A Story of Linux

To Become Irreplaceable Software Fundamental for Consumer Electronics Products

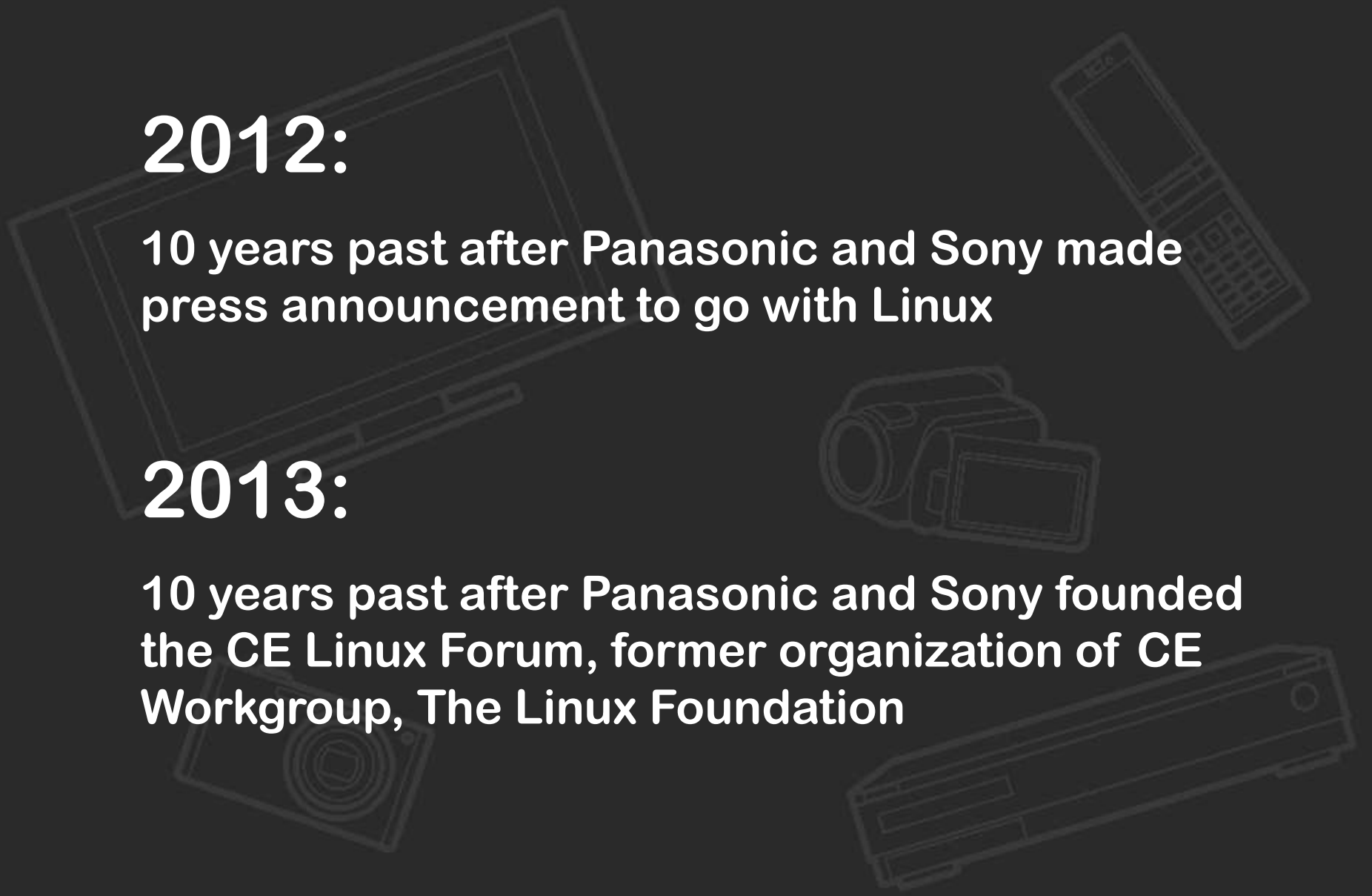
Satoru Ueda
Sony Corporation

注： irreplaceable → かけがえのない

It is too long story to cover within the given time slot

Please do not hesitate asking me to repeat the presentation which I am happy to!

In Japanese? Yes, I DO welcome!



2012:

10 years past after Panasonic and Sony made press announcement to go with Linux

2013:

10 years past after Panasonic and Sony founded the CE Linux Forum, former organization of CE Workgroup, The Linux Foundation

Linux for CE Products
It's already commonsense!

http://www.sony.net/Products/Linux/

Sony source code publication site based on GPL/LGPL requirement

Intention

- For us, CE industry, who have been using Linux for more than 10 years
  - To review our past activities and aim at our future
- For you, who are going to use Linux for your embedded system
  - Encourage going together with Linux and the community

What was right? During past 10 years

- DISCARDED the specification
  - Jumping into the Community and we could learn very important things!
  - “We do something” and “You do something”
  - Efforts especially Japanese engineers to go with global community
- Found out the way of super long term support which only Linux can

注： discard → 捨て去る

What was right? During past 10 years (cont'd)

- Users (Application system providers) oriented initiation of the activities
  - Along with the affiliate industry
- Good balance of top management understandings and grass root efforts
  - Get rid of the hesitation of grass root people
- Started as global initiative from the beginning

What was wrong? During past 10 years

They are too much to mention within this small slide space……

What we have been challenging

- Closer relationship with the community
  - LTSI initiative
  - Community funding project
- Encourage Linux penetration to yet another embedded systems

First of All

Introduction of myself

About me

- **Satoru Ueda**
  - Satoru.Ueda@jp.sony.com
- **Sony corporation**
  - Though graduated *engineering* faculty…
    - Sony have never taken my great technical skill
    - Product planning, Marketing, Business strategy…
  - 2003, a strange offer came to me

A telephone call

January 21st, 2003
Noon time
“ Are you free now?”

Evening January 21st, 2003

"Yes, I'm free" I told

"We're going to begin a joint development project of OS for consumer electronics products together with Panasonic. Can you coordinate the project?"

"Together with Panasonic?"

"Yes, indeed. If we choose Open Source Software, it must be possible, as you know."

"Wow! It means that we are concluded to go with Linux, isn't it!"

He's my boss, who brought me such a mysterious offer.

Back to 2001

CE Industry had faced a great turning point of the software development style

Burst of software scale

- Digital television, Blu-ray recorder…
  - Will become equivalent to top end personal computer
  - Without the face of computer
- Same thing may happen so shortly upon…
  - Digital still camera, video camera
  - Advanced car navigation system
  - Future of cellular phone … and many more

"We definitely need to renovate our software design style with sophisticated Operating System!"

Operating System
for CE products view point

- It was not an easy way to get such ideal software system platform
  - Digital Consumer Electronics embedded system bring hard technical requirements for the operating system

2001

Who cares
"CPU resource"??

Takes **more than one minute** to power on

No immediate reaction when you commanded to change the channel

Disturbance of smooth moving picture play caused by lack of CPU resource

2001

Products vendor responsibility

Battery runs out very quickly. Waste electric power

Users always use the products **for 10 years or even more**

Internet connection increases the **risk of security**

Super Long Term Support

A problem has been detected and Windows has been shut down to prevent damage
to your computer.

The problem seems to be caused by the following file: SPCMDCON.SYS

PAGE_FAULT_IN_NONPAGED_AREA

If this is the first time you've seen this Stop error screen,
restart your computer. If this screen appears again, follow
these steps:

Check to make sure any new hardware or software is properly installed.
If this is a new installation, ask your hardware or software manufacturer
for any Windows updates you might need.

If problems continue, disable or remove any newly installed hardware
or software. Disable BIOS memory options such as caching or shadowing.
If you need to use Safe Mode to remove or disable components, restart
your computer, press F8 to select Advanced Startup Options, and then
select Safe Mode.

Technical information:

*** STOP: 0x00000050 (0xFD3094C2,0x00000001,0xFBFE7617,0x00000000)

*** SPCMDCON.SYS - Address FBFE7617 base at FBFE5000, DateStamp 3d6dd67c

Can you stand this situation?

注： stand → 耐える

3 options

- Home brew
- Buy from others
- Use Open Source Software

The 1st Option Home Brew

注： home brew → 自家製

Engineers can do everything

Engineers can do nothing

They were engaged by many tasks such as new device support, bug fix, new network architecture support, software tools preparation and many thing more!

The 2nd Option
Buy from others

Fear of “Black Box”

“All right, we have registered your report into our database and recognized it caused by some bug. We will fix it at the next major release expected 3 month later. Thank you very much.”

We have much hesitation to embed any black box into our products which will reduce our customer satisfaction level.

