Longterm Stable (LTS) の近況

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はじめに

- 本資料は ELC-E 2015 での 宗像さんの発表資料のLTSの概要説明部分から抜粋させていただいたページが多々あります．(資料から抜粋することについて，宗像さんから了承頂きました)

- ELC-E 2015での宗像さんの発表資料
    - http://events.linuxfoundation.org/sites/events/files/slides/elce2015_LTSI_munakata_0.pdf

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Upstream Kernel

The Linux Kernel Archives

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Protocol	Location
HTTP	https://www.kernel.org/pub/
GIT	https://git.kernel.org/
RSYNC	rsync://rsync.kernel.org/pub/

Latest Stable

Latest Stable Kernel:
4.6

開発中
mainline
linux-next

Stable と
Longterm

mainline:	4.6	2016-05-15	[tar.xz] [pgp] [patch]		[view diff] [browse]	
stable:	4.5.5	2016-05-19	[tar.xz] [pgp] [patch]	[inc. patch]	[view diff] [browse]	[changelog]
longterm:	4.4.11	2016-05-19	[tar.xz] [pgp] [patch]	[inc. patch]	[view diff] [browse]	[changelog]
longterm:	4.1.24	2016-05-11	[tar.xz] [pgp] [patch]	[inc. patch]	[view diff] [browse]	[changelog]
longterm:	3.18.33	2016-05-11	[tar.xz] [pgp] [patch]	[inc. patch]	[view diff] [browse]	[changelog]
longterm:	3.16.35	2016-04-30	[tar.xz] [pgp] [patch]		[view diff] [browse]	
longterm:	3.14.70	2016-05-19	[tar.xz] [pgp] [patch]	[inc. patch]	[view diff] [browse]	[changelog]
longterm:	3.12.59	2016-04-27	[tar.xz] [pgp] [patch]	[inc. patch]	[view diff] [browse]	[changelog]
longterm:	3.10.101	2016-03-16	[tar.xz] [pgp] [patch]	[inc. patch]	[view diff] [browse]	[changelog]
longterm:	3.4.112	2016-04-27	[tar.xz] [pgp] [patch]	[inc. patch]	[view diff] [browse]	[changelog]
longterm:	3.2.80	2016-04-30	[tar.xz] [pgp] [patch]	[inc. patch]	[view diff] [browse]	[changelog]
linux-next:	next-20160519	2016-05-19			[browse]	

https://www.kernel.org より (Screenshot：2016/05/19)

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2016/05/30 のScreenshot

Protocol	Location
HTTP	https://www.kernel.org/pub/
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RSYNC	rsync://rsync.kernel.org/pub/

Latest Stable Kernel:
⊙ 4.6

mainline:	4.7-rc1	2016-05-29	[tar.xz] [pgp] [patch]		[view diff] [browse]			
mainline:	4.6	2016-05-15	[tar.xz] [pgp] [patch]		[view diff] [browse]			
stable:	4.5.5	2016-05-19	[tar.xz] [pgp] [patch] [inc. patch]	[view diff] [browse] [changelog]				
longterm:	4.4.11	2016-05-19	[tar.xz] [pgp] [patch] [inc. patch]	[view diff] [browse] [changelog]				
longterm:	4.1.25	2016-05-21	[tar.xz] [pgp] [patch] [inc. patch]	[view diff] [browse] [changelog]				
longterm:	3.18.34	2016-05-21	[tar.xz] [pgp] [patch] [inc. patch]	[view diff] [browse] [changelog]				
longterm:	3.16.35	2016-04-30	[tar.xz] [pgp] [patch]		[view diff] [browse]			
longterm:	3.14.70	2016-05-19	[tar.xz] [pgp] [patch] [inc. patch]	[view diff] [browse] [changelog]				
longterm:	3.12.60	2016-05-23	[tar.xz] [pgp] [patch] [inc. patch]	[view diff] [browse] [changelog]				
longterm:	3.10.101	2016-03-16	[tar.xz] [pgp] [patch] [inc. patch]	[view diff] [browse] [changelog]				
longterm:	3.4.112	2016-04-27	[tar.xz] [pgp] [patch] [inc. patch]	[view diff] [browse] [changelog]				
longterm:	3.2.80	2016-04-30	[tar.xz] [pgp] [patch] [inc. patch]	[view diff] [browse] [changelog]				
linux-next:	next-20160530	2016-05-30		[browse]				

