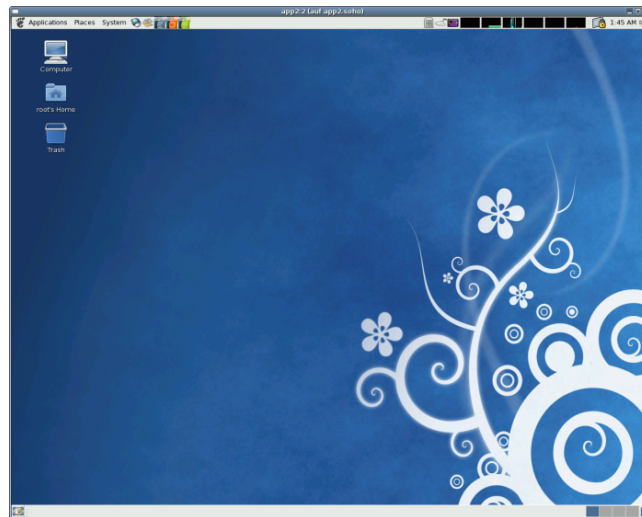


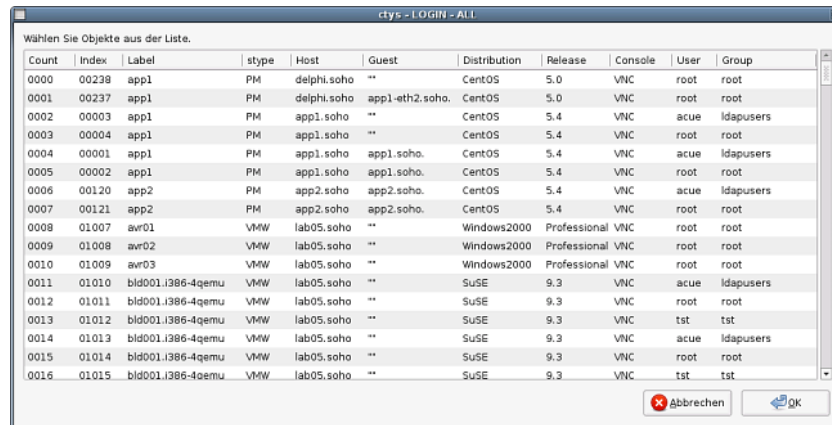
Figure 24: Gnome starter - Resulting Desktop

The VM starter could be configured in the same manner as any menu item. The required call is

```
gnome-starter CREATE CONSOLE VM
```

5.3 LOGIN - HOSTs Starter

The starter for LOGIN is similar but slightly different. This is due to required additional information related to the guest OS, such as the ip address of the contained guest system. Also the preconfigured default HOSTs CONSOLE is displayed and used instead of the CONSOLE to be attached to the hypervisor. In addition some helpful information related to the contained guest OS distribution are presented.



Wählen Sie Objekte aus der Liste.

Count	Index	Label	stype	Host	Guest	Distribution	Release	Console	User	Group
0000	00238	app1	PM	delphi.soho	**	CentOS	5.0	VNC	root	root
0001	00237	app1	PM	delphi.soho	app1-eth2.soho.	CentOS	5.0	VNC	root	root
0002	00003	app1	PM	app1.soho	**	CentOS	5.4	VNC	acue	ldapusers
0003	00004	app1	PM	app1.soho	**	CentOS	5.4	VNC	root	root
0004	00001	app1	PM	app1.soho	app1.soho.	CentOS	5.4	VNC	acue	ldapusers
0005	00002	app1	PM	app1.soho	app1.soho.	CentOS	5.4	VNC	root	root
0006	00120	app2	PM	app2.soho	app2.soho.	CentOS	5.4	VNC	acue	ldapusers
0007	00121	app2	PM	app2.soho	app2.soho.	CentOS	5.4	VNC	root	root
0008	01007	avr01	VMW	lab05.soho	**	Windows2000	Professional	VNC	root	root
0009	01008	avr02	VMW	lab05.soho	**	Windows2000	Professional	VNC	root	root
0010	01009	avr03	VMW	lab05.soho	**	Windows2000	Professional	VNC	root	root
0011	01010	bld001.i386-4qemu	VMW	lab05.soho	**	SuSE	9.3	VNC	acue	ldapusers
0012	01011	bld001.i386-4qemu	VMW	lab05.soho	**	SuSE	9.3	VNC	root	root
0013	01012	bld001.i386-4qemu	VMW	lab05.soho	**	SuSE	9.3	VNC	tst	tst
0014	01013	bld001.i386-4qemu	VMW	lab05.soho	**	SuSE	9.3	VNC	acue	ldapusers
0015	01014	bld001.i386-4qemu	VMW	lab05.soho	**	SuSE	9.3	VNC	root	root
0016	01015	bld001.i386-4qemu	VMW	lab05.soho	**	SuSE	9.3	VNC	tst	tst