The 3rd Option
Use Open Source

Open Source Software

Only one option left for us to take

No OSS at that timing were not supposed to be used for any kind of embedded systems.

We had never experienced the OSS software license, therefore we have concerned the legal issue and patent issue.

Decision to go with Linux!

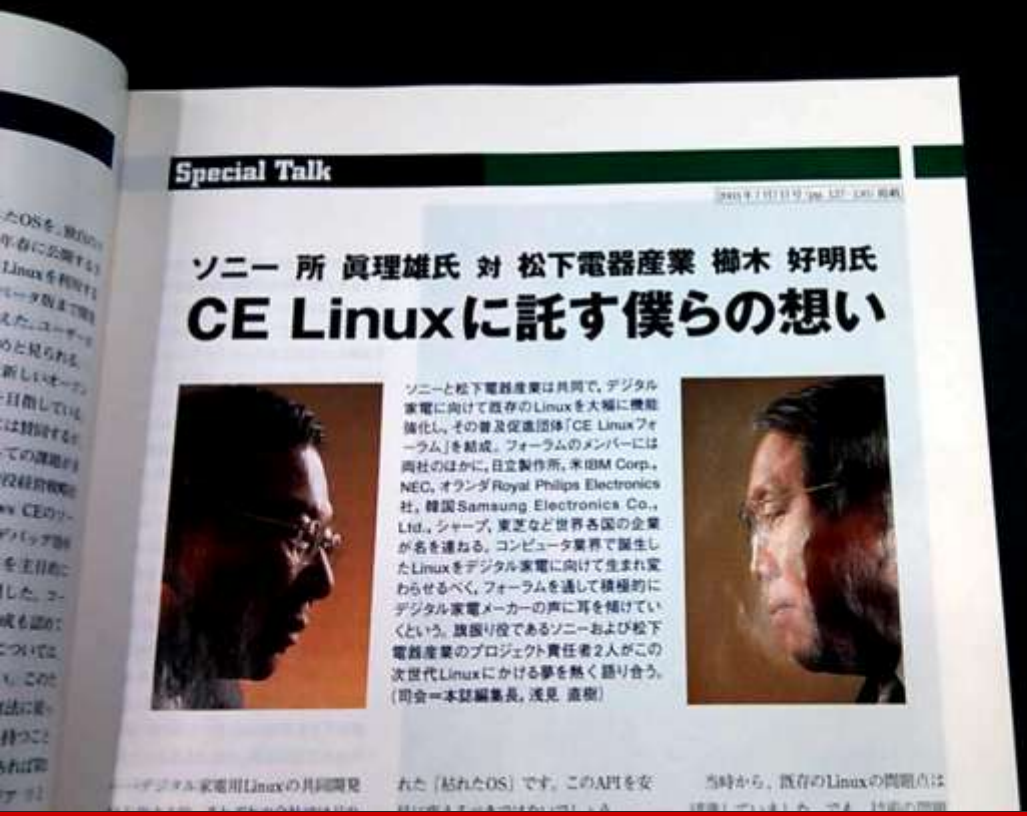
- It was **not because** we anticipated to use **just free of charge software**
- We realized it is the **most ideal and realistic way** to develop the Operating System for our products together with Open Community people

Anticipation for the "beyond barrier" open collaboration

OSS, Not a lonely place

Encounter with Panasonic

A happening among two CTOs from Sony and Panasonic


Special Talk

ソニー 所 眞理雄氏 対 松下電器産業 樋木 好明氏

CE Linuxに託す僕らの想い

ソニーと松下電器産業は共同で、デジタル家電に向けて既存のLinuxを大幅に機能強化し、その普及促進団体「CE Linuxフォーラム」を結成。フォーラムのメンバーには両社のほかに、日立製作所、米IBM Corp.、NEC、オランダRoyal Philips Electronics社、韓国Samsung Electronics Co., Ltd.、シャープ、東芝など世界各国の企業が名を連ねる。コンピュータ業界で誕生したLinuxをデジタル家電に向けて生まれ変わらせるべく、フォーラムを通して積極的にデジタル家電メーカーの声に耳を傾けていくという。旗振り役であるソニーおよび松下電器産業のプロジェクト責任者2人がこの次世代Linuxにかける夢を熱く語り合う。（司会＝本誌編集長、浅見 直樹）

れた［結んだOS］です。このAPIを安

当時から、既存のLinuxの問題点は

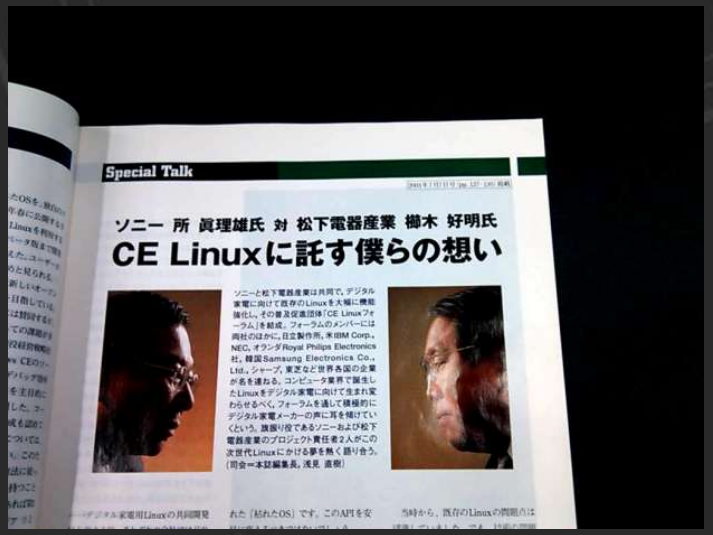
“Are you decided to select Linux for your future OS? We’ve just made the same decision.”

“How about us to collaborate together?”

“That’s great!”

Press announcement in December 2002

Why Sony and Panasonic?


Special Talk

ソニー 所 眞理雄氏 対 松下電器産業 樋木 好明氏

CE Linuxに託す僕らの想い

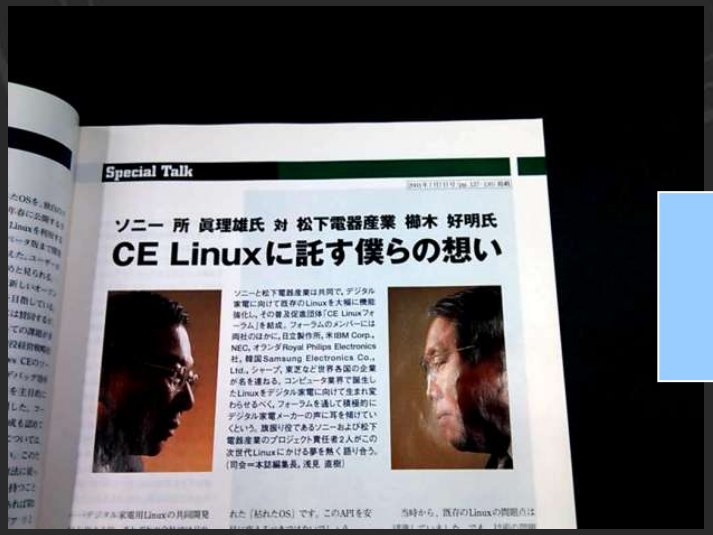
OS is not for product differentiation but common technological fundamental

Both needed the best software platform

Open source way

It enables to get rid of the barrier even such companies which are fighting severely in the business arena

Why not include many companies!


Special Talk

ソニー 所 眞理雄氏 対 松下電器産業 榊木 好明氏

CE Linuxに託す僕らの想い

Expansion to the other CE vendors, Semiconductor vendors and Software developers

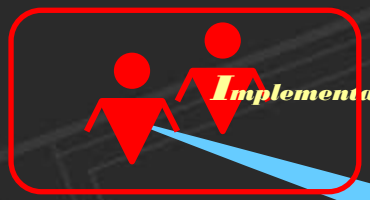
Founded CE Linux Forum in June 2003

My impressions about the community

Something like *The Moldau from "My Country"*

Bedřich Smetana

It begins from a drip of water



Originators of the idea

"It's Cool" phenomenon

People who ignore

Implementation

Implementation

I

I

People saying *"It's Cool!"*

"Stone headed" Managers

People who do not like the idea

A scene at Ottawa Linux Symposium 2006

People who say “It’s cool!”

Note:
bigotry → 片意地を張る
extinct → 絶滅する

Someone may simply reflectively say “It’s Cool”.

But mostly they communicate each other and try to be fully understood the intention, mutually

Try not to be bigotry and listen to the others carefully.

