terra soft®
SOLUTIONS

Does a new chip in and of itself
drive **innovation**?

Or do the delivery vehicles of this new technology spark the **imagination** of the industry?

Cell-*ebration*

A brief history of Terra Soft's 3 years experience with Cell.

Capturing the human **creative spirit**,
the Cell Broadband Engine and Terra Soft's Yellow Dog Linux have together driven robot vehicles, probed the universe for black holes, and provided a rich, **dynamic** desktop **experience**.

Mercury Computer

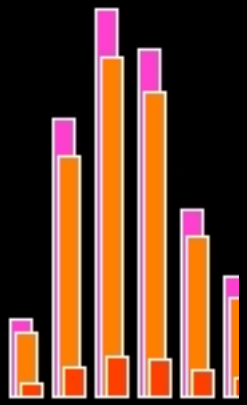
Terra Soft contracted to provide Linux
Board Support Package for the Mercury Cell blade.

November 2005

Sony Computer Entertainment

Terra Soft contracted to provide Linux OS for the PLAYSTATION3

June 2006



In the fall of 2006, Terra Soft launched Yellow Dog Linux v5.0 for the PS3, driving more than **1,000,000 hits** and 30,000 visitors to its website per day.

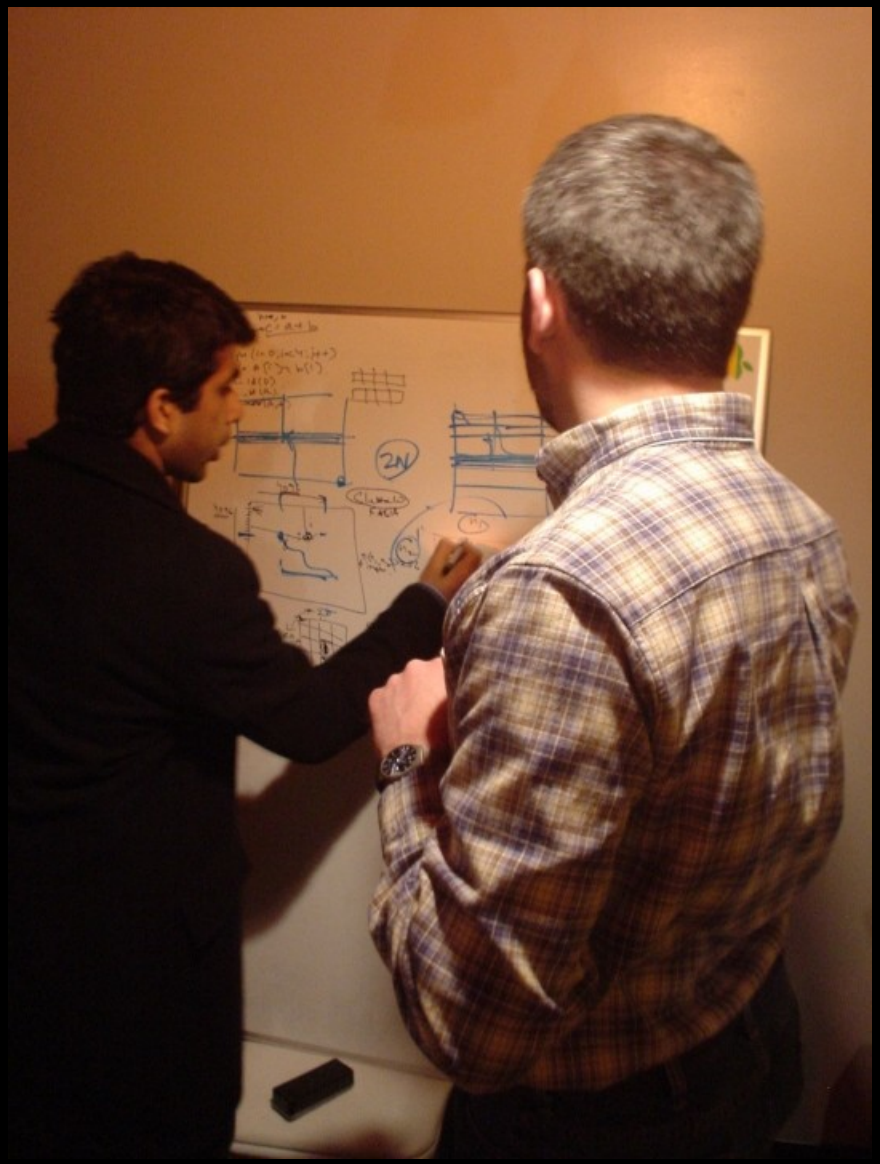
“Hack-a-thon”

Terra Soft hosts hands-on Cell development workshop in Loveland, Colorado, providing first access to PS3 and IBM Cell blade technology.