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HTTP	https://www.kernel.org/pub/
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Latest Stable Kernel:
⬇ 4.6.1

mainline:	4.7-rc1	2016-05-29	[tar.xz] [pgp] [patch]		[view diff] [browse]
stable:	4.6.1	2016-06-01	[tar.xz] [pgp] [patch]		[view diff] [browse] [changelog]
stable:	4.5.6	2016-06-01	[tar.xz] [pgp] [patch] [inc. patch]	[view diff] [browse] [changelog]
longterm:	4.4.12	2016-06-01	[tar.xz] [pgp] [patch] [inc. patch]	[view diff] [browse] [changelog]
longterm:	4.1.25	2016-05-21	[tar.xz] [pgp] [patch] [inc. patch]	[view diff] [browse] [changelog]
longterm:	3.18.34	2016-05-21	[tar.xz] [pgp] [patch] [inc. patch]	[view diff] [browse] [changelog]
longterm:	3.16.35	2016-04-30	[tar.xz] [pgp] [patch]		[view diff] [browse]
longterm:	3.14.71	2016-06-01	[tar.xz] [pgp] [patch] [inc. patch]	[view diff] [browse] [changelog]
longterm:	3.12.60	2016-05-23	[tar.xz] [pgp] [patch] [inc. patch]	[view diff] [browse] [changelog]
longterm:	3.10.101	2016-03-16	[tar.xz] [pgp] [patch] [inc. patch]	[view diff] [browse] [changelog]
longterm:	3.4.112	2016-04-27	[tar.xz] [pgp] [patch] [inc. patch]	[view diff] [browse] [changelog]
longterm:	3.2.80	2016-04-30	[tar.xz] [pgp] [patch] [inc. patch]	[view diff] [browse] [changelog]
linux-next:	next-20160602	2016-06-02			[browse]

