IPC GateMP Support for UIO and Misc Driver

Introduction

Starting in IPC 3.42, the GateMP module added support for accessing device memory without using /dev/mem. Instead of accessing /dev/mem, a uio driver for Shared Region 0 access and a misc driver to expose a hwspinlock user interface can be used. These drivers are added in the Android SDK and GLSDK kernels. This feature was added because in some environments, /dev/mem may not be accessible to the LAD.

> **NOTE**
>
> There is no change to how LAD is launched in this case, and if the uio and misc driver are not available in the kernel, it will fall back to using /dev/mem.

> **NOTE**
>
> This applies only to Linux/Android IPC.

Config

Enable the uio and misc drivers in the kernel by enabling the following config options:

```
CONFIG_HWSPINLOCK_USER=y
CONFIG_UIO=y
CONFIG_UIO_PDRV_GENIRQ=y
```

Update your dts file to define the hwspinlocks being used by the misc driver. Must start from hwspinlock "0" and go up sequentially:

```
gatemp {
        compatible = "hwspinlock-user";
        hwlocks = <&hwspinlock 0>,
                <&hwspinlock 1>,
                <&hwspinlock 2>,
                <&hwspinlock 3>,
                <&hwspinlock 4>,
                <&hwspinlock 5>,
                <&hwspinlock 6>,
                <&hwspinlock 7>,
                <&hwspinlock 8>,
                <&hwspinlock 9>;
};
```

The hwspinlock configuration in the dts file MUST match the BIOS-side IPC HWSpinlock configuration. Configuration the BIOS-side IPC module by adding the following to your cfg file (where <N> is equal to the number of spinlocks in the dts listing): <syntaxhighlight lang='javascript'>

```
var HWSpinlock = xdc.useModule('ti.sdo.ipc.gates.GateHWSpinlock');
HWSpinlock.numLocks = <N>;
```

</syntaxhighlight>

Update your dts file to add the UIO-based node for Shared Region 0 (modify address and size so that it matches the Shared Region 0 definition in the remote core image):

Kernel 3.14-based releases:

```
sr0 {
        compatible = "generic-uio";
        reg = <0xbfd00000 0x100000>;
};
```

Kernel 4.4-based releases:

```
sr0 {
        compatible = "generic-uio";
        reg = <0x0 0xbfb00000 0x0 0x100000>;
};
```

> **NOTE**
>
> Make sure that the "compatible" property in the sr0 dts node matches the UIO's of_id string defined in the kernel command line.

Append the following to the kernel's CONFIG_CMDLINE:

```
uio_pdrv_genirq.of_id=generic-uio
```

For example:

```
CONFIG_CMDLINE="root=/dev/mmcblk0p2 rw console=ttyS0,119200 androidboot.console=ttyS0 init=/init rootfstype=ext4 rootwait drm.rnodes=1 snd.slots_reserved=1,1
androidboot.selinux=permissive androidboot.hardware=jacinto6evmboard uio_pdrv_genirq.of_id=generic-uio"
```

> **NOTE**
>
> Changes for the command line are already present in the Android 6AM.1.0 release. For GLSDK, the command line comes from the bootargs set in the uenv.txt file in the boot partition.

Also, specific owner/group must be set for the following files:

- /dev/uio0
- /dev/hwspinlock
- **Android:** /data/lad, /data/lad/LAD
- **Linux:** /tmp/LAD

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