Leave the room to include another intentions or ideas
→ Sometimes intentionally present immature implementation

Whenever they say “It’s cool!” they try to do something for the project.

They do not just say “It’s cool!” but they act.

Through this process, hopeless ideas will be screened and *EXTINCT*

Project supported by the “It’s cool!” network will get into *EVOLUTIONAL* status

Merging another ideas

Implementation

People saying *"It's Cool!"*

Matchmaker

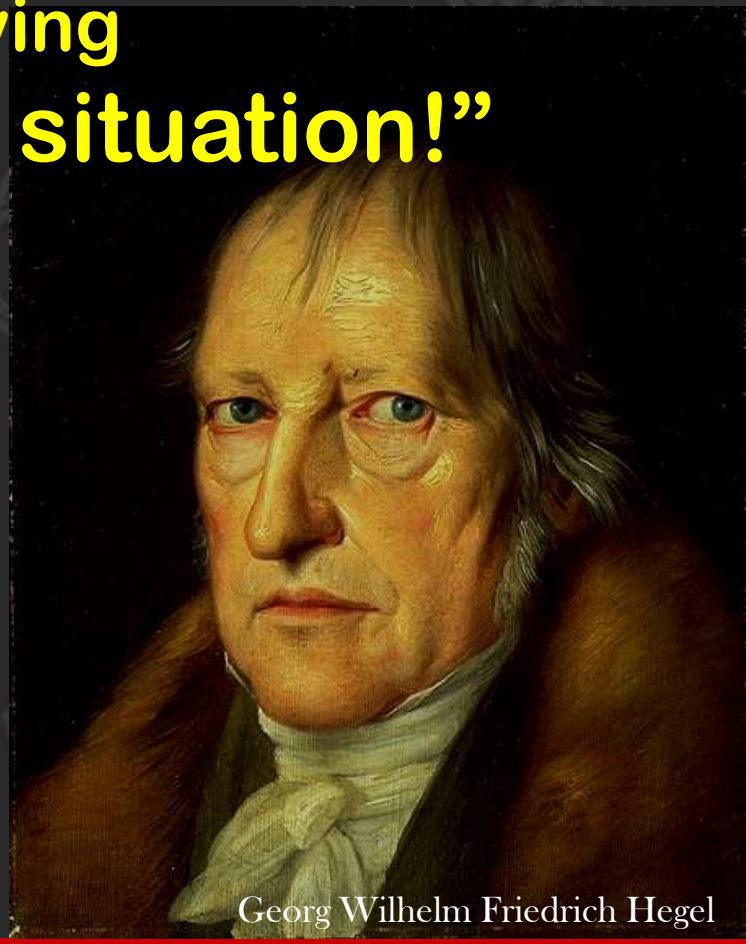
If both of them are flexible enough
it may lead another evolution

Community people always saying

“I like the controversial situation!”

Most of Japanese people hate such condition, though.

Essence of “Dialectic”