January 2007

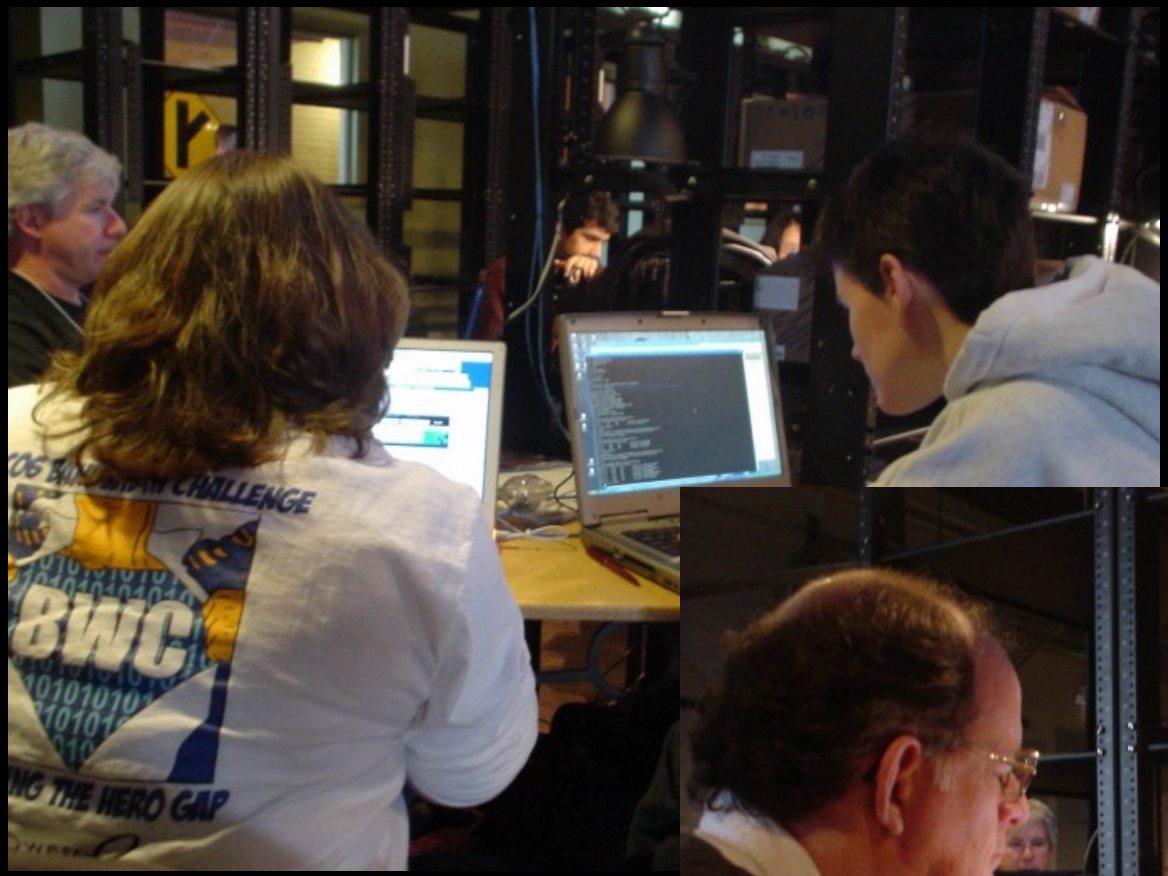
Attendees comprised of more than 40 individuals from:

- Argonne National Lab
- Los Alamos National Lab
- Georgia Southern University
- UC Boulder
- Colorado State
- Indiana University
- Purdue
- UCLA
- UCAR/NCAR
- Boeing-SVS
- IBM Research Labs, Mercury Computer, and RapidMind.



