
# LTSI Project update

*Long Term Support Initiative*

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LinuxCon Japan@Chinzan so

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LONG TERM SUPPORT INITIATIVE

- Linux Development status and it’s process
- Status of LTSI
- Use case of LTSI

# Status of Latest Linux Kernel

LONG TERM SUPPORT INITIATIVE

- Latest released Kernel : 4.6
  - Released: May 15, 2016
  - Lines of code : 21,422,808
  - Files : 53,637
- Current Stable Kernel: 4.6.3
- Current development kernel: 4.7-rc7

# Linux Development process

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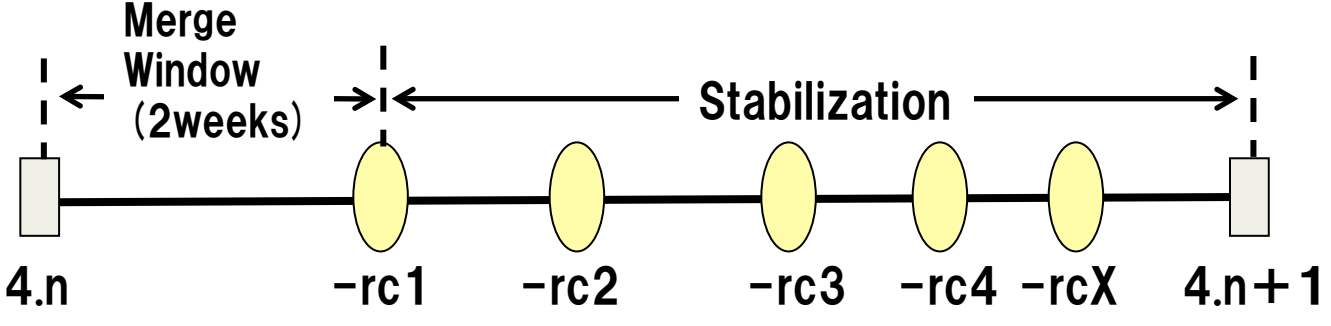
- Just after the release of 4.n, two weeks of merge window will be opened for proposal of new features
- After 2 weeks of merge window, -rc1 will be released and the stabilization will be started
- 4.n+1 will be released when it becomes reasonably stable by some of -rcX released



# Kernel release cycle

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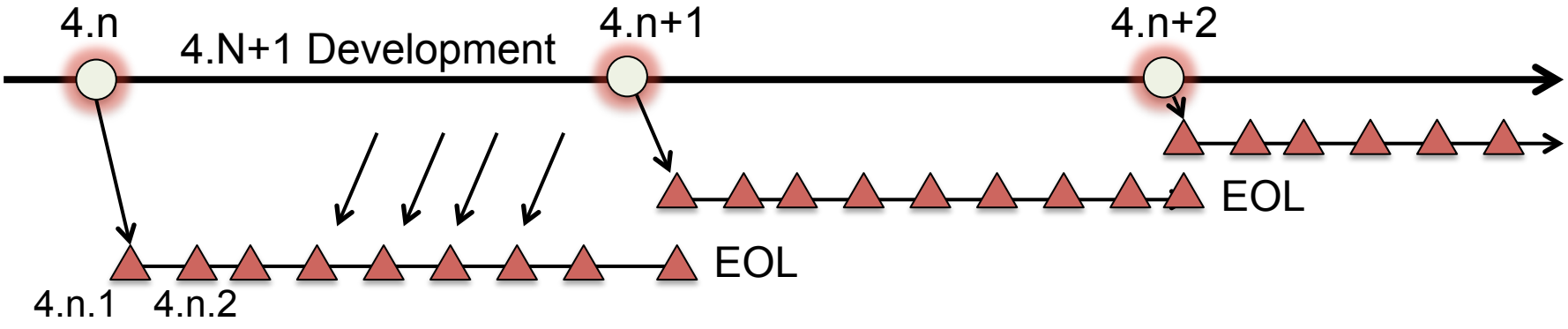
- Release cycle of Linux kernel is about 65days