Abbrechen OK

Figure 25: Gnome starter - LOGIN list

The resulting call is a complete call due to the much simpler structure for a simple login, than in case of CREATE, where additional data may be fetched from the database.

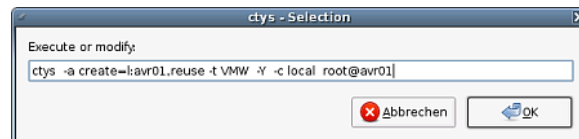


Figure 26: Gnome starter - LOGIN confirmation

5.4 Troubleshooting

In case of difficulties call the interface manually from the command line. The main prerequisite is an existing cacheDB (refer to **ctys-vdbgen(1)**), which may not contain redundant entries. This could be verified by **ctys-vhost(1)** with the **-M** option.

When a call does not start from the menu entry the required PATH may not be complete. Thus one solution is to enter absolute pathnames for the executable, for example:

```
/home/yourHome/bin/ctys ...
```

6 Multiple Monitors - Xinerama Setup

The most important practical usability aspect when working with huge amounts of machines and consoles - either physical, or virtual, or just ordinary remote desktops - is the usability of the workspace on the desktop. The key for the usability is here the application of multiple display environments, where these could be either combined locally, or virtually from local and remote sites.



Figure 27: Gnome Xinerama

These local and remote physical screens could be combined to a virtual screen by e.g. Xinerama (or distributed e.g. by Xrdb) what is supported by the UnifiedSessionsManager particularly through the extension of the **geometry** option of X11. This extension provided - beneath others - for an overlay of a virtual grid of screens on top of the combined displays, thus the physical screens could be addressed by user-defined labels, the required pixel-calculations are encapsulated by the mapping-functions of the UnifiedSessionsManager. The following screenshot represents the logical view of the combined displays.

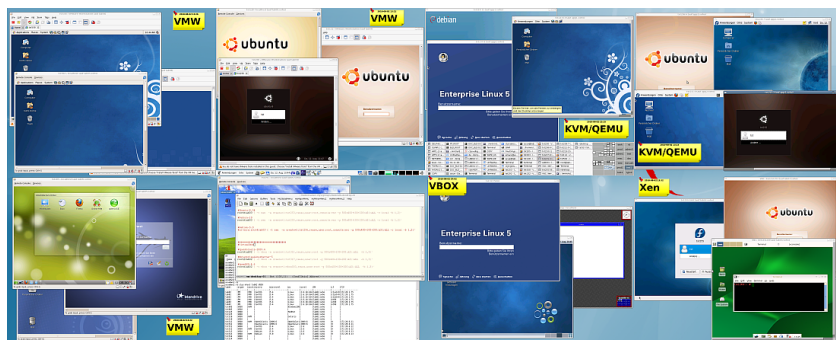


Figure 28: Gnome Xinerama

Another benefit from handling of logical addresses only is the independent addressing from physical changes, which occurs frequently when the hardware is exchanged. This is due to the automatic enumeration of components by the system, which varies widely by seemingly minor changes.

The mapping and address calculations are described in depth within the User-Manual of the DOC-Package (Remember the CCL-3.0 Licensing).

6.1 Physical and Logical Screens - A Sumup

Physical screens are by default supported for the X11 based desktops as independent terminal sessions. This particularly excludes the mouse movement between the screens by default.

One appropriate facility for the combination of physical screens into one superpositined-screen as a combination is the so called Xinerama mode. This simply adds the pixel-arrays together and produces a resulting array of size by the overall sum of pixels. Therefore the new address range changes to the new screen size. In practical cases the order of the screens - meaning the actual physical position of a specific pixel-area - may change e.g. due to initialization or hardware-exchange. Particularly the hardware exchange, even the exchange of the slot position of a specific graphics card, may change the whole setup dramatically. Therefore the persistent storage of desktop scripts with geometry-positions should address logically without physical dependency.