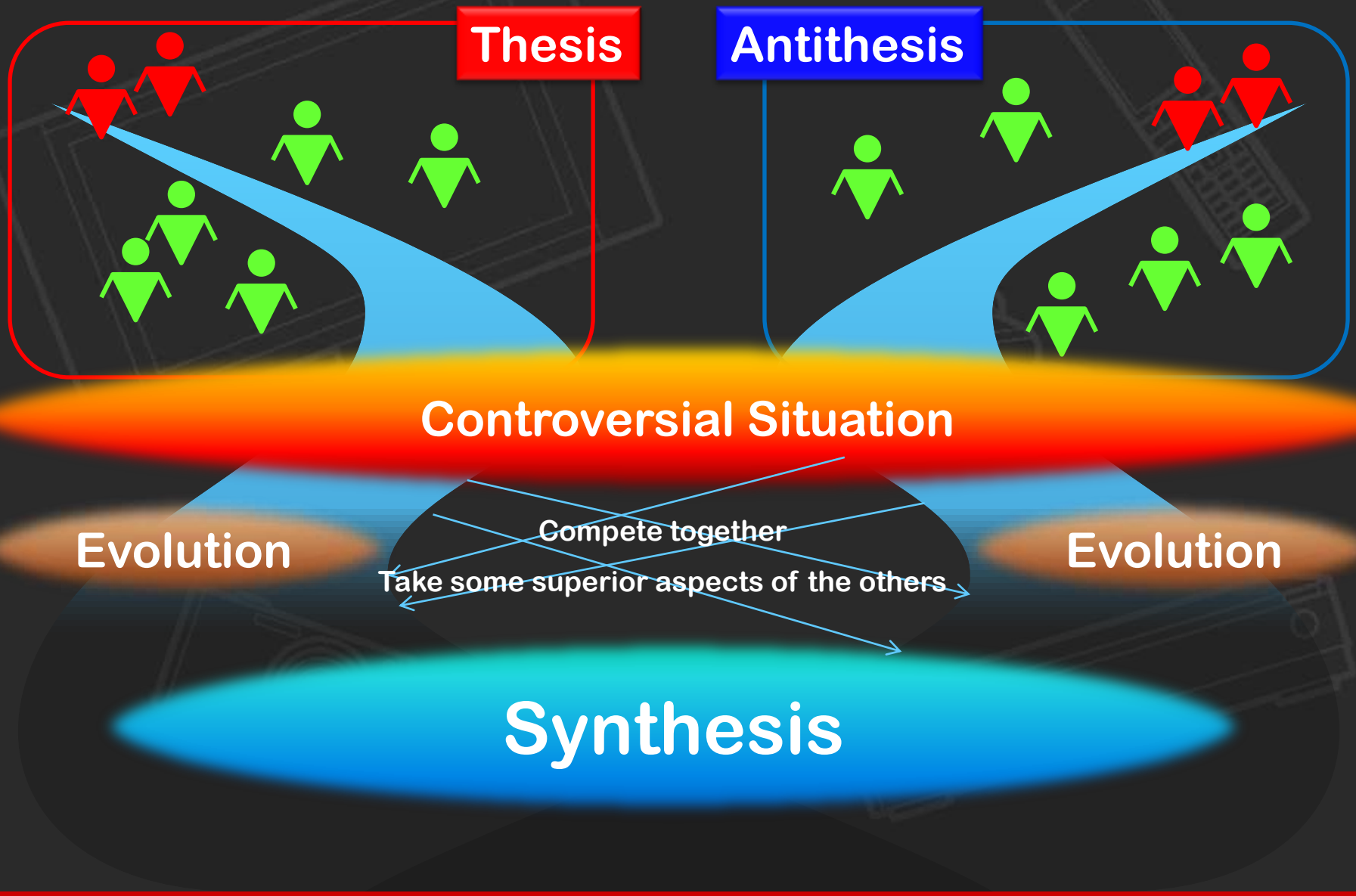


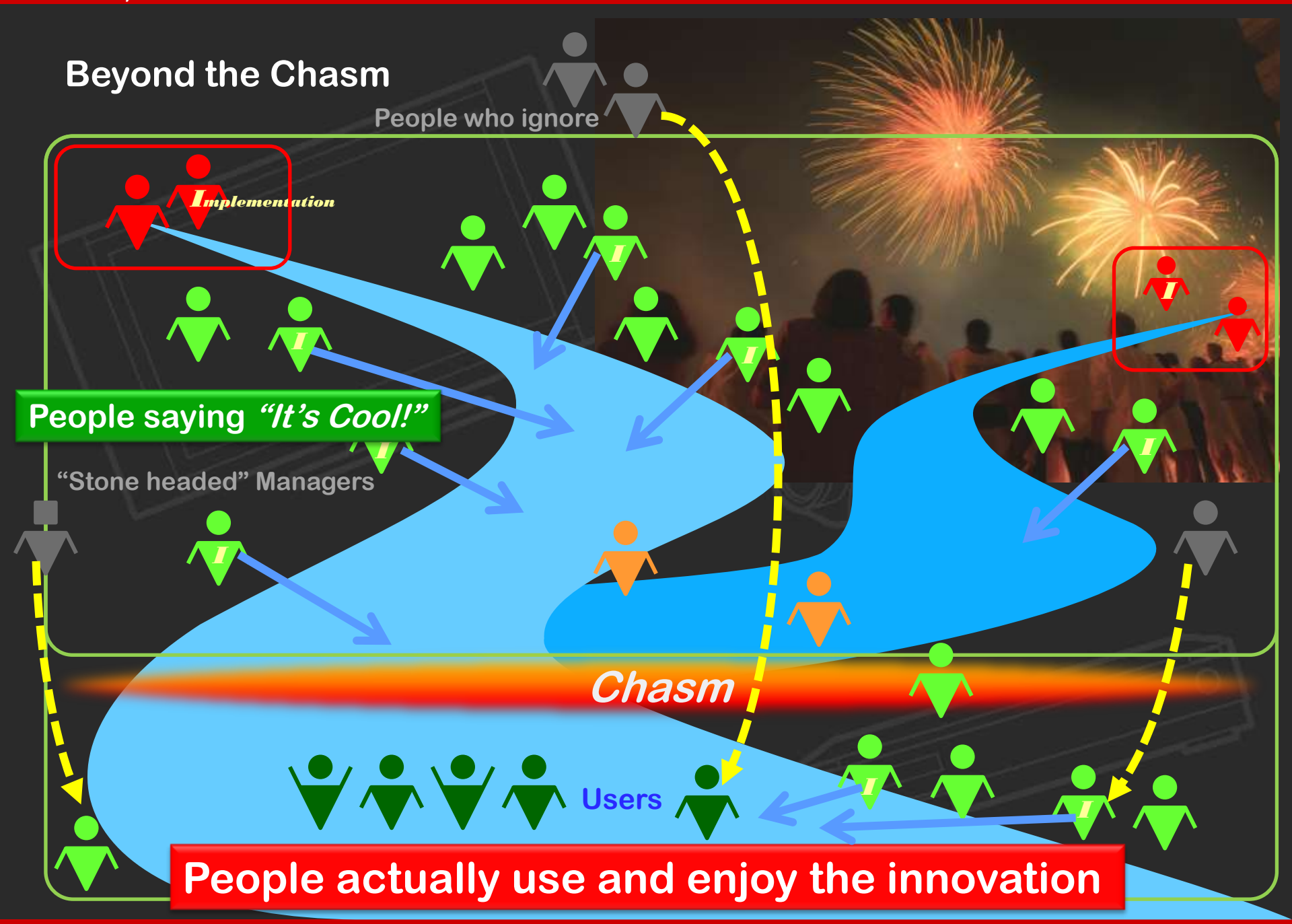
Georg Wilhelm Friedrich Hegel

Note:

Dialectic → 弁証法
Controversial → 喧喧諤諤

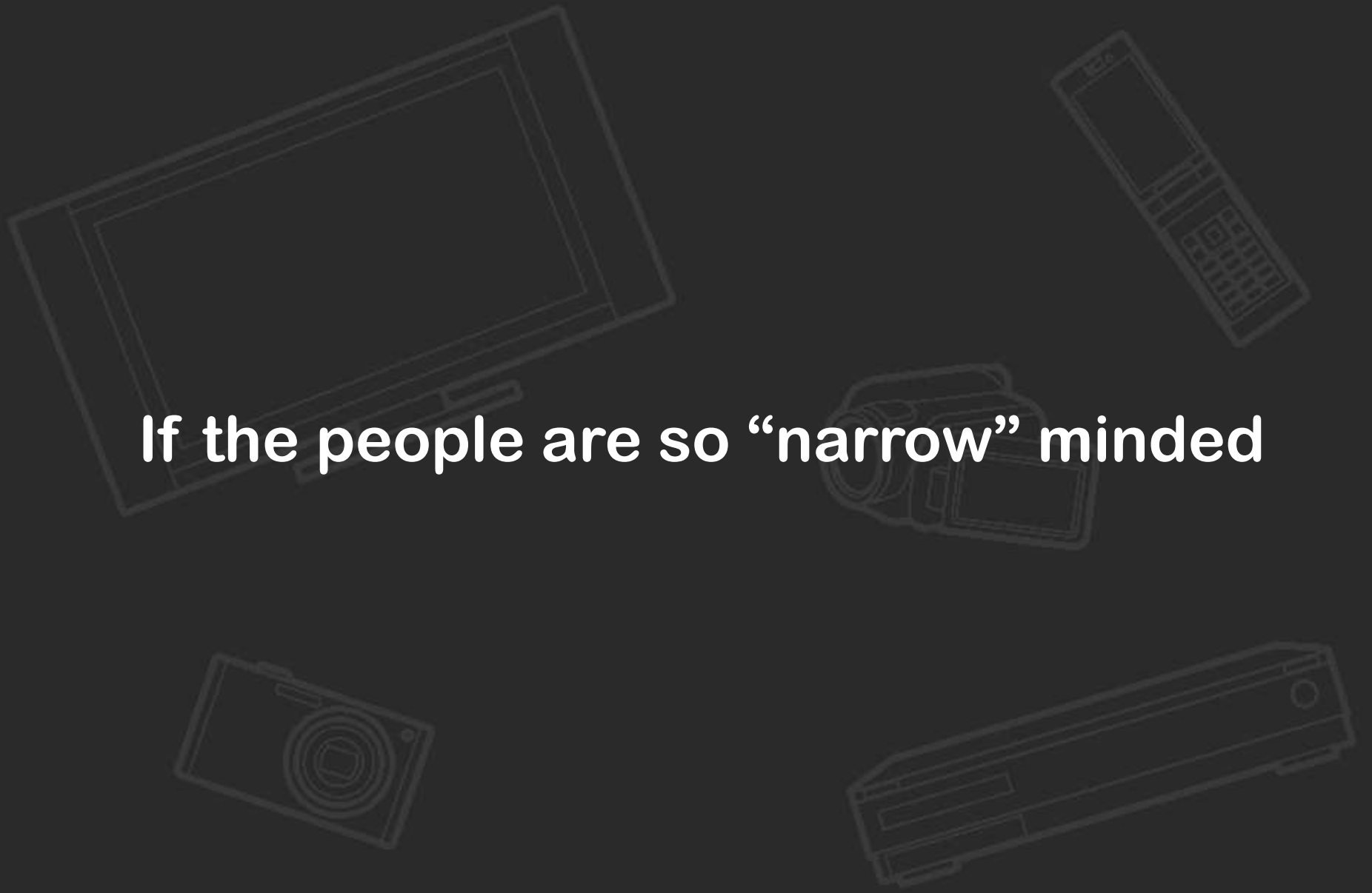
“Aufheben (German)” … Lift




Beyond the Chasm
People who ignore
Implementation
People saying "It's Cool!"
"Stone headed" Managers
Chasm
Users
People actually use and enjoy the innovation

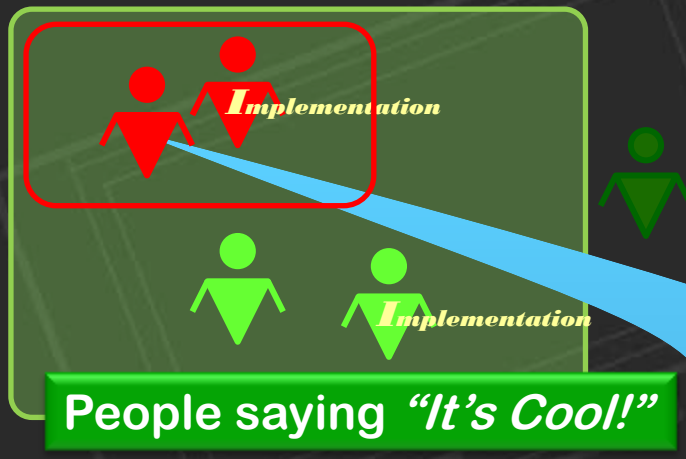
"I like Isaac Newton" Linus Trovalds said Why?

"Standing on the shoulders of giants"
...each other



If the people are so “narrow” minded

"Narrow" minded people

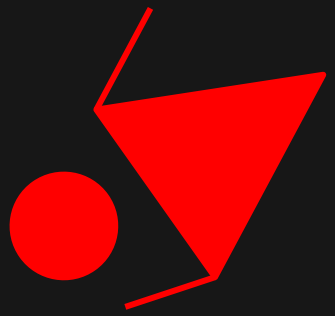


Will *surely* miss the opportunity to meet and collaborate with community mainstream

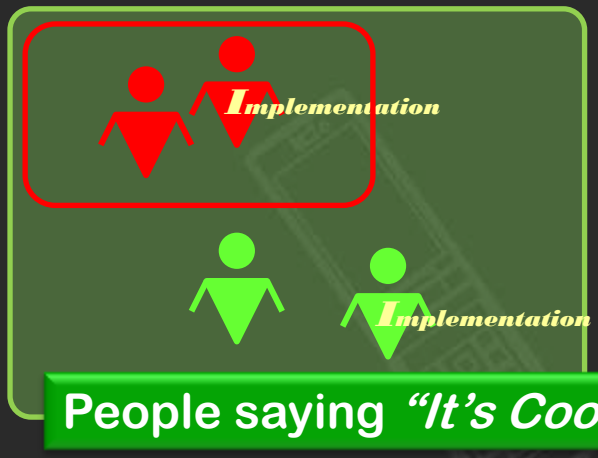
Such complacent idea may have no prospect of evolution together with Community

注： complacent → 自己満足の

“Narrow” minded people



Apart from the community main stream



I know there are some technologies which are required by quite limited people or industry

My impression is they are exceptional and few

Here's a fact!

