Linux Plumbers Conference 2024

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Productizing the Linux boot time tweaks and tricks – an engineering problem !

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Boot time plays an important role in defining the user experience of a product, the more time it takes in getting the device into action the quicker it is pulled out of the stands.

Linux & it's stacks can be tweaked to boot as quickly as possible but the challenge is beyond just optimizing the flow –it gets into defining the use cases to go after –to –productizing these features and deploying in test farms and delivering to customers.

In this session I would like to share with you the challenges of optimizing boot time and productizing these optimizations.

Problem 1 : Identifying those minimum & complicated Fixed Functions : (should be optimized by default)
Examples:

- Authentication : Best possible authentication of Image.
- Boot media : OSPI NAND / NOR fetch, eMMC reads, etc.
- Power : Resume latency, suspend latency.

Problem 2: Tweaking the flow for individual Use cases (individual) :
Examples:

- Early Audio
- Early Display with Graphics.
- Early Ethernet, CAN

Problem 3: Dealing with Combined Use cases (combo) :
Examples:

- Networking + Display
- Networking + Camera + decode / encode
- Audio + Display

Problem 4 : Accelerated with MCU cores and Linux late attach (Late attach) :
Examples:

- Early display and taken over by A core after boot
- Early audio from boot loader and control taken over by Linux post boot.

Problem 5: Packaging & Delivery of optimizations
Examples :

- Document with build and reproducible steps ? where to host such documentation ?
- wic image on yocto ? with bbappend patches ?

Problem 6: Maintenance & long term support

- Moving along with kernel versions and file system revisions.
- Test automation possibilities (how to ensure tweaks can be deployed in farm)

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