In 8 days, the Hack-a-thon produced the world's first optimized Cell code for realworld use. These initial Consortium members worked in a collaborative fashion on:

- BLAST
- ClustalW
- Dot Product
- Kernel Probe
- Life Sciences
- Mesa
- SDK v2.0
- VR, Visualization, Games
- A Windows cross development environment for Cell


CHALLENGE
BWC
THE HERO GAP

The Mesa project in particular stands out as a success with a demonstrated increase in performance over the PPU alone:

- Speed ratio in frames/s 7 : 1
- Speed ratio in million fragments/s 80 : 1

“The hack-a-thon is an interesting exercise in social & commercial collaboration ... the break-down of day-to-day barriers that otherwise interfere with open collaboration and research, while fostering and building relationships between individuals of cross disciplines and industries that might not have occurred on their own. To my taste, the working server lab designed to house a powerful cluster is a wonderful backdrop, underscoring the stated mission and target outputs." --Michael Paolini, IBM Master Inventor

Terra Soft was in the news with feature articles in a dozen publications and cover stories for Linux Journal, PS3 User, Heise of Germany and Impress Japan.

Heise shipped 50,000 copies of YDL, Impress Japan 20,000.

Hack-a-thon II

At the Power Architecture Developer Conference,
Austin, Texas, IBM sponsored this second,
unique event which focused on building PS3 clusters.

September 2007

NEAL KOCUREK MEMORIAL
Power Architecture Dev. Conf.
Cell Hack-a-Thon II
September 22 - 25, 2007
AUSTIN CONVENTION CENTER

IBM

Terra Soft contracted to provide Linux Board Support Package for the QS21 blade.

October 2007

Built upon CentOS (RHEL), this first release of the Yellow Dog Linux v6.0 operating system was fully tested against the IBM Cell SDK v3.0 both by Terra Soft and IBM staff.

Yellow Dog Linux is the only Linux OS to ship with the IBM SDK and make it available from the installer.

Axion Racing Team

DARPA Autonomous Vehicle Challenge

Victorville, California

November 2007

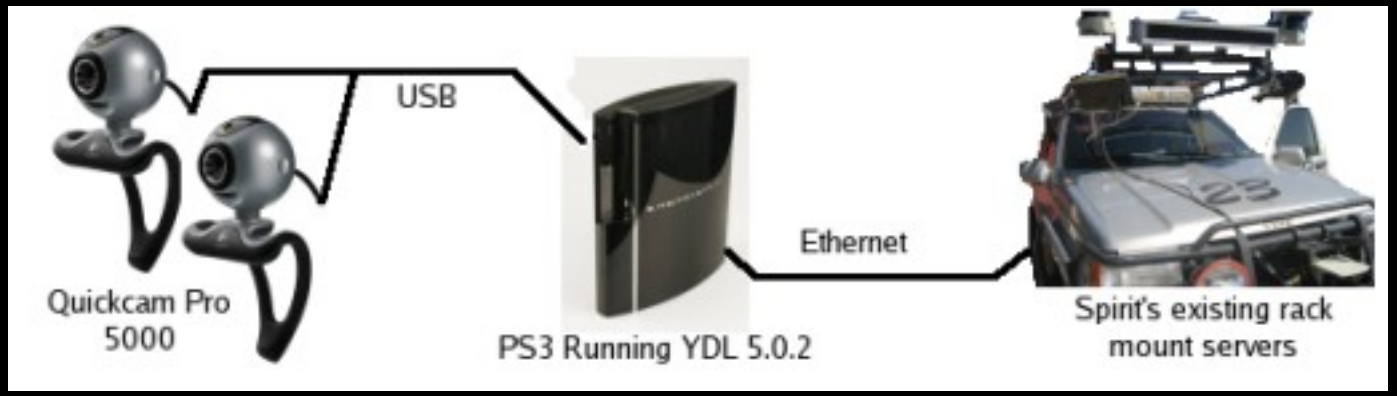
The Yellow Dog Learns to Drive

Terra Soft Solutions lent an innovative hand to the Axion Racing team with a Sony PS3 running Yellow Dog Linux to assist with on-board, realtime image processing system.

- In 10 days, Terra Soft's Bill Mueller ported, wrote, and optimized code for a Yellow Dog Linux PS3 connected to an RGB camera.
- This realtime image processing system enabled the robot vehicle to “see” the street terrain and avoid obstacles.
- The RGB camera is tied into the Axion arbitrator and other computerized sensors to help determine the best path for the 3/4 ton Jeep.
- All sensors vote and then send commands to actuators that control steering, gas, and brakes for the vehicle.