Ottawa Linux Symposium 2005

"The power management technologies are just what we have been seeking for"

by Blade Server system developers

We have learned many things from our mistakes

Mistake (1) !
Specification!

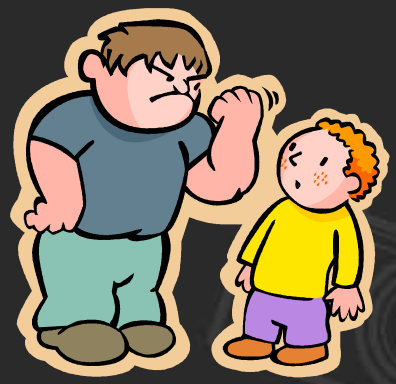
The first major mistake

May 2004

- The first year activity of the forum :

Embedded Linux Specification

F_Specification_V_1_0_R1



"If you are believing that someone will implement such specification and foster Linux for use of embedded systems, ***YOU ARE MAKING A BIG MISTAKE!*** *Before you write such specification, why you don't bring your source code to community?"*

6. Remaining Issues

https://lkml.org/lkml/2004/5/17/149 ← See this thread

http://celinuxforum.org/docs/CELF_Specification_V_1_0_R1-1.pdf ← ruin of the specification

5. References
6. Remaining Issues

On Mon, May 17, 2004 at 12:05:36PM -0700, Tim Bird wrote:

> I am writing to announce the availability of the first draft of
> the CE Linux Forum ‘s first specification. This specification
> represents the efforts of six different technical working groups
> over about the last 9 months.

If you want my 2 Cent:

- stop these rather useless specifications and provide patchkits instead
- try to actually submit the patches upstream to get a feeling which of your 'features' are compltely hopeless, which are okay and which can better be solved in different ways.

"Specification"

- What Linux Community people pointed out were extremely right
  - We changed our mind to "Implementation First" way
- On the other hand, the "Specification" was so useful for our self
  - To define our requirement, difficulties to use Linux four our products and our target

Why Japanese are always so silent

Mistake (2) !
Sound of silence

Technical conference in June 2005, Yokohama

- Without any question and answer!

Although the session topics was the most advance case study of Linux for use of cellular phone by Panasonic.

“Fools” said I you do not know
Silence like a cancer growth

The first and the most unsuccessful embedded Linux technical conference in Japan, June 13, 2005

Suggestion of a social psychologist

Professor Toshio Yamagishi (Hokkaido University)

Introduced in my presentation at the Japan Linux Symposium 2009

Why Are We Hesitating to Join the Community?

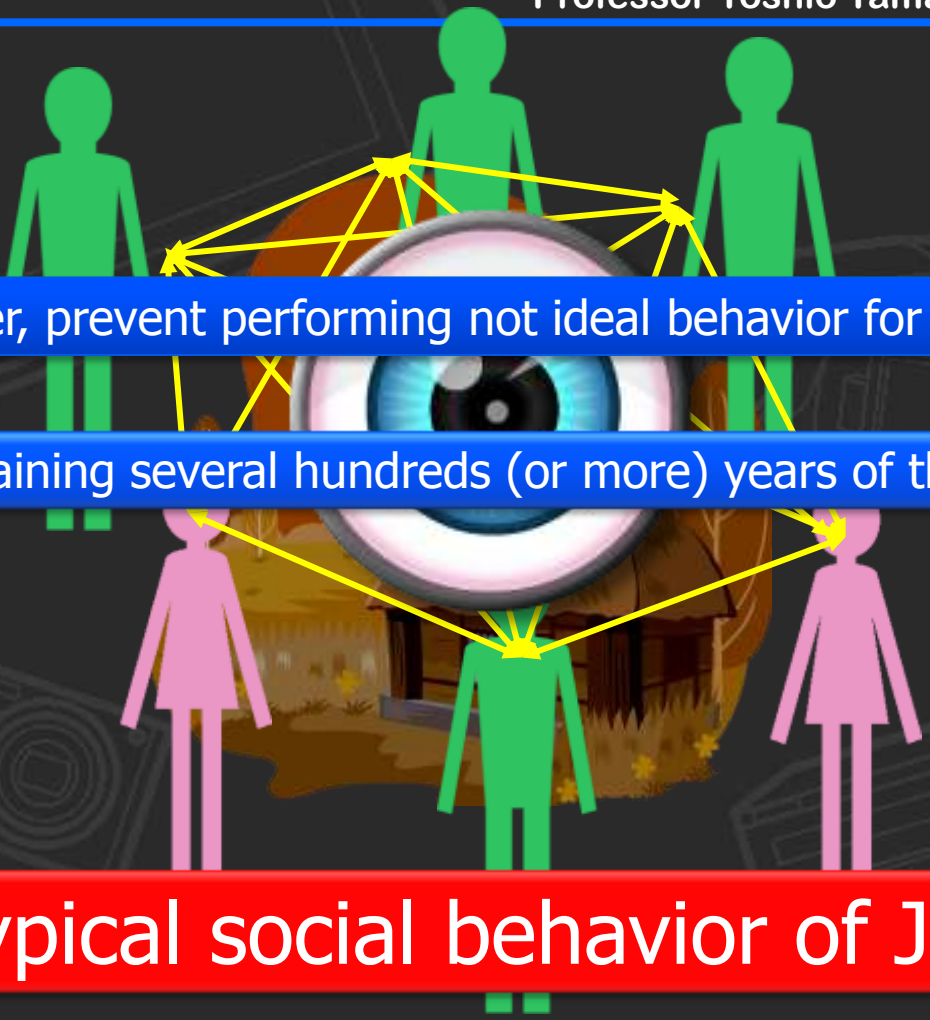
Satoru Ueda

- CE Linux Forum
- Japan OSS Promotion Forum
- Sony

At Japan Linux Symposium 2009
October 23
from 2:15 at Hall 2

Suggestion of a social psychologist

Professor Toshio Yamagishi (Hokkaido University)

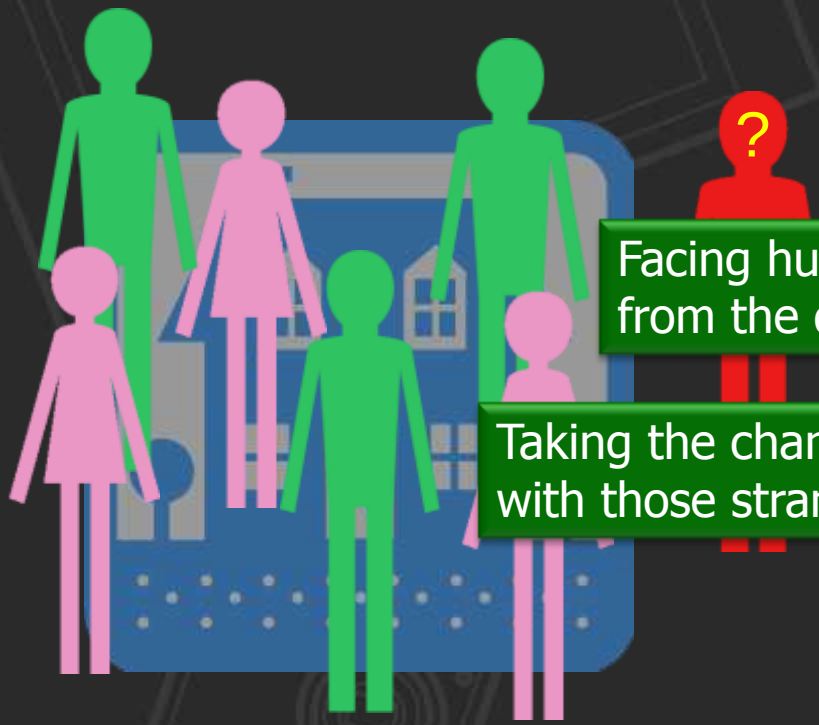


Inspect each other, prevent performing not ideal behavior for the society

Sustaining several hundreds (or more) years of the human relationship

Typical social behavior of Japanese

Suggestion of a social psychologist



Facing huge possibilities to encounter “strangers” from the different cultural back ground

Taking the chance to collaborate and maximize the value with those strangers

Most of the society out of Japan with very limited exception

To deal with *"Sound of Silence"*

- "That's GPL" campaign
  - "Why you hoard your code? They should be obliged to publicize when you release the products. Release it right now so that some super skilled person may really help you."
- Japan Technical Jamboree
  - It is not technical conference but JAMBOREE
- "Let's go to Ottawa" campaign
  - Jump into the community melting pot
- Cerebrate our own international conference
  - Embedded Linux Conference to welcome the community people to our field of interest

It IS Jamboree!
Not Conference!

