Agenda

- questions, comments, issues, concerns from the crowd
- Plumbers 2017
- Plumbers 2016
- Devicetree Specification
- documentation
- Build warnings
- Overlays
- Status of debug tools
What do you want to talk about?

questions

comments

issues

concerns
Linux Plumbers Conference 2017

Los Angeles, CA
Sept 13 - 15

with: Open Source Summit, Sept 11 - 13

Would you attend a Devicetree session?

Plumbers:
- focus on solving problems
- rather than presenting status

https://www.linuxplumbersconf.org/2017/
Plumbers 2016 Summary

Device Tree Schema Verification
  Grant Likely (slides and etherpad)

Hardware Description vs Configuration vs Policy
  (slides and etherpad)

Overlays
  (etherpad)

Slides:
  http://elinux.org/Device_tree_future#presentation_material_2

Etherpad Notes:
  http://elinux.org/Device_tree_plumbers_2016_etherpad
Devicetree Specification

Devicetree Specification 0.1 supersedes ePAPR for the Linux kernel, continues to evolve

https://www.devicetree.org/specifications/

Mail list, Build Instructions, etc

https://www.devicetree.org/collaborate/

Repository

https://github.com/devicetree-org/devicetree-specification
Devicetree Documentation

elinux.org/Device_Tree_Reference
  - becoming more complete
  - contributions and comments welcome

device tree man pages, as of Linux 4.7-rc2
  http://elinux.org/Device_Tree_Linux#Linux_Man_pages
  man pages update and submittal to mainline
delayed by kernel switch to sphinx
Devicetree Build Warnings

Rob has been enhancing dtc error checks

Enabled for “W=1” builds

$ make V=0 W=1 qcom-apq8074-dragonboard.dtb

make[1]: Entering directory `/local/frowand_nobackup/src/git_linus/build/dragon_linus_4.10'
  DTC arch/arm/boot/dts/qcom-apq8074-dragonboard.dtb
Warning (unit_address_vs_reg): Node /memory has a reg or ranges property, but no unit name
Warning (unit_address_vs_reg): Node /soc/spmi@fc4cf000/pm8941@0/vadc@3100/die_temp has a reg or ranges property, but no unit name
Warning (unit_address_vs_reg): Node /soc/spmi@fc4cf000/pm8941@0/vadc@3100/ref_625mv has a reg or ranges property, but no unit name
Warning (unit_address_vs_reg): Node /soc/spmi@fc4cf000/pm8941@0/vadc@3100/ref_1250v has a reg or ranges property, but no unit name
Warning (unit_address_vs_reg): Node /soc/spmi@fc4cf000/pm8941@0/vadc@3100/ref_gnd has a reg or ranges property, but no unit name
Warning (unit_address_vs_reg): Node /soc/spmi@fc4cf000/pm8941@0/vadc@3100/ref_vdd has a reg or ranges property, but no unit name
make[1]: Leaving directory `/local/frowand_nobackup/src/git_linus/build/dragon_linus_4.10'
Overlays

Pantelis's base dtc patches
  - expose “internal representation”
  - in git.kernel.org/pub/scm/utils/dtc/dtc.git
  - expected in Linux 4.11

Pantelis's patch to hide “internal representation”
  - not yet accepted
Overlays

- U-Boot overlay support
- Connectors (sockets and plugs)
- Overlay Managers
  - capemgr
Overlays

- Examples of use cases
  - beaglebone
  - raspberry pi
  - minnowboard
  - C.H.I.P.
  - Arduino
  - seeedstudios Grove 4 pin connectors
  - others?

- FPGA
Overlays

- Combinatorial explosion of .dts / .dtb files

  example:
  Devicetree Hardware Autoconfiguration
  Hans de Goede
  ELC Europe 2016
Debug Tools

scripts/dtc/dtx_diff
- diff .dts, .dtb, /proc/device-tree/
- pre-process includes into a single .dts
- merged in 4.6-rc1

scripts/dtc/dt_to_config
- drivers and kernel config needed by a device tree
- merged in 4.8-rc1
Kernel Configuration Info

dt_to_config
    arch/arm/boot/dts/qcom-apq8074-dragonboard.dts
    --short-name
    --config ${KBUILD_OUTPUT}/.config
    --config-format
    > dragon_config_info

$ grep -i coincell dragon_config_info

# -d-c-----n--F : coincell@2800 : qcom,pm8941-coincell : drivers/misc/qcom-coincell.c : CONFIG_QCOM_COINCELL : n
# CONFIG_QCOM_COINCELL is not set
# CONFIG_QCOM_COINCELL=y