| Version | Release | Rel. span |
|---|---|---|
| 3.10 | 2013-6-30 | 63 |
| 3.11 | 2013-9-2 | 64 |
| 3.12 | 2013-11-15 | 74 |
| 3.13 | 2014-1-21 | 67 |
| 3.14 | 2014-3-30 | 68 |
| 3.15 | 2014-6-8 | 70 |
| 3.16 | 2014-8-3 | 56 |
| 3.17 | 2014-10-5 | 63 |
| 3.18 | 2014-12-7 | 63 |
| 3.19 | 2015-2-9 | 64 |

| Version | Release | Rel. span |
|---|---|---|
| 4.0 | 2015-4-12 | 62 |
| 4.1 | 2015-6-22 | 71 |
| 4.2 | 2015-8-30 | 69 |
| 4.3 | 2015-11-2 | 64 |
| 4.4 | 2016-1-10 | 68 |
| 4.5 | 2016-3-14 | 64 |
| 4.6 | 2016-5-15 | 63 |

# Stable kernel release

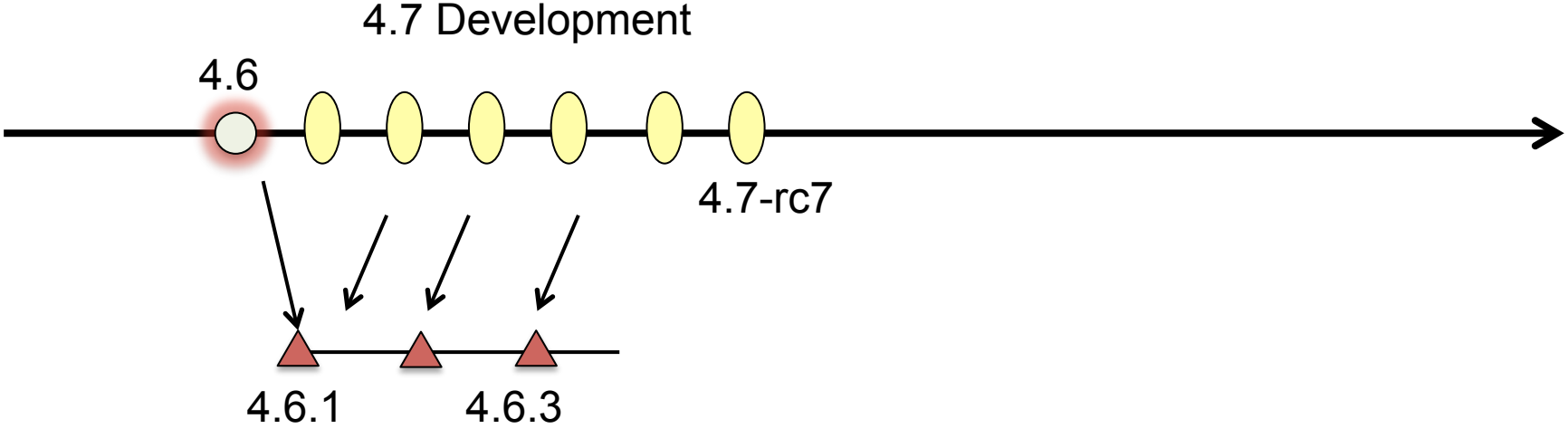



- Recommended branch for users who want the most recent stable kernel
- 3 part version like 4.n.m
- Contain small and critical fixes for security problems or significant regressions discovered in a latest development version
- Becomes End Of Life when next stable kernel were released

# Status of Latest Linux Kernel Again

LONG TERM SUPPORT INITIATIVE

- Latest released Kernel : 4.6
- Current Stable Kernel: 4.6.3
- Current development kernel: 4.7-rc7



# Stable_kernel_rules.txt

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- Strict rule to back port from latest version
- Published since 2006.