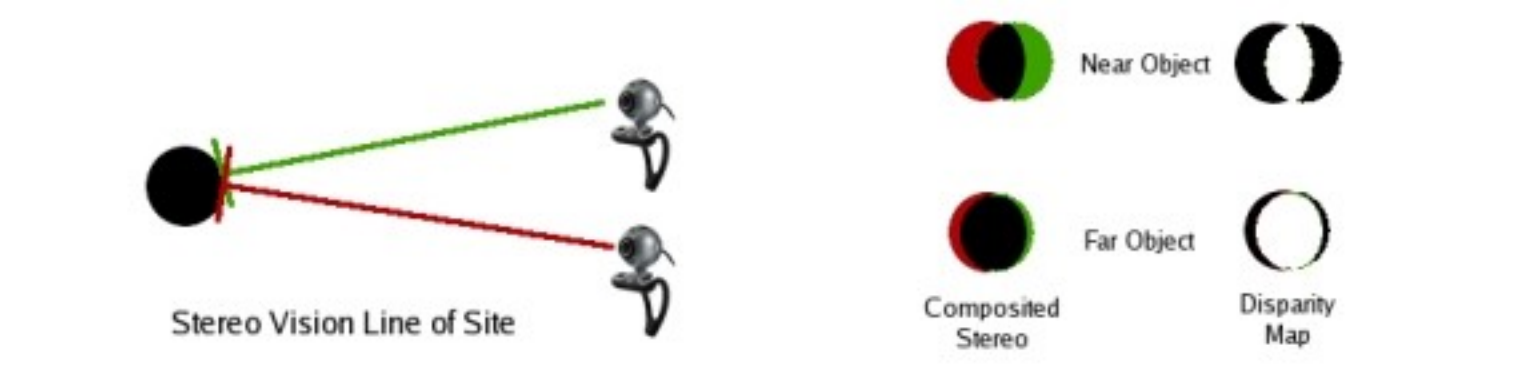
Architecture Overview

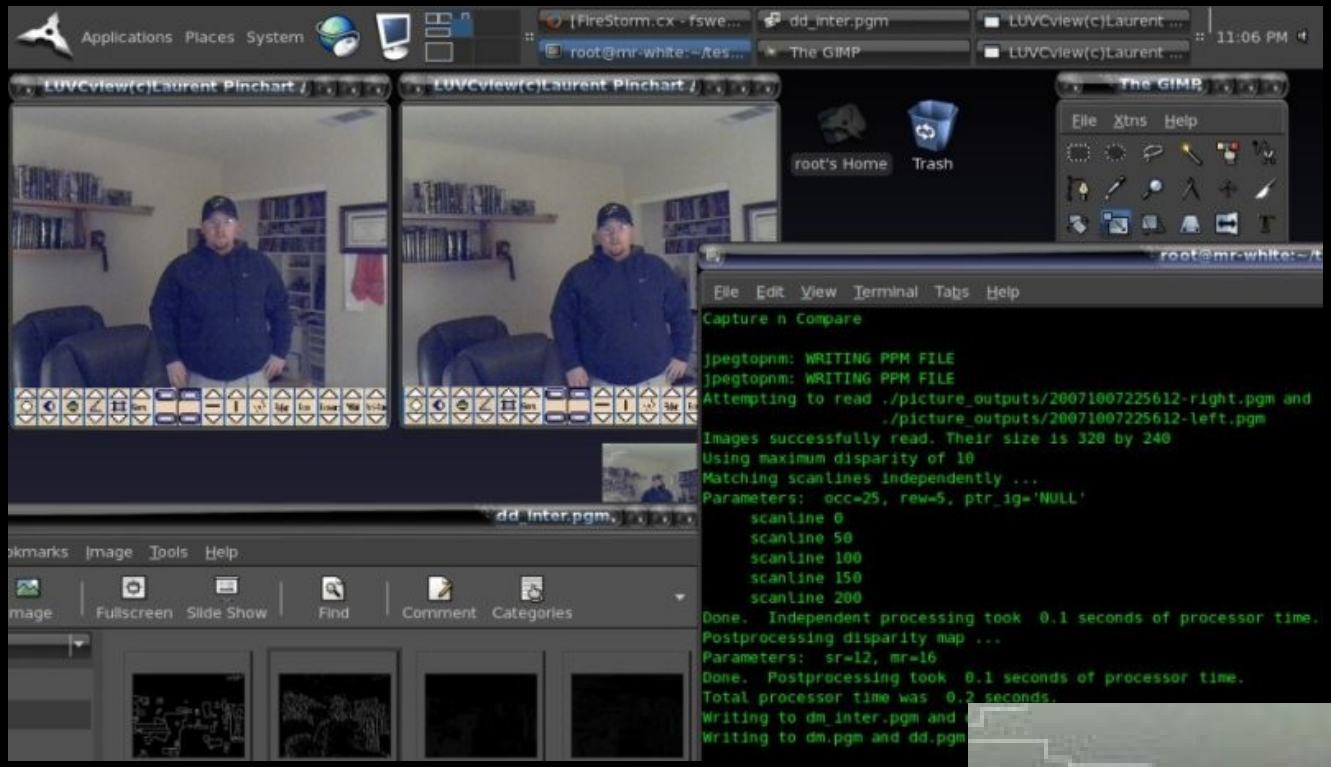
Two Logitech Quickcam Pro 5000's are connected via USB to the PS3 running YDL 5.0.2. The PS3 is connected to Spirit's Dell server rack over 100Mb ethernet. The PS3 captures the images, processes the data, and sends a message to Spirit indicating the presence, distance, and general direction of obstacle.