CELF Technical Jamboree

A step toward the global community scene

3 "No" at Jamboree

- No Commitment
- No Obligation
- No Confidential

- In Japanese
- Step to global community

Japan Jamboree

Next Japan Jamboree (#41) is scheduled on 21st June at Nakano Sunplaza

http://elinux.org/Japan_Technical_Jamboree_41

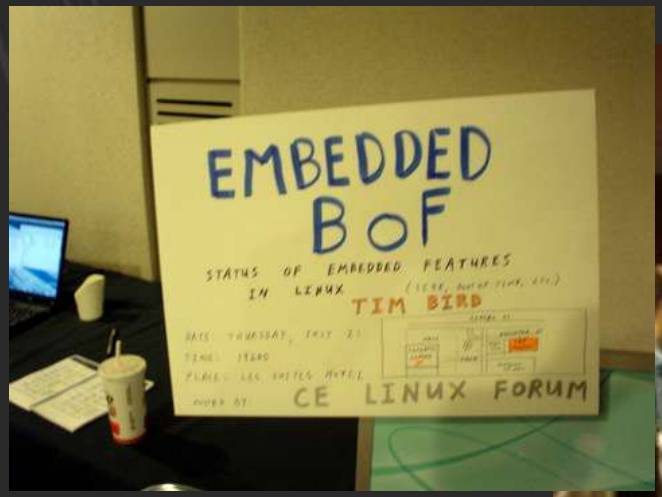
Jamboree 41

次回のジャンボリーは
6月21日10時～
中野サンプラザで開催します

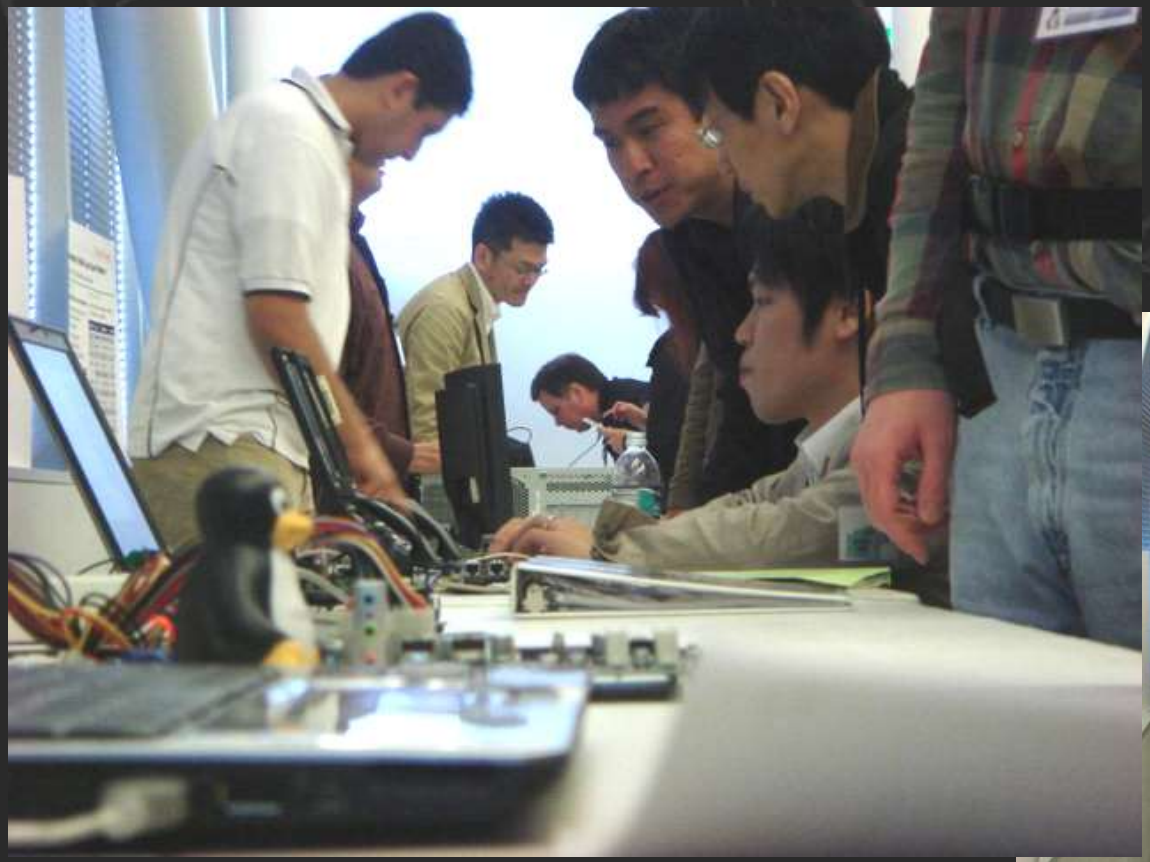
無料でどなたでも参加できます
情報家電関係に限りません

飛び入りの発表も大歓迎です！

Ottawa Linux Symposium
→ LinuxCon by the Linux Foundation



Embedded Linux Conference

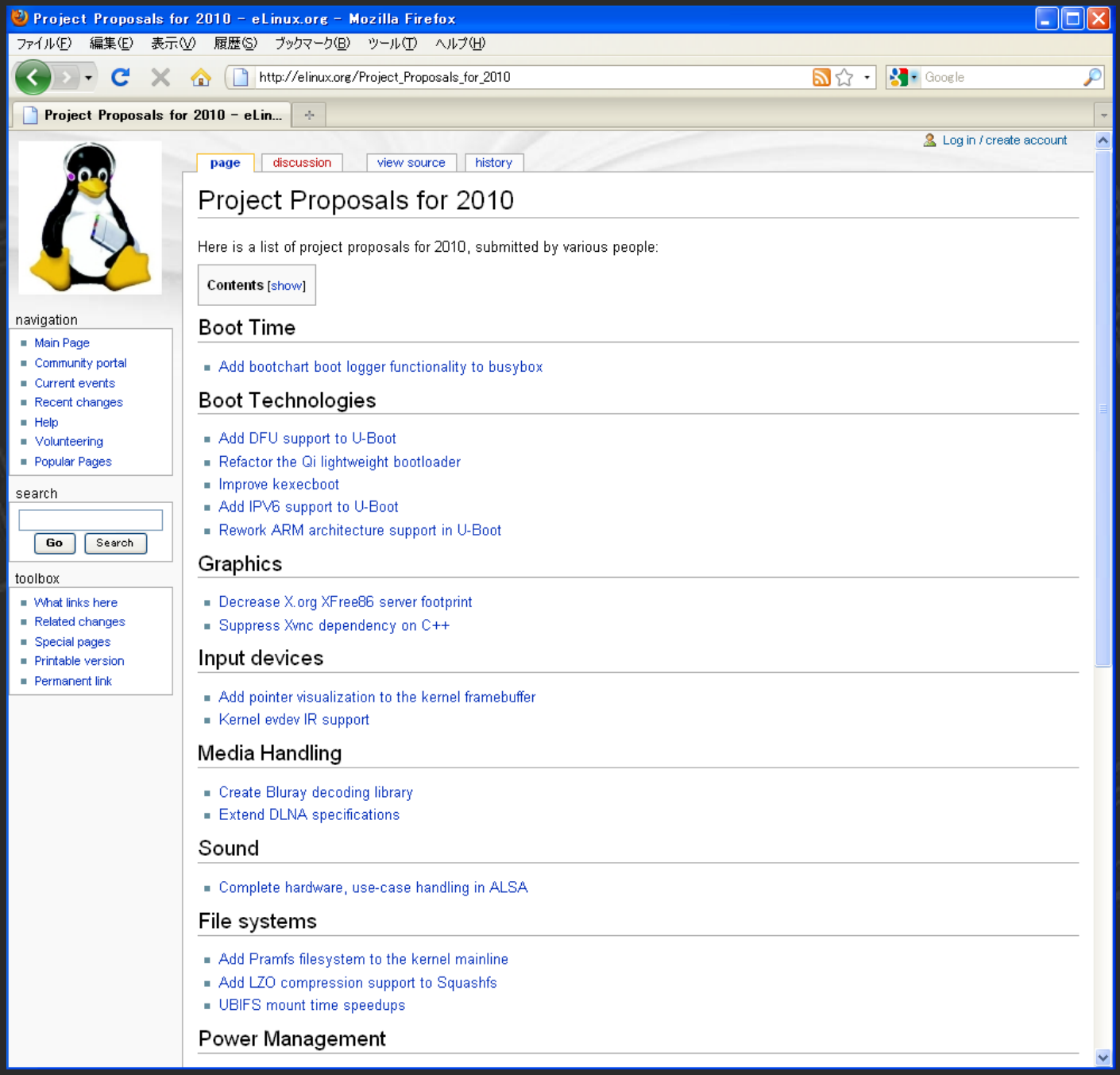


For whom proposing crucial technology development

Community Funding

Community Funding

- From 2010
  - http://elinux.org/Project_Proposals_for_2010
  - http://elinux.org/Project_Proposals_for_2011
  - http://elinux.org/Project_Proposals_for_2012