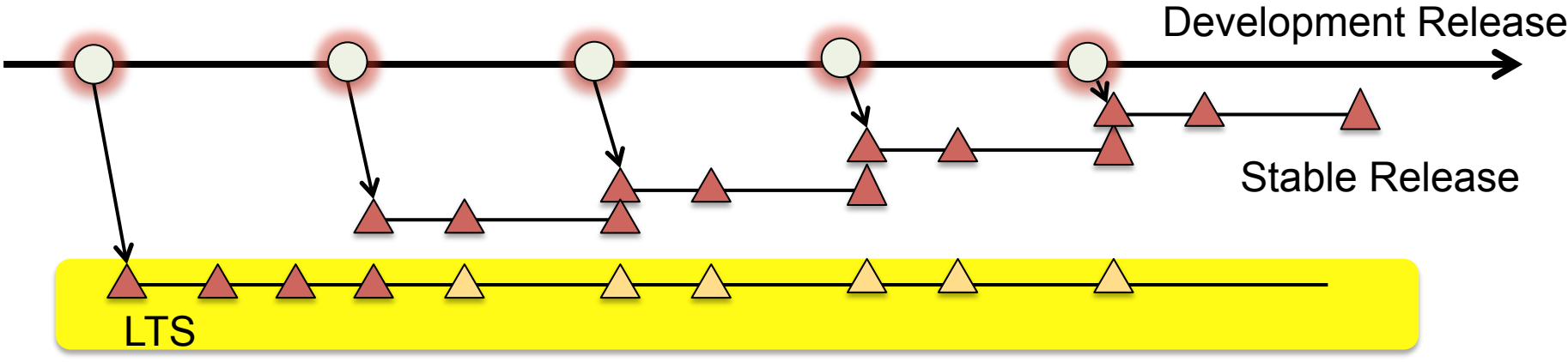
See Documentation/stable_kernel_rules.txt

- It must be obviously correct and tested.
- It cannot be bigger than 100 lines, with context.
- It must fix only one thing.
- It must fix a real bug that bothers people.
- It must fix a problem that causes a build error, an oops, a hang, data corruption, a real security issue, In short, something critical.
- Serious issues as reported by a user may also be considered.
- New device IDs and quirks are also accepted.
- No "theoretical race condition" issues, unless an explanation of how the race can be exploited is also provided.
- It cannot contain any "trivial" fixes in it .
- It or an equivalent fix must already exist in Linus' tree (upstream). ……

# LTS: LongTerm Stable Kernel

LONG TERM SUPPORT INITIATIVE

- Extended maintenance period for stable kernel
- Pick one version per year and maintain 2 years
- Bug and security fixes found in latest version are continued to back ported



# Current LTS versions

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| Version | Maintainer | Released | Projected EOL |
|---|---|---|---|
| 4.4 | Greg Kroah-Hartman | 2016-1-10 | Feb, 2018 |
| 4.1 | Sasha Levin | 2015-6-21 | Sep, 2017 |
| 3.18 | Sasha Levin | 2014-12-07 | Jan, 2017 |
| 3.16 | Ben Hutchings | 2014-8-3 | Apr, 2020 |
| 3.14 | Greg Kroah-Hartman | 2014-3-30 | Aug, 2016 |
| 3.12 | Jiri Slaby | 2013-11-3 | Jan, 2017 |
| 3.10 | Willy Tarreau | 2013-6-30 (2016-6) | Oct, 2017 |
| 3.4 | Li Zefan | 2012-5-20 (2014-9-4) | Sep, 2016 |
| 3.2 | Ben Hutchings | 2012-1-4 | May, 2018 |

https://www.kernel.org/category/releases.html

# LTS includes large number of fixes

LONG TERM SUPPORT INITIATIVE

- 600 – 700 fixes included in a Stable release
- LTS include fixes multi number of stable releases

| Version | | # of commits |
|---|---|---|
| From | To | |
| **3.0** | **3.0.101** | **3953 (EOL)** |
| 3.1 | 3.1.10 | 695 (EOL) |
| **3.2** | **3.2.81** | **7072** |
| 3.3 | 3.3.8 | 698 (EOL) |
| **3.4** | **3.4.112** | **5797** |
| 3.5 | 3.5.7 | 816 (EOL) |
| 3.6 | 3.6.11 | 757 (EOL) |
| 3.7 | 3.7.10 | 718 (EOL) |
| 3.8 | 3.8.13 | 996 (EOL) |
| 3.9 | 3.9.11 | 746 (EOL) |

| Version | | # of commits |
|---|---|---|
| From | To | |
| **3.10** | **3.10.102** | **5332** |
| 3.11 | 3.11.10 | 677 (EOL) |
| **3.12** | **3.12.61** | **6468** |
| 3.13 | 3.13.11 | 903 (EOL) |
| **3.14** | **3.14.73** | **4779** |
| 3.15 | 3.15.10 | 703 (EOL) |
| **3.16** | **3.16.36** | **4945** |
| 3.17 | 3.17.8 | 884 (EOL) |
| **3.18** | **3.18.36** | **3439** |
| 3.19 | 3.19.8 | 873 |