Stereo Vision Concept

The two cameras are placed side by side. Pictures from the right and left cameras are taken simultaneously. This data is fed into an algorithm that detects apparent shift of objects in the images which generates a disparity map. The greater the shift, the higher the value in the disparity map.

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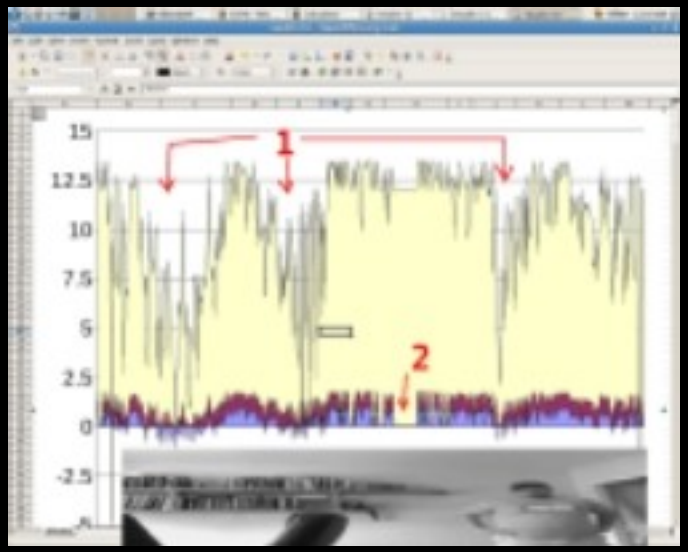
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DeWALT

How did we do?

We were the first ...

... to crash into a human driven vehicle :(

Astrophysicist Replaces Supercomputer with Sony PLAYSTATION3s

Cluster of 8 PS3s solving a celestial mystery involving gravitational waves and what happens when a super-massive black hole, about a million times the mass of our own sun, swallows up a star.

"The interest in the PS3 really was for two main reasons," explains Gaurav Khanna, assistant professor at the University of Massachusetts, Dartmouth who specializes in computational astrophysics.

- The Sony PS3 runs open source Linux.
- The console's Cell processor, co-developed by Sony, IBM and Toshiba, delivers massive amounts of power ... comparable to that of a supercomputer.
- Running simulations to detect gravitational waves ... postulated for almost 100 years but never observed.

MIT Prepares PS3 Programming Guide

Students learned about the new Cell microprocessor and then designed and implemented projects to run directly on PS3 consoles running Yellow Dog Linux.

Georgia Tech Optimizes Libraries for Cell

Cellbuzz is a collection of libraries optimized for the Cell/B.E., which cover a wide domain of application areas such as signal processing, video / imaging, compression / decompression, and data encryption / decryption.

Commercial Software tools for Cell

- Terra Soft's Yellow Dog Linux OS.
- Mercury Computer optimized libraries.
- RapidMind compiler tools.
- Allinea debugging and profiling tools.
- Gedae productivity enhancing IDE.

More information at:
www.terrasoftsolutions.com/products/ydl/devel-isv.shtml

Yellow Dog **Linux**

FOR SONY PS3 - IBM CELL - APPLE POWER PC

Featuring the E17 Desktop

Yellow Dog Linux

Since 1999, Terra Soft has devoted its engineering and product development resources to the Power architecture, emerging as a leader in both Power Linux and open source development.

Yellow Dog Linux v6.0

- YDL offers a single, easily installed DVD with Guide to Installation, on-line HOWTOs, both paid and free, community support.

- YDL v6.0 maintains binary compatibility with Apple G3-G4 Macs, IBM System p and Cell blades, PA Semi PWficient based systems, a full line of Freescale boards, and AMCC 440/460 based systems.