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Stable

After each mainline kernel is released, it is considered "stable." **Any bug fixes for a stable kernel are backported from the mainline tree** and applied by a designated stable kernel maintainer. **There are usually only a few bugfix kernel releases until next mainline kernel becomes available -- unless it is designated a "longterm maintenance kernel."** Stable kernel updates are released on as-needed basis, usually 2-3 a month.
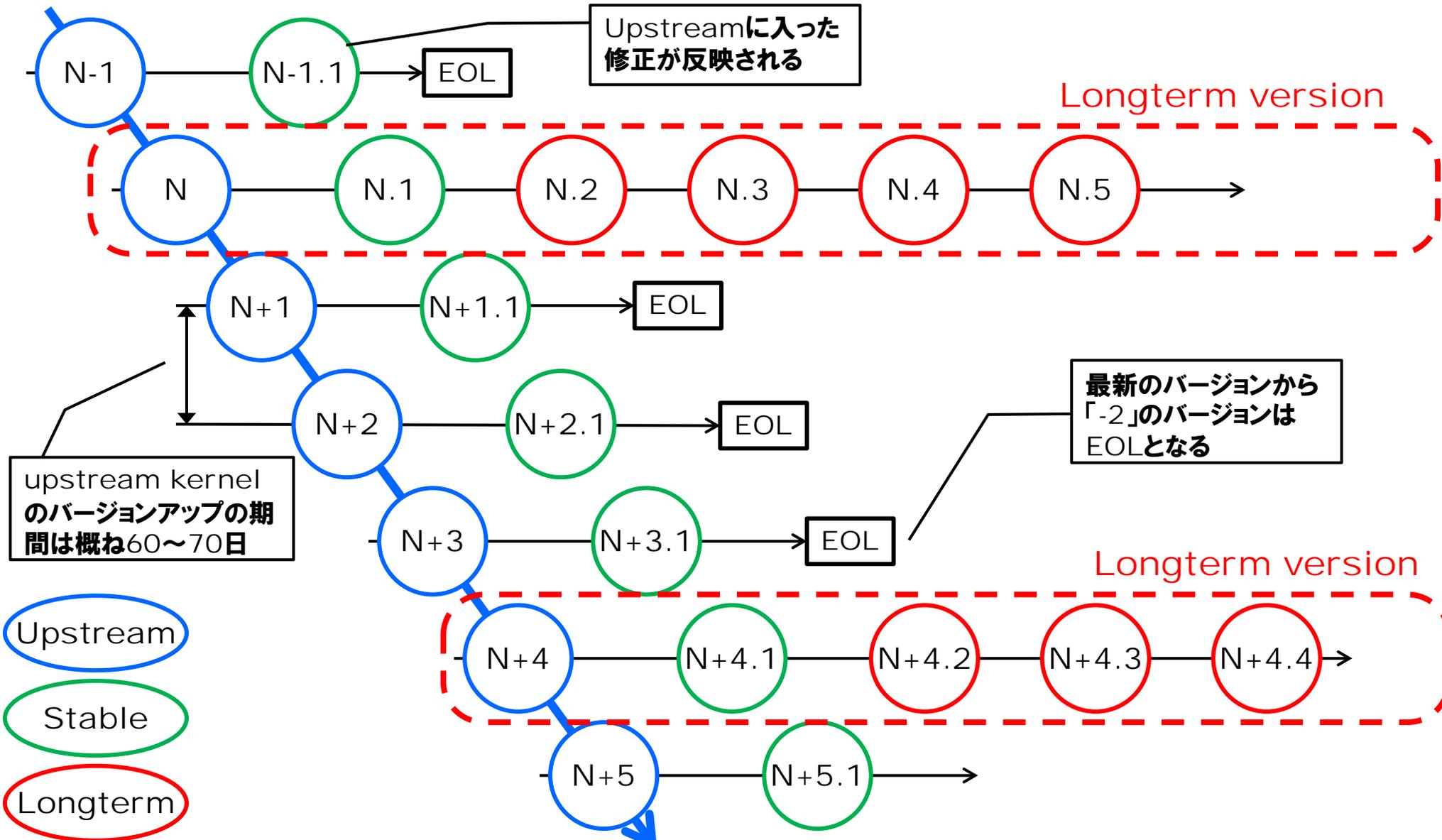
Longterm

There are usually several "longterm maintenance" kernel releases provided for the purposes of backporting bugfixes for older kernel trees. **Only important bugfixes are applied to such kernels and they don't usually see very frequent releases, especially for older trees.**

Longterm release kernels

Version	Maintainer	Released	Projected EOL
4.4	Greg Kroah-Hartman	2016-01-10	Feb, 2018
4.1	Sasha Levin	2015-06-21	Sep, 2017
3.18	Sasha Levin	2014-12-07	Jan, 2017
3.16	Ben Hutchings	2014-08-03	Apr, 2020
3.14	Greg Kroah-Hartman	2014-03-30	Aug, 2016
3.12	Jiri Slaby	2013-11-03	Jan, 2017
3.10	Willy Tarreau	2013-06-30	Oct, 2017
3.4	Li Zefan	2012-05-20	Sep, 2016
3.2	Ben Hutchings	2012-01-04	May, 2018

https://www.kernel.org/category/releases.html より (Screenshot: 2016/05/19)