| Version | | # of commits |
|---|---|---|
| From | To | |
| 4.0 | 4.0.9 | 757 |
| **4.1** | **4.1.27** | **2674** |
| 4.2 | 4.2.8 | 903 |
| 4.3 | 4.3.6 | 618 |
| **4.4** | **4.4.14** | **1712** |
| 4.5 | 4.5.7 | 973 |
| 4.6 | 4.6.3 | 314 |

As of 2016/7/11

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# LTSI Status

# What is LTSI

LONG TERM SUPPORT INITIATIVE

- Open Source community to create and maintain Linux kernel for long term
  - Based on LTS
  - Add another chance to include further patches on top of LTS
  - Same lifetime with LTS (yearly release and 2 years life time)
- Industry party to share practice and experience among the companies

# LTSI includes LTS

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**LTSI**

- Add vendor required features
- Share status, info, problem among industry people
- Huge testing by contributors
- Auto test frame work
- Provide help to developer for upstream

**LTS**

- Release 1 version / year, Maintain 2 years
- Frequently and large number of bug /security fixes

# History of LTSI

LONG TERM SUPPORT INITIATIVE

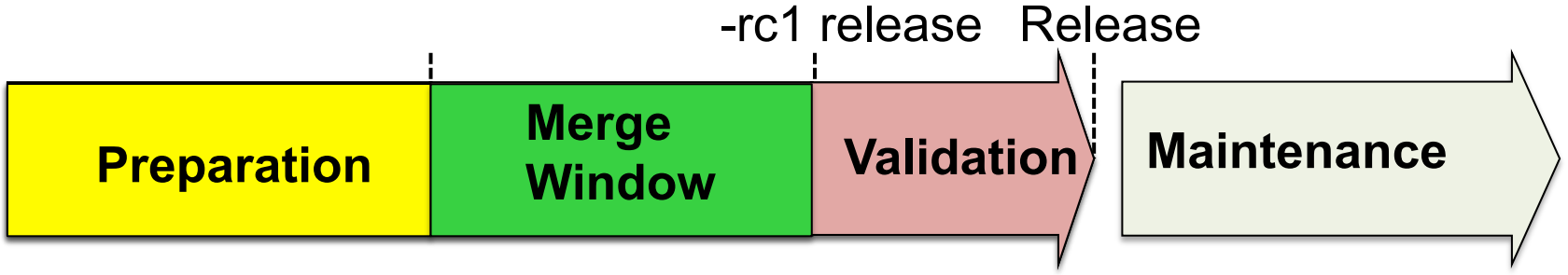
- Established 2011 – 5 yeas now
  - Started to have the stable Kernel for Android
- Integrated by Yocto (2012, May)
- Have had a workshop/session to share information and discuss issue among users
- Released yearly basis; 3.0, 3.4, 3.10, 3.14, 4.1
- Announced Autotest packages as reference (but works good)

# Shape of LTSI Project

LONG TERM SUPPORT INITIATIVE

- Small staff to coordinate workshop , session at LF conference
- Maintainer: Greg Kroah-Hartman , Fellow of Linux Foundation
- Working with upstream Linux Community
- Keeping neutral position to be able to use for variety of use case

# LTSI development process




- Preparation: Merge own patch to upstream and back port to LTSI version. 4-5 month about 2 of upstream release happen
- Merge window: Merge window period will be 2 month or more
- Validation: a month or more. All the contributor must validate and report back

# LTS is one of most secure kernel

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- Greg stated at coreosfesta May 9th 2016:

> **”If you are not using a stable/longterm kernel, your machine is insecure"**
>
> **- me**

- CoreOS and ChromeOS have mechanism to update new kernel image while current kernel is running and after update has done reboot to new kernel.