6.2 Logical Display Addressing by the UnifiedSessionsManager

The applied scheme for logical addressing is - as the main philosophy - kept as simple as possible, therefore just relies on the standard means of the X11 configuration files. The specific approach is to utilize the X11 feature of user specific section/screen address labels for multiple display. These could be simply registered by editing the file

`/etc/X11/xorg.conf`

The custom labels are from then on valid screen aliases for the specific array of pixels of the defined screen. Particularly in case of hardware changes the only thing to change is the label within the xorg.conf file, the bunch of user specific desktop configurations could remain unchanged.

An extract from an example file is given in the following figure. The Section **ServerLayout** is the logical overall screen, whereas the **Screen** sub-sections represent specific **pixel-arrays** mapped to a physical position. Thus by exchange of physical pixel arrays a re-positioning of physical devices could be adapted to previous definitions, and the legacy desktop configurations could be kept unchanged. In this particular case the screen names are defined in accordance to the 2-dimension array-like matrice-layout of the virtual screen. This eases the addressing e.g. by '100x100+766+531:A21', which means the positions are relative to the screen A21. instead of calculating '100x100+2146+1811', which may change completely for HW changes, without physical changes of the screen-position. This results from a logically double-level-remapping of pixels. For further details refer to the User-Manual(Remember the **CCL-3.0 License** with the full scope of **commercial restrictions**).

```
# nvidia-xconfig:
#   X configuration file generated by nvidia-xconfig
# nvidia-xconfig:
#   version 1.0 (buildmeister@builder58) Tue Oct 20 21:25:04 PDT 2009
```

```
Section "ServerLayout"
    Identifier       "ALL"
    Screen           0  "A11" 1280 1024
    Screen           1  "A21" 2560 1024
    Screen           2  "A30" 3840 0
    Screen           3  "A01" 0 1024
    Screen           4  "A00" 0 0
    Screen           5  "A31" 3840 1024
    Screen           6  "A10" 1280 0
    Screen           7  "A20" 2560 0
    InputDevice      "Keyboard0" "CoreKeyboard"
    InputDevice      "Mouse0" "CorePointer"
    Option           "Xinerama" "1"
EndSection
```

```
Section "Files"
    FontPath          "unix/:7100"
```

```

EndSection

Section "Module"
    Load      "dbe"
    Load      "extmod"
    Load      "type1"
    Load      "freetype"
    Load      "glx"
EndSection

Section "ServerFlags"

# Removed Option "Xinerama" "1"
# Removed Option "Xinerama" "0"
    Option    "Xinerama" "1"
EndSection

Section "InputDevice"

    # generated from default

```

The following (independent) example depicts the resulting mapping required for actually unchanged virtual display positions in case of physical re-ordering of pixels.

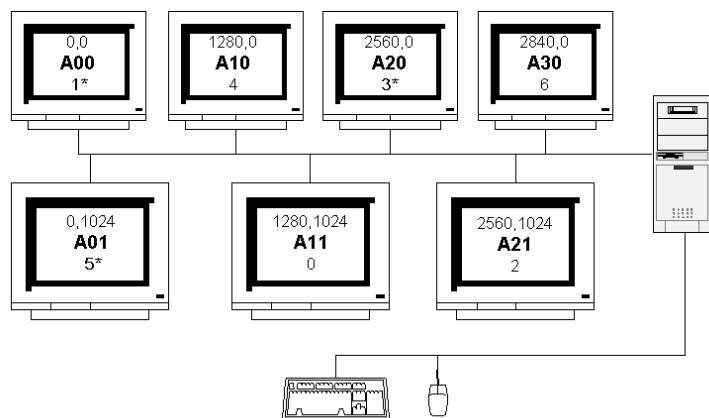


Figure 29: Physical Xinerama-Mapping

7 Examples

The following examples show some additional exemplary cases of convenience integration into gnome by simple menus.

7.1 Demo-Desktop

The following desktop demonstrates the automated setup of a complex runtime environment. There are just some positioning restrictions due to limits of some propriatery client applications.