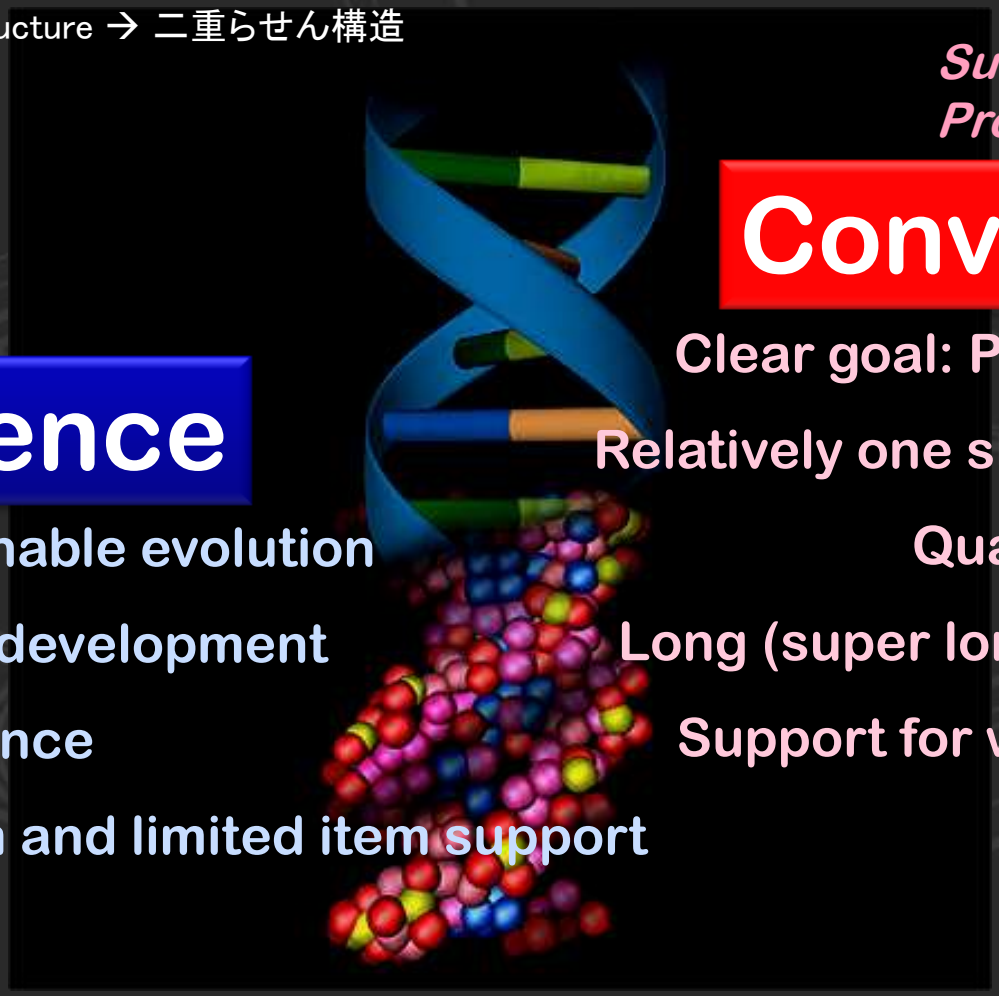

Project Proposals for 2010 - eLinux.org - Mozilla Firefox
ファイル(F) 編集(E) 表示(V) 履歴(S) ブックマーク(B) ツール(T) ヘルプ(H)
http://elinux.org/Project_Proposals_for_2010
Google
Project Proposals for 2010 - eLin...
Log in / create account
page
discussion
view source
history
navigation
Main Page
Community portal
Current events
Recent changes
Help
Volunteering
Popular Pages
search
Go
Search
toolbox
What links here
Related changes
Special pages
Printable version
Permanent link
Project Proposals for 2010
Here is a list of project proposals for 2010, submitted by various people:
Contents [show]
Boot Time
Add bootchart boot logger functionality to busybox
Boot Technologies
Add DFU support to U-Boot
Refactor the Qi lightweight bootloader
Improve kexecboot
Add IPV6 support to U-Boot
Rework ARM architecture support in U-Boot
Graphics
Decrease X.org XFree86 server footprint
Suppress Xvnc dependency on C++
Input devices
Add pointer visualization to the kernel framebuffer
Kernel evdev IR support
Media Handling
Create Bluray decoding library
Extend DLNA specifications
Sound
Complete hardware, use-case handling in ALSA
File systems
Add Pramfs filesystem to the kernel mainline
Add LZO compression support to Squashfs
UBIFS mount time speedups
Power Management

Linux community scene vs. Products development scene

Convergence and Divergence LTSI initiative

Double helices structure by two types of the people

注： Double helices structure → 二重らせん構造



Suites
Product developers…

Convergence

Clear goal: Product shipment

Relatively one shot development

Quality requirement

Long (super long) term support

Support for wide range items

Geeks…

Divergence

Think sustainable evolution

Ever lasting development

Fair governance

Shorter term and limited item support

Tragedy

Why they do not provide with patches?

Suites
Product developers…

Convergence

Why they can't provide long term support?

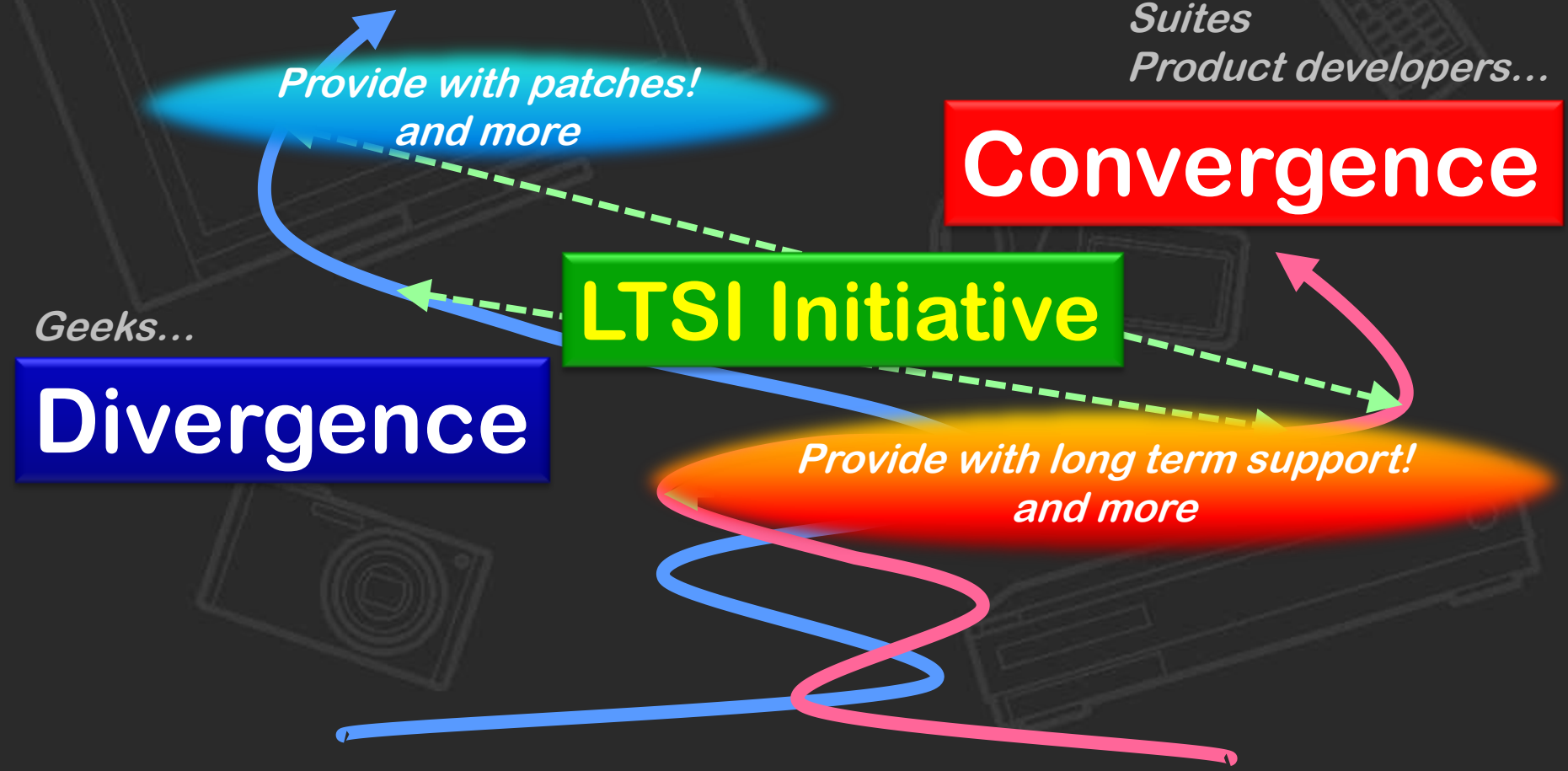
Geeks…

Divergence

Relation with Community

Let's start using Linux!