# Being as a part of Distro

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- Yocto has a normal option to use LTSI.
  - So, you can create your own distribution with LTSI
  - Yocto is doing their own tests for the distribution with LTSI. Both build distro and run it.
- Many of report/blog in the internet using Yocto and LTSI

# Fuego: Auto test package

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- Dockerized, Jenkins based test packages
  - Licensed under 3-clause BSD license
  - Over 50 test packages included with Web based monitor
- Got nice new name “Fuego” by the community
- Already used by number of users
- We see this is a referenced implementation

# Use Case: Automotive Grade Linux

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- Developing reference implementation called UCB (Unified Code Base) distribution v1.0 using LTSI 3.14 kernel
- Have had a demonstration at CES 2016 Las Vegas with announcement
- AGL is using Yocto and LTSI
- V2.0 Brilliant Blowfish is under development
  - Based on Yocto2.0

# Use Case: Civil Infrastructure Platform

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- Established Feb 2016, by Toshiba, Hitachi, Siemens and others to create reference distribution for Civil infrastructure
- One of major requirement includes Super Long Term Support: 10-15 years
- Planning to take over maintenance of LTSI after EOL

# Conclusion

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- LTSI is not a brilliant project. It's a fundamental project for embedded
- Well Eco system support : Yocto and Fuego
- Strong use case is on going

- Why don't you join LTSI?
  - By joining the community, you will be able to share best practice
  - That will increase your development speed

# Q: How about this year's LTSI?

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- Kernel Summit 2015 have had discussion about LTS and decided to be 4.4
- It seems same situation this year
- Usually, we announced at LinuxCon Japan and released early January next year (7month release process)

# LTSI process from LTS

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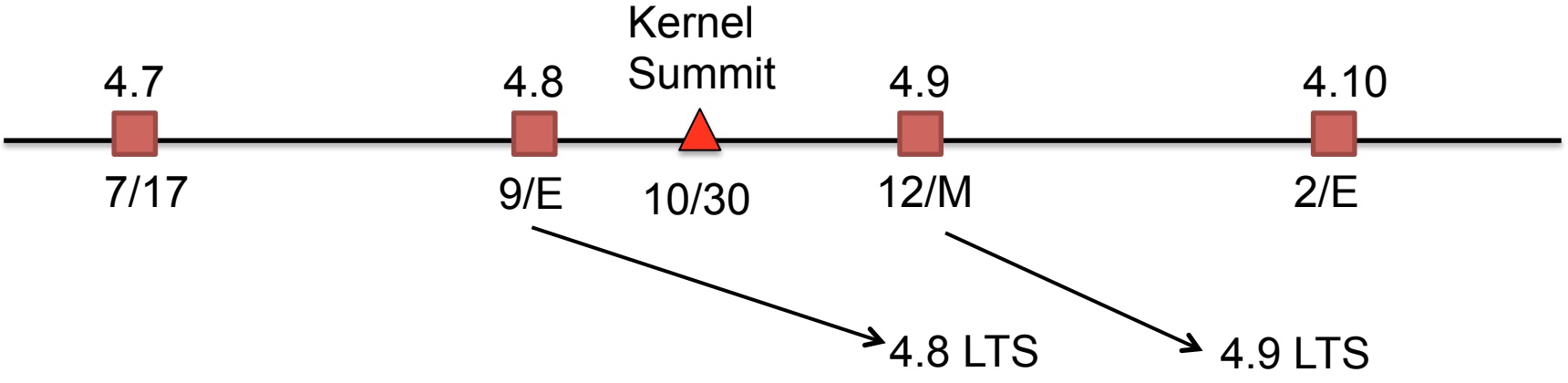
- Full process : 7 month
  - Preparation for Merge window: 4 month
  - Merge window: 2m
  - Validation: 1m
- Shorter process : 4 month
  - Preparation for merge window: 2m
  - Merge window: 1m
  - Validation: 1m

※Special process for this time

# Schedule expectation

- Kernel Summit 2016 will be the time to decide LTS version




LTSI release schedule

| | |
|---|---|
| Full | 7/M |
| Shorter | 4/M |

| | |
|---|---|
| Full | 9/E |
| Shorter | 6/E |

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# THANK YOU

# You can participate LTSI

- Follow on Twitter account:

  @LinuxLTSI


- Web:

  http://ltsi.linuxfoundation.org

- Mailing list:

  https://lists.linuxfoundation.org/mailman/listinfo/ltsi-dev

- Git tree :

  http://git.linuxfoundation.org/?p=ltsi-ernel.git;a=summary