The required menu entry for starting is:

```
/home/userName/bin/ctys demo/vm-desktop-01
```

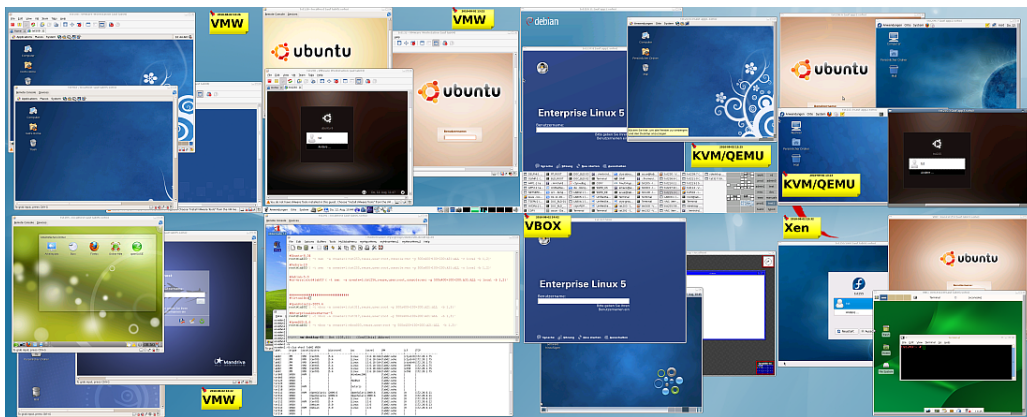


Figure 30: Gnome starter - Demo Desktop

The following extract from the GROUPs file shows the configuration parts for XEN and VBOX.