LTSI Initiative



Super Long Term Support

10 years or more

Support by Community

Support by Distributor

Support by Industry

Linux Long Term Support initiative for Industry

Support by Each company

Average Product Lifetime

Products Release Timing

Linux Release Timing

Support by each company?!

Yes, it is possible in realistic way
It is NOT required huge human resources

Assuming pretty matured Linux, based on LTSI

Because it is Open Source and Open Community,
→ you can find someone who knows the technology
→ you can read the source code

If there're some (not many) community relation skilled developer in your company, it becomes more realistic

Users always use the products for 10 years or ever

ion of

Super Long Term Support

Products ven responsibility

Linux and OSS gives answers!

Tell the value of Community and the way to increase it

Managements' endorsement

Dealing with “Ish-Atama”!

- Is it your manager?

= “石: *Ishi*” means “Stone”
= “頭: Atama” *Atama* means “Head”

“*Ishi-atama*” managers preventing developers participating community?

Japan OSS Promotion Forum Embedded System Workgroup

- From 2008
  - Three white papers for corporate executives
    - Sorry but all of them are in Japanese
    - http://ossforum.jp/embedded_sub
  - White paper "2009"
    - "Corporate rule of *MAY*, not *MUST NOT*"
      - Say "You may participate in the open community"
  - White paper "2010"
    - "Economical reason to go with the community"
      - Raise of "delivery support for the innovation"
  - White paper "2011"
    - "Assign community experts in each company"
      - Value of the specialists harmonizing together with the community

Do you think your manager is still "Ishi-atama"?

- We found out some terms to convince them
  - Such as:
    - Economical reason:
      - "Delivery support for the Innovation"
      - "Shared cost"
        - Thanks to James Bottomley
    - What the rule of "May" leads us
    - Advantage of the community specialists
- Many executives in Consumer Electronics industry get to well understand and support the employees to go with the community

What most of all we imagined about 10 years ago come true!

And now

Who cares "CPU resource"??

Takes mo… one minu… power on

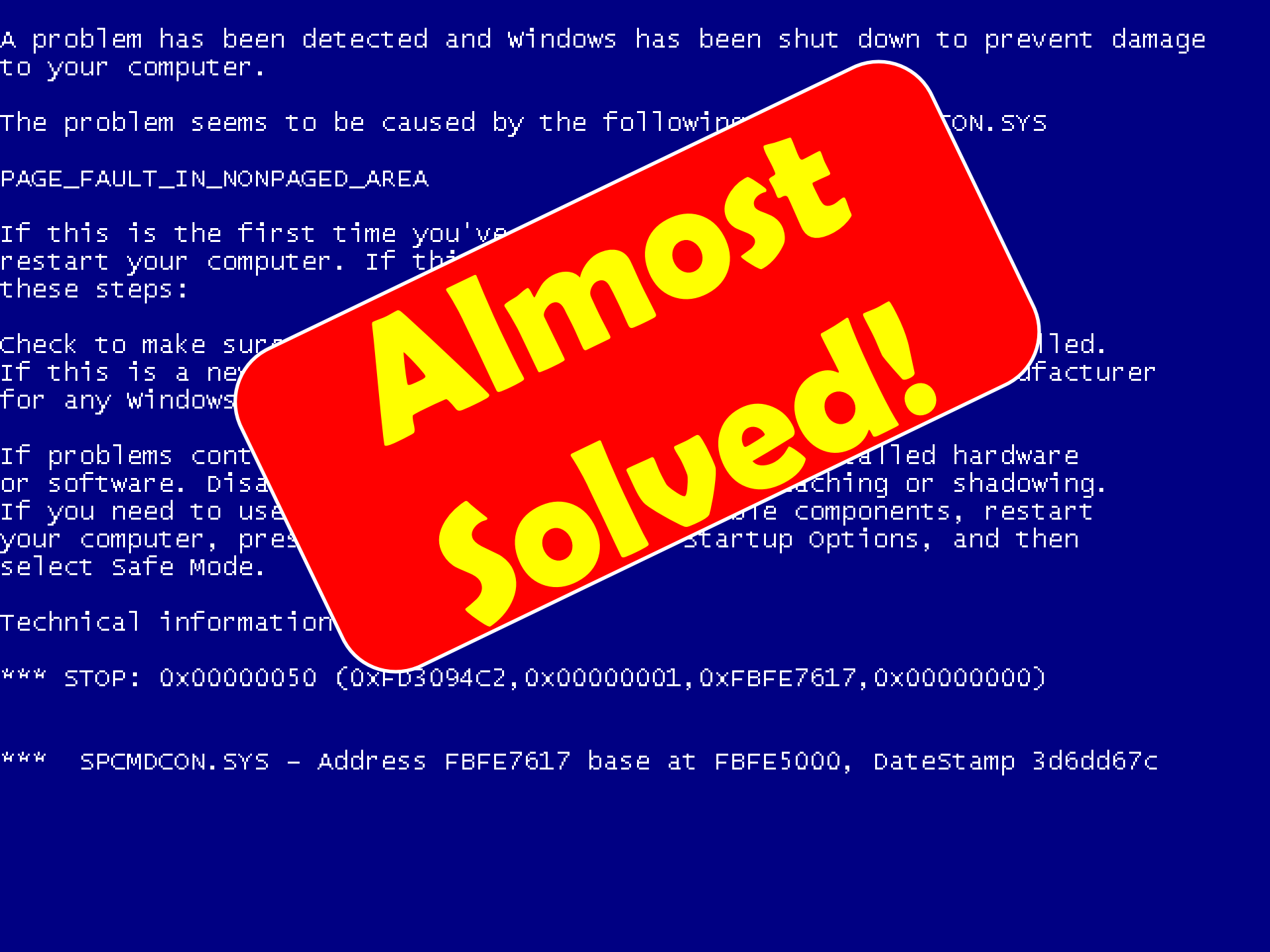
Almost Solved!

No immediat… action when ve… manded to c… ge the channel

Almost Solved!

Disturbance of smooth moving pic… play becau… lack of CPU resource

Almost Solved!


A problem has been detected and Windows has been shut down to prevent damage
to your computer.
The problem seems to be caused by the following
ON.SYS
PAGE_FAULT_IN_NONPAGED_AREA
If this is the first time you've
restart your computer. If thi
these steps:
Check to make sur
lled.
If this is a ne
facturer
for any Windows
If problems cont
alled hardware
or software. Disa
aching or shadowing.
If you need to use
le components, restart
your computer, pres
Startup Options, and then
select Safe Mode.
Technical information
*** STOP: 0x00000050 (0xFD3094C2,0x00000001,0xFBFE7617,0x00000000)
*** SPCMDCON.SYS - Address FBFE7617 base at FBFE5000, DateStamp 3d6dd67c
Almost
Solved!

Now
no one will be doubtful
to use Linux
for Consumer Electronics
embedded systems!

Software burst crisis is saved by Linux

- Digital television, Blu-ray recorder…
- Digital still camera, video camera
- Advanced car navigation system
- Professional audio visual equipments
- Cellular phone → Android

- And many things more!

What is Community?

My tentative answer is ...

Community is micro cosmos

which is formed by *people*, not stars
which is tied by *human relationship*, not gravity

Human relationship,

Share value and respect each other
Act and contribute to the community

Finally

CE industry made desirable OS reality together with the community

- However we are regarding that we have much more to contribute and work with community
- Keep on challenging of the improvement through such as LTSI initiative

Are you hesitating to use Linux?
Don’t waste your time!

- It’s your time to become a part of community!

Great Appreciation!