

OTA Updates in AGL Using OSTree

...

Phil Wise, ATS Advanced Telematic Systems GmbH

Introduction

Project Goals

OSTree overview

Situation - Anton & Leon's progress

Plans

Goal: OTA Updates for

Development

From bitbake to the device

Production

From 10 demo units to series ...eventually

AGL Demo Platform

Pre-loaded R-PI

What do you know about OSTree

Heard of it?

Arthur's OTA presentation yesterday?

Disclaimer

I didn't write OSTree

How OSTree works 1/2

Git, but for a rootfs

- Not actually git: file metadata contains UIDs etc

One physical filesystem shared between multiple rootfs's

Uses hardlink trees to share identical files between chroots

/etc and /var are magical

OSTree Hard link trees

Files shared using hard links:

/ostree/repo/4b/cdef...

/b2/...

/ostree/deploy/osname/v1/etc/...

/usr/bin/bash

...

/ostree/deploy/osname/v2/etc/...

/usr/bin/bash

bash

The diagram illustrates how multiple OSTree paths share a single file through hard links. On the right, a white box labeled 'bash' represents the single file. On the left, three paths are listed: '/ostree/repo/4b/cdef...' and '/b2/...' (grouped by a bracket), and two paths under '/ostree/deploy/osname/v1/' and '/ostree/deploy/osname/v2/'. The paths under '/ostree/deploy/osname/v1/' and '/ostree/deploy/osname/v2/' each contain a box listing '/usr/bin/bash' and '...'. Arrows point from the bracketed paths and the '/usr/bin/bash' entries in both deployment boxes to the 'bash' file box, indicating they are all hard links to the same file.

OSTree Boot Process

1. Decide which deploy to boot
2. Mount `/ostree/deploy/os/vXYZ` as `/`
3. Keep `/` available as `/sysroot`

Update Process

Fetch objects into /ostree/repo

(c.f. 'git fetch')

Checkout hard link tree

(c.f. 'git checkout')

Notify bootloader

Reboot

AGL OTA Integration Tasks

Build OSTree tools in AGL - (done)

Separation of RO and RW parts of filesystem - (in progress)

Bootloader / initramfs integration (chroot to /ostree/os/v3) - (code review)

Building two images: - (in progress)

- Rootfs -> check in ostree repo
- 'Factory image' -> Written to SD card

Transferring the update to the client (planning)

Building OSTree tools in AGL

Done:

`meta-agl-extra/meta-sota`

Separation of RO and RW parts of filesystem

Rules:

/var is persisted, initially empty

/etc is 3-way merged

Everything else blown away

`image_types_ostree.bbclass` (meta-agl-extra)

Move /home under /var

Bootloader / Initramfs Integration

Initial target: U-Boot + Qemu

Next target: U-Boot + Porter

Implementation: WIP

Building two images in bitbake

`image_types_ostree.bbclass` (meta-agl-extra)

Runs ‘ostree commit’, rather than generating a .hddimg or .iso

`image_types_ota.bbclass` (meta-agl-extra)

Creates an image to write to disk

Transporting the Updates

Which devices get an update?

ATS' SOTA Server (Open source, developed for GENIVI)

Moving the bits

Plan to add OSTree support to SOTA Server

Uploading from development/CI

New tool in planning: `bitbake my-cool-image && push-to-ota-server my-cool-image`

Summary

Aim to OTA-enable AGL by default

Development underway now

Fin

Questions? Potential user?

phil@advancedtelematic.com or

automotive-discussions

I'd love to hear from you.