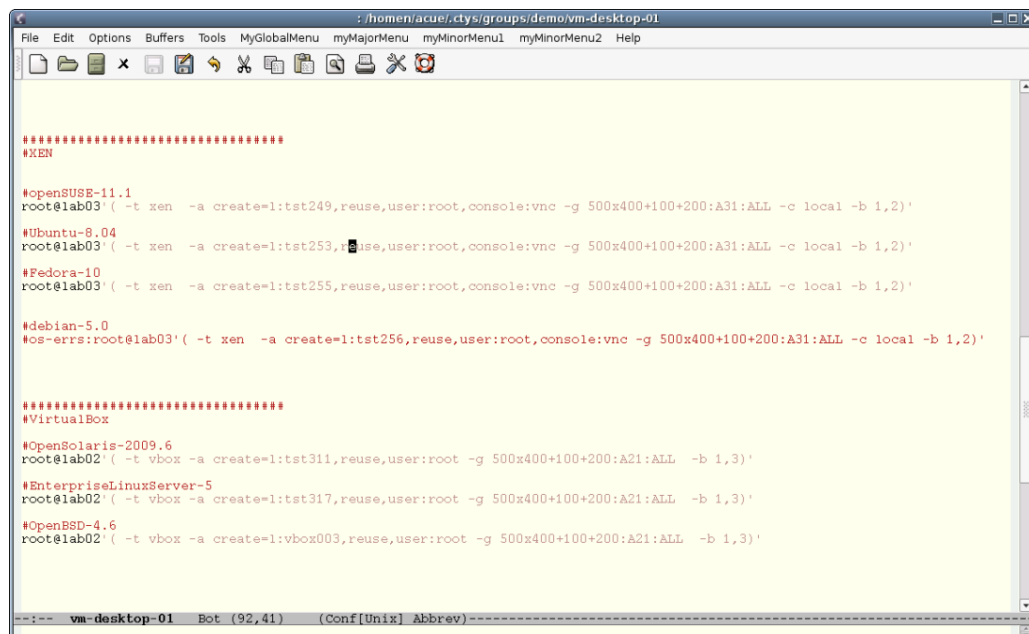


Figure 31: Gnome starter - Extract from GROUP

The ctys-groups(1) command could be used to resolve the entries within the GROUP for cut-and-paste operations.

```

Terminal
Datei Bearbeiten Ansicht Terminal Beiter Hilfe

acue@ws2:~$ ctys-groups -n 5 demo/vm-desktop-01
-----
Groups Sources:
-----

Current group files of:

CTYS_GROUPS_PATH = /homen/acue/.ctys/groups
                  : /mntn/rd/p-open/ctys/src/01.11/ctys-01_11_008/ctys-rt/src/conf/ctys/groups
                  :
                  :
                  : /tmp/ctys.acue/groups

/homen/acue/.ctys/groups
demo/vm-desktop-01:
0: ctys lab05' (-t vmw -a create=l:tst291,reuse,user:tst%tst1 -g 500x400+0+200:A11:ALL -b 1,2)'
1: ctys lab04' (-t vmw -a create=l:tst508,reuse,user:tst%tst1 -g 500x400+0+0:A00:ALL -b 1,2)'
2: ctys lab05' (-t vmw -a create=l:tst502,reuse,user:tst%tst1 -g 500x400+0+0:A00:ALL -b 1,2)'
3: ctys lab04' (-t vmw -a create=l:tst112,reuse,user:tst%tst1 -g 500x400+0+0:A00:ALL -b 1,2)'
4: ctys lab05' (-t vmw -a create=l:tst205,reuse,user:tst%tst1 -g 500x400+200+200:A01:ALL -b 1,2)'
5: ctys lab05' (-t vmw -a create=l:tst003,reuse,user:tst%tst1 -g 500x400+0+400:A01:ALL -b 1,2)'
6: ctys lab05' (-t vmw -a create=l:tst203,reuse,user:tst%tst1 -g 500x400+300+600:A01:ALL -b 1,2)'
7: ctys lab05' (-t vmw -a create=l:tst128,reuse,user:tst%tst1 -g 500x400+0+0:A10:ALL -b 1,2 -c local)'
8: ctys lab04' (-t vmw -a create=l:tst132,reuse,user:$USER -g 500x400+100+200:A10:ALL -b 1,2)'
9: ctys lab04' (-t vmw -a create=l:tst230,reuse,user:$USER -g 500x400+300+400:A10:ALL -b 1,2)'
10: ctys app1' (-t qemu -a create=l:tst237,reuse,user:$USER -g 500x400+400+800:A20:ALL -b 1,2)'
11: ctys app1' (-t qemu -a create=l:tst213,reuse,user:$USER -g 500x400+0+0:A20:ALL -b 1,2)'
12: ctys app1' (-t qemu -a create=l:tst210,reuse -g 500x400+0+0:A20:ALL -b 1,2)'
13: ctys app2' (-t qemu -a create=l:tst236,reuse,user:$USER -g 500x400+100+200:A30:ALL -b 1,2)'
14: ctys app2' (-t qemu -a create=l:tst215,reuse,user:$USER -g 500x400+300+400:A30:ALL -b 1,2)'
15: ctys app2' (-t qemu -a create=l:tst239,reuse,user:$USER -g 500x400+100+200:A30:ALL -b 1,2)'
16: ctys app2' (-t qemu -a create=l:tst211,reuse,user:$USER -g 500x400+300+400:A30:ALL -b 1,2)'
17: ctys root@lab03' (-t xen -a create=l:tst249,reuse,user:root,console:vnc -g 500x400+100+200:A31:ALL -c local -b 1,2)'
18: ctys root@lab03' (-t xen -a create=l:tst253,reuse,user:root,console:vnc -g 500x400+100+200:A31:ALL -c local -b 1,2)'
19: ctys root@lab03' (-t xen -a create=l:tst255,reuse,user:root,console:vnc -g 500x400+100+200:A31:ALL -c local -b 1,2)'
20: ctys root@lab02' (-t vbox -a create=l:tst311,reuse,user:root -g 500x400+100+200:A21:ALL -b 1,3)'
21: ctys root@lab02' (-t vbox -a create=l:tst317,reuse,user:root -g 500x400+100+200:A21:ALL -b 1,3)'
22: ctys root@lab02' (-t vbox -a create=l:vbox003,reuse,user:root -g 500x400+100+200:A21:ALL -b 1,3)'

/mntn/rd/p-open/ctys/src/01.11/ctys-01_11_008/ctys-rt/src/conf/ctys/groups
/tmp/ctys.acue/groups
acue@ws2:~$

```

Figure 32: Gnome starter - Display of resolved GROUP

7.2 Single Machine Entry

This example shows an entry for a single VM. The actual menu entry is written within one line:

```
/homen/acue/bin/ctys
delphi'(
  -t vmw
  -a create=reuse,l:office001,b:/mntn/vmpool/vmpool03/vmw/office,user:acue
  -g 1268x994:A11:ALL
  -b 1
  -c local
),'
```

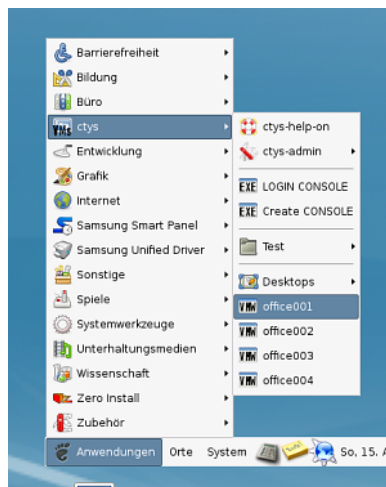


Figure 33: Gnome starter single entry - Menu

This menu entry starts a VM for example here on a VMware Server-2(TM). It has to be recognised that the whole command line is visible in clear text by 'ps' command on the local machine, and at least partially on the target machine. The intermediate connection is encrypted by OpenSSH. Additionally menu entries are stored within files, which must not contain any serious passwords at all. Thus for security reasons in this case the username is provided only, the password is entered interactively.