- YDL is available with a Japanese language installer and default Japanese language desktop from Terra Soft's long-standing reseller-partner Amulet (www.amulet.co.jp).

Terra Soft -- Linux for Cell, PlayStation PS3, QS20, QS21, QS22, IBM System p, Mercury Cell, and Apple PowerPC. - Mozilla...

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http://www.terrasoftsolutions.com/tss_home.s

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High Performance Linux Computin

THE STORE : SOLUTIONS : SOFTWARE : SERVICES : SUPPORT : SHOWCASE : YDL.NET : COMPANY

Terra Soft Wants You!

Do you have a HOWTO to share or a Story to tell? If your submission is posted on the TSS website, you will receive a T-shirt, flippy, cooler and/or YDL.net account. Learn how!

IN THE NEWS

Press Release: 5 Feburary 2008
Terra Soft Releases YDL v6.0 for Apple PowerPC, Sony PS3, IBM System P

Announcement: 25 January 2008
Terra Soft Requests Donations for Kenyan Orphanage

Announcement: 24 January 2008
Terra Soft Sponsors Inaugural International Short Film Festival

Press Release: 13 November 2007
Y-Film Delivers Tools for Professional VFX Production Shops

Press Release: 12 November 2007
Terra Soft Offers Support for the IBM QS21 Cell Blade with support for the IBM Cell SDK v3.0.

WHAT'S NEW FROM TSS

1TF for < $18k
New PS3 clusters from Terra Soft offer even less expensive, Teraflop performance on Cell processors.
Available from the TSS Store now!

GEEKS CORNER

Cell*ebration* Showcase

- Black hole research on PS3s, YDL.
- The Yellow Dog learns to drive.
- Turn a PS3 into a PVR.
- IBMers Build Box-trees Cluster

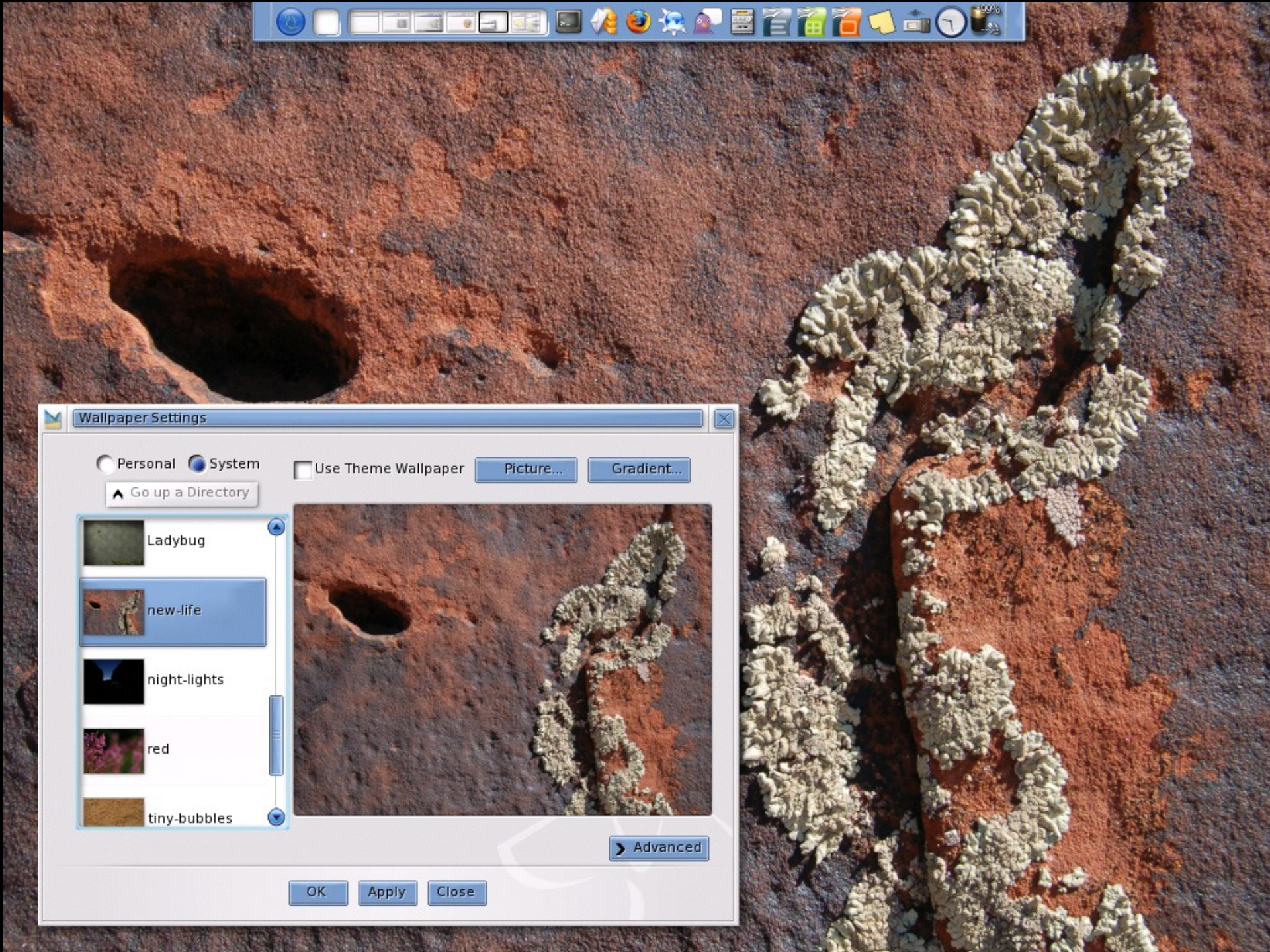
Find: yum Next Previous Highlight all Match case