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Upstreamに入った
修正が反映される

Longterm version

N-1 — N-1.1 → EOL

N — N.1 — N.2 — N.3 — N.4 — N.5 →

N+1 — N+1.1 → EOL

最新のバージョンから
「-2」のバージョンは
EOLとなる

N+2 — N+2.1 → EOL

upstream kernel
のバージョンアップの期
間は概ね60〜70日

N+3 — N+3.1 → EOL

Longterm version

N+4 — N+4.1 — N+4.2 — N+4.3 — N+4.4 →

Upstream

Stable

Longterm

N+5 — N+5.1 →

http://events.linuxfoundation.org/sites/events/files/slides/elce2015_LTSI_munakata_0.pdf より

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It must be obviously correct and tested.	明らかに正しく、テストされているものでなければならない。
It cannot be bigger than 100 lines, with context.	文脈（変更行の前後）を含めて 100 行より大きくてはいけない。
It must fix only one thing.	ただ一個のことだけを修正しているべき。
It must fix a real bug that bothers people（not a, "This could be a problem…" type thing）.	皆を悩ませている本物のバグを修正しなければならない。（"これはバグで あるかもしれないが…"のようなものではない）
It must fix a problem that causes a build error（but not for things marked CONFIG_BROKEN）, an oops, a hang, data corruption, a real security issue, or some "oh, that's not good" issue. In short, something critical.	ビルドエラー（CONFIG_BROKENになっているものを除く）, oops, ハング、デー タ破壊、現実のセキュリティ問題、その他 "ああ、これはダメだね"という ようなものを修正しなければならない。短く言えば、重大な問題。
Serious issues as reported by a user of a distribution kernel may also be considered if they fix a notable performance or interactivity issue. As these fixes are not as obvious and have a higher risk of a subtle regression they should only be submitted by a distribution kernel maintainer and include an addendum linking to a bugzilla entry if it exists and additional information on the user-visible impact.	それらが顕著なパフォーマンスや相互の問題を修正する場合、Distribution Kernelのユーザによって報告された重要な問題も考慮するかもしれない。これらの修正が明確ではなく些細なリグレッションの高いリスクが伴うとき、それらはDistribution Kernelのメンテナによって提出され、Bugzillaのエントリがあれば追加リンクとユーザに見える影響上の追加情報を含むべきである。
New device IDs and quirks are also accepted.	新しい device ID とクオークも受け入れられる。
No "theoretical race condition" issues, unless an explanation of how the race can be exploited is also provided.	どのように競合状態が発生するかの説明も一緒に書かれていない限り、"理論的には競合状態になる"ようなものは不可。
It cannot contain any "trivial" fixes in it（spelling changes, whitespace cleanups, etc）.	いかなる些細な修正も含めることはできない。（スペルの修正、空白のクリー ンアップなど）
It must follow the Documentation/SubmittingPatches rules.	Documentation/SubmittingPatches の規則に従ったものでなければならない。
It or an equivalent fix must already exist in Linus' tree（upstream）.	パッチ自体か同等の修正が Linus のツリー（upstream）に既に存在しなければならない。

Documentation/stable_kernel_rules.txt
https://www.kernel.org/doc/Documentation/ja_JP/stable_kernel_rules.txt

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Longterm Stable Kernel (LTS)

- 過去
  - Kernel 2.6.16 (2006/03/20 リリース)が初めてのLTS
  - その後、どのバージョンがLTSになるかの明確なルールはなかった
  - 主要Distributionで採用されたバージョンが、「結果的にLTSとしてメンテナンスすることになった」というもの
  - 各Distributionが採用したバージョンが、それぞれLTSになっている状態に。コミュニティとして非効率
- 2011年8月：LTSメンテナーのGreg氏が、LTSの選定ルールを提案
  - http://www.kroah.com/log/linux/longterm-proposal-08-2011.html
- Longterm Stable Kernel selection rules (Greg氏の提案)
  - **a new -longterm kernel is picked every year. (毎年、ひとつのバージョンをLTSにする)**
  - **a -longterm kernel is maintained for 2 years and then dropped. (2年間メンテナンスされ、その後EOLとする)**
  - -stable kernels keep the same schedule that they have been (dropping the last one after a new release happens.) These releases are best for products that require new hardware updates (desktop distros, community distros, fast-moving embedded distros (like Yocto)).
  - the normal -stable rules apply to these -longterm kernels as described in Documentation/stablekernelrules.txt