Figure 34: Gnome starter LOGIN - VMWRC Login

The started Windows2000(TM) desktop in this case could be seen as 'second level menu entry' for virtual applications.

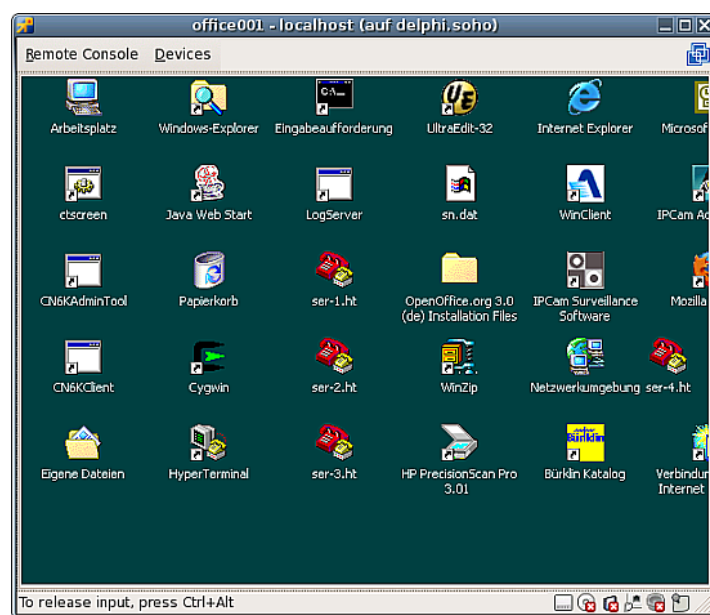


Figure 35: Gnome starter LOGIN - Started W2K desktop

7.3 PABX with VLAN-Gateway

This example shows an entry for the maintenance of two PABXs, where one is an Asterisk PABX on a distinct VoIP VLAN.

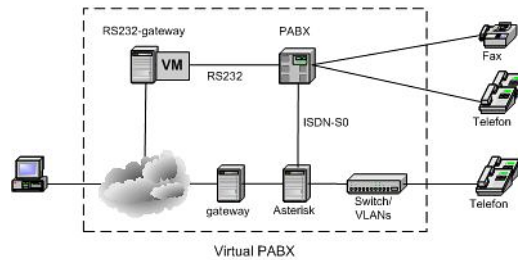


Figure 36: Gnome starter PABX - Interconnection Structure

The interconnection is setup by an intermediate gateway, which is passed by the utility 'ctys-beamer'.

```
ctys-beamer -Y --x11 -R root@tserv00 -b async --beam-this \
  ctys -Y -a create=1:PABX2,reuse root@192.168.50.1
```