Done

Yellow Dog Linux VERSION 6

Yellow Dog Linux v6.0 includes:

- E17 & Gnome installed by default, KDE included.
- Gnash, the Flash work-alike.
- Ekiga VoIP, Pidgin IM/IRC, and Fluendo codec installer.
- kernel v2.6.23, gcc v4.1.1, gblic v2.5, and Eclipse v3.2.2
- The only Linux distro to include the Cell SDK v3.0.
- IBM iRT (interactive raytrace) demo available via YDL.net Enhanced.
- More than 2400 packages in all ...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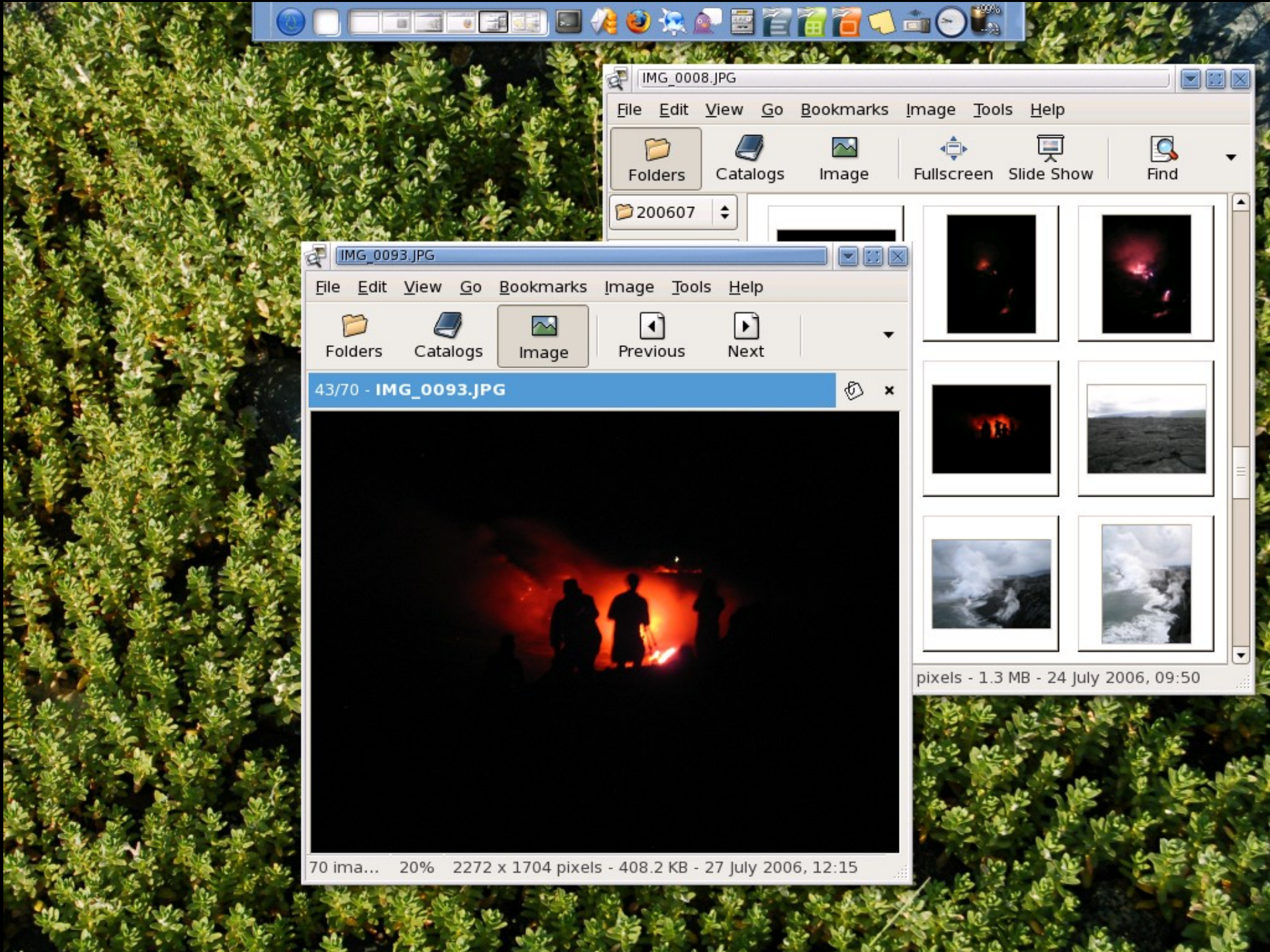
Yellow Dog Linux v6.0 supports:

- Sony PS3.
- Apple PowerPC G4, G5.
- IBM System p (JS2x, 510, 520, 540).
- 802.11b Airport auto-config; Extreme with configuration.
- Audio on all tested machines.
- Sony PS3 Sixaxis game controller.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pixels - 1.3 MB - 24 July 2006, 09:50

Yellow Dog **Linux**

FOR SONY PS3 - IBM CELL - APPLE POWER PC

Featuring the E17 Desktop

Yellow Dog Enterprise Linux

Built upon CentOS, a Red Hat Enterprise Linux (RHEL) based distribution, YDEL is a Yellow Dog Linux foundation coupled with enterprise level support from the leader in Linux for the Power architecture.

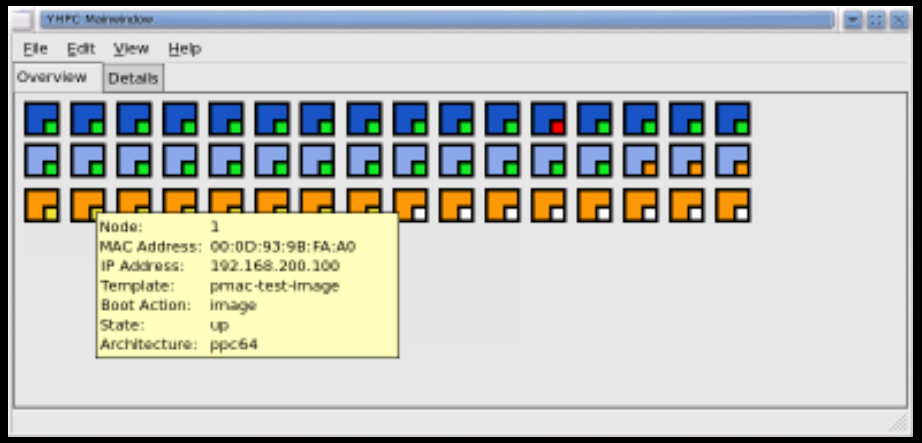
- IBM Cell QS20, QS21, and QS22.
- Technical support by email and telephone.
- Free updates via YDL.net HPC accounts.
- $400 USD per board license per year.

Y-HPC

FOR POWER, X86_64
Cluster Construction Suite

Y-HPC

Y-HPC is the first and only cluster construction suite designed to auto-build and configure both Sony PS3 and IBM Cell blade clusters.



Y-FILM

FOR POWER, X86_64

Film/Video Rendering, Workflow & Asset Mng

Y-Film

A VFX asset manager and workflow pipeline suite.

- Y-Film integrates a time tested Asset Manager, a Workflow Pipeline, an Artist Productivity Tool suite, and an end-to-end Color Management System.

- Y-Film streamlines the production of computer graphics imaging from Windows and OSX desktops to a high performance Linux render farm.

- Y-Film supports x86_64, Power, and Cell render farms.

This is the end of my presentation,
but not of the ***Cell-ebration***.

Kai Staats, CEO
Terra Soft Solutions
kstaats@terrasoftsolutions.com

www.terrasoftsolutions.com/showcase/cellebration/

This presentation was prepared entirely with Yellow Dog Linux and open source tools.