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```
4.4      : LTS in 2016
4.1      : LTS in 2015
3.18     : Sasha Levinがメンテナーを申し出た
3.16     : Debian 8 で使われている
3.14     : LTS in 2014
3.12     : SUSE 12 で使われている
3.10     : LTS in 2013
3.4      : LTS in 2012
3.2      : Ubuntu 12.04, Debian 7 で使われている
```

https://www.kernel.org/category/releases.html より (Screenshot: 2016/05/19)

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Longterm release kernels

☆：LTS in the Year

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- **Greg Kroah-Hartman：LinuxのStableカーネルのメンテナー(2005年から)．Novell勤務だったが2012年からLinux Foundation所属．LTSは2年間メンテナンスのルールに従いLTSの2つを担当．アメリカ在住**
- **Sasha Levin：Oracle所属**
- **Ben Hutchings：Debianパッケージのメンテナー．イギリス在住**
- **Jiri Slaby：SUSE所属．チェコ在住**
- **Willy Tarreau：元「2.6.32 LTS」のメンテナー**
- **Li Zefan：Huawei所属．3.4 LTSがEOLになる際にGregからメンテナーを引継ぐ**

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Longterm release kernels

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3.10	☆	Willy Tarreau	2013-06-30	Oct, 2017
3.4	☆	Li Zefan	2012-05-20	Sep, 2016
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- **Projected EOL：各LTSのメンテナーがEOLを宣言している．EOLが近づくと延長のアナウンスがされることがある．**
- **3.2と3.16はDebian7,8のEOLと同期(メンテナーはDebianパッケージのメンテナー)**
- **これまでのLTS in the Yearは,「このバージョンをLTSにする」というアナウンスが当該バージョンのリリース後にされていたが, 4.4 LTSについては, 事前アナウンスだった. また年明けすぐのリリースがLTSに選ばれた.**

その他：長らくLTSとしてメンテナンスされていた 2.6.32 はDebian6のEOLとともにEOLとなった(2016年3月)

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

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EOCE 2015 での宗像さんの発表資料
http://events.linuxfoundation.org/sites/events/files/slides/elce2015_LTSI_munakata_0.pdf より

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3.2		Ben Hutchings	2012-01-04	2016

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3.18		Sasha Levin	2014-12-07	Jan, 2017	Oracle
3.16		Ben Hutchings	2014-08-03	Apr, 2020	Debian 8
3.14	☆	Greg Kroah-Hartman	2014-03-30	Aug, 2016	
3.12		Jiri Slaby	2013-11-03	Jan, 2017 ★	SUSE 12
3.10	☆	Willy Tarreau ★	2013-06-30	Oct, 2017 ★	
3.4	☆	Li Zefan	2012-05-20	Sep, 2016	
3.2		Ben Hutchings	2012-01-04	May, 2018 ★	Debian 7

☆：LTS in the Year

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- **Longterm Stable Kernel (LTS)**
  - 一定のルールに従ってUpdateがなされている
    - Upstreamで取り込まれたバグフィックス, セキュリティフィックスのみが実施される (機能等のバックポートは無い)
  - コミュニティによる長期のメンテナンス
    - 最低限2年間。メンテナーの後任がつけば延長。
- **Kernelの入手経路によらず、採用時には下記でLTSのバージョンの参照を**
  - https://www.kernel.org/category/releases.html

Resources

- **https://www.kernel.org/**
- **https://www.kernel.org/category/releases.html**
- **https://www.kernel.org/doc/Documentation/stable_kernel_rules.txt**
- **https://lkml.org/**
- **http://lwn.net/**
- **http://events.linuxfoundation.org/sites/events/files/slides/elce2015_LTSI_munakata_0.pdf**

Thank you

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kato.shinsuke@jp.panasonic.com