The resulting starter script is

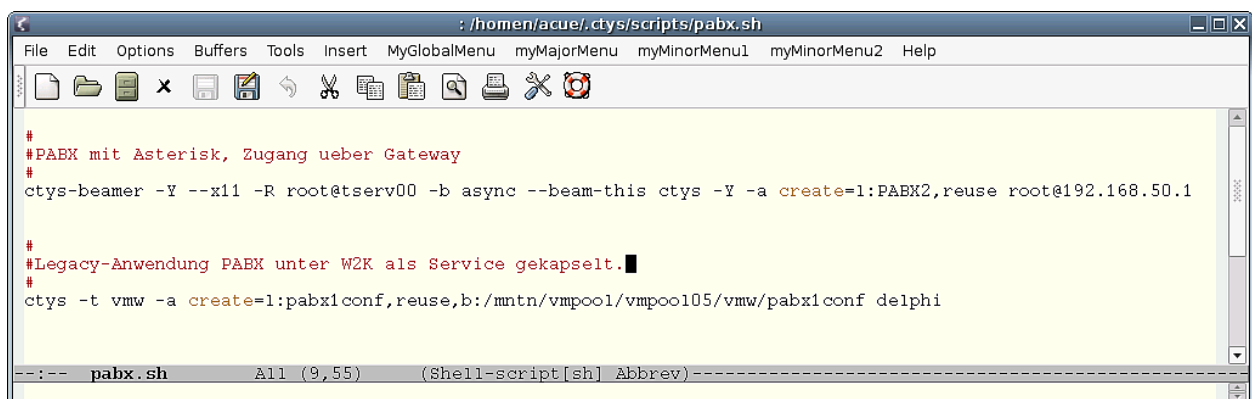


Figure 37: Gnome starter PABX - Script

The actual menu entry is:

pabx.sh

which could be started as:

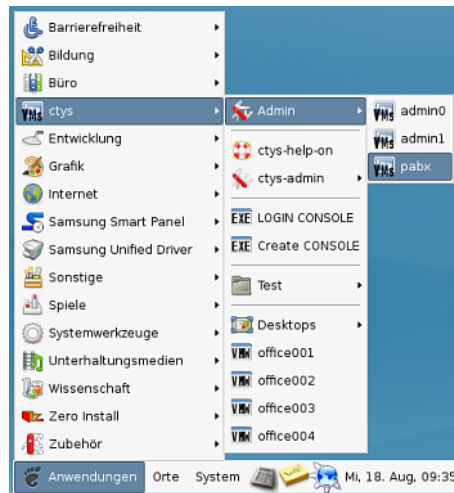


Figure 38: Gnome starter PABX - menu

This opens the two views, on the left the VM containing the legacy configuration and monitoring utility from the '90s' running on the local segment interconnected by an RS232 on one gateway. The right view shows the Asterisk master PABX which is running on the VoIP gateway within another VLAN, thus has to be interconnected by a TCP/IP gateway.

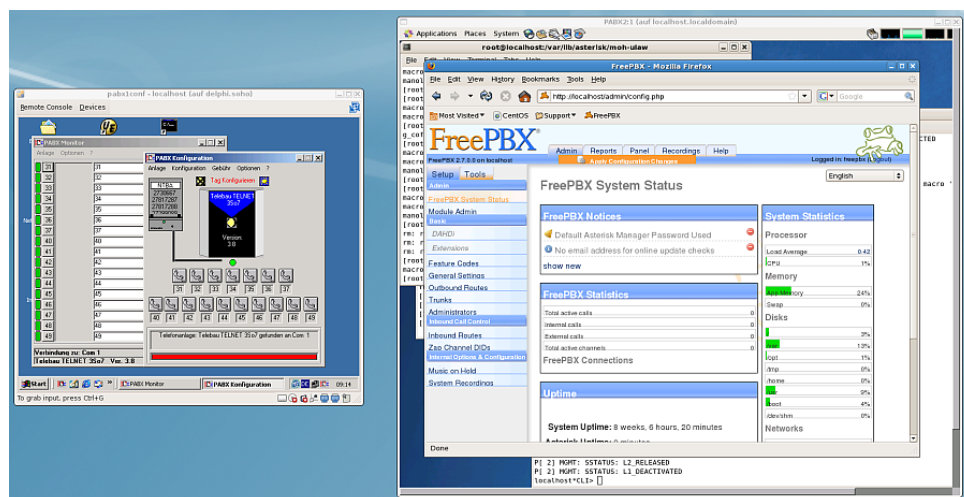


Figure 39: Gnome starter PABX - Asterisk

REMARK:

Due to some limits by OpenSSH for handling of specific interfaces on the targeted TCP/IP gateway, eventually some static routing for specific hosts on different VLANs is required.

8 SEE ALSO

ctys(1) , *ctys-config(1)* , *ctys-groups(1)* , *ctys-macros(1)* , *ctys-scripts(1)* , *gnome-starter(1)* , *ctys-xdg(1)* , *ctys-vdbgen(1)* , *ctys-vhost(1)* , *zenity(1)*

For standards:

Freedesktop: <<http://www.freedesktop.org>>

Xorg: <<http://www.x.org>>

For implementations:

FVWM: <<http://www.fvwm.org>>

Gnome: <<http://www.gnome.org>>

KDE: <<http://www.kde.org>>

XFCE: <<http://www.xfce.org>>

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Berlios.de: <<http://ctys.berlios.de>>
Commercial: <<http://www.i4p.com>>



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