# -d-c-----n--F : coincell@2800 : qcom,pm8941-coincell : ......
# CONFIG_QCOM_COINCELL is not set
# CONFIG_QCOM_COINCELL=y
Debug Tools

scripts/dtc/dt_prop
- Compare properties accessed on target system vs a device tree (dtX)
- available on elinux.org
- Plan to submit to mail list “any day now”
dt_prop example snippets

```
$ dt_prop --td dmesg_4.5-rc5_160307_2100 qcom-apq8074-dragonboard.dts

# --- dmesg_4.5-rc5_160307_2100
# +++ qcom-apq8074-dragonboard.dts
/dts-v1/;

// *****  i2c@f9964000 disabled  *****
  i2c@f9964000 {
+       #address-cells;
+       #size-cells;
+       clock-names;
+       clocks;
+       compatible;
+       interrupts;
+       reg;
+       status;
  }
```
Debug Tools

dt_node_info, dt_stat
- Provide info about device tree nodes from /proc/device-tree files
- proof of concept on elinux.org
- Stalled, awaiting some of Frank's bandwidth
$ dt_node_info coincell

===== devices

===== nodes
/soc/spmi@fc4cf000/pm8941@0/qcom,coincell@2800 qcom,

===== nodes bound to a driver

===== nodes with a device

===== nodes not bound to a driver
/soc/spmi@fc4cf000/pm8941@0/qcom,coincell@2800 qcom,

===== nodes without a device
/soc/spmi@fc4cf000/pm8941@0/qcom,coincell@2800 qcom,
dt_node_info example 2

$ dt_node_info coincell

===== devices
/sys/devices/platform/soc/fc4cf000.spmi/spmi-0/0-00/

===== nodes
/soc/spmi@fc4cf000/pm8941@0/qcom,coincell@2800 qcom,

===== nodes bound to a driver

===== nodes with a device
/soc/spmi@fc4cf000/pm8941@0/qcom,coincell@2800 qcom,

===== nodes not bound to a driver
/soc/spmi@fc4cf000/pm8941@0/qcom,coincell@2800 qcom,

===== nodes without a device
Debug Tools

dtc: dts source location annotation
  - Provide source locations from .dts & .dtsi
  - Several proof of concept versions on devicetree-compiler list
  - Stalled, awaiting some of Frank's bandwidth
source location annotation

----- short format -----

sdhci@f9824900 { /* qcom-apq8074-dragonboard.dts:14 */
    compatible = "qcom,sdhci-msm-v4"; /* qcom-msm8974.dtsi:240 */
    reg = <0xf9824900 0x11c 0xf9824000 0x800>; /* qcom-msm8974.dtsi:241 */
    reg-names = "hc_mem", "core_mem"; /* qcom-msm8974.dtsi:242 */
    interrupts = <0x0 0x7b 0x0 0x0 0x8a 0x0>; /* qcom-msm8974.dtsi:243 */
    interrupt-names = "hc_irq", "pwr_irq"; /* qcom-msm8974.dtsi:244 */
    clocks = <0xd 0xd8 0xd 0xd7>; /* qcom-msm8974.dtsi:245 */
    clock-names = "core", "iface"; /* qcom-msm8974.dtsi:246 */
    status = "ok"; /* qcom-apq8074-dragonboard.dts:17 */
    bus-width = <0x8>; /* qcom-apq8074-dragonboard.dts:15 */
    non-removable; /* qcom-apq8074-dragonboard.dts:16 */
}; /* qcom-apq8074-dragonboard.dts:18 */
THE END

Thank you for your participation...
Questions?

Comments?
Resources

http://elinux.org/Device_Tree_presentations_papers_articles
http://elinux.org/Device_Tree_presentations_papers_articles#debug

http://elinux.org/Device_Tree_Reference
Resources

dtx_diff
dtc --annotate
dt_node_info

Solving Device Tree Issues:
Frank Rowand, elce 2015
(In this presentation, dtx_diff was named dtdiff.)

Supporting material for: Solving Device Tree Issues:
http://elinux.org/Device_Tree_frowand
   section: Embedded Linux Conference Europe (ELCE) - October 6, 2015

dt_to_config

Solving Device Tree Issues - Part 2:
Frank Rowand, LinuxCon Japan 2016
http://elinux.org/images/5/50/Dt_debugging_part_2.pdf
Resources

dt_prop

Solving Device Tree Issues - Part 3:
Frank Rowand, elce 2016

Supporting material for: Solving Device Tree Issues - Part 3:
kernel patches
scripts/dtc/dts_diff
scripts/dtc/dt_prop
http://elinux.org/Device_Tree_frowand
  section: Resources for "Solving Device Tree Issues - Part 3" talk
How to get a copy of the slides

1) frank.rowand@sony.com
2) http://elinux.org/Device_Tree
3) http://events.linuxfoundation.org