Cgroups as a Resource Management Technique

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Massively produced devices have to be cheap, and what’s going to be sacrificed then?
- Network capacity
- Pixels per dollar
- CPU productivity
- Battery charge capacity

- Mass storage volume
- Disc I/O speed
- RAM access speed
- etc.
Problems:

- How to make a massively produced cheap and functional device today?
- How to maximize yield from potential in a given device?
- How to define acceptable balance of functionality, price and time-to-market for future devices?
Resources

"You move to an area, and you multiply, and you multiply, until every natural resource is consumed... You are a plague, and we are the cure."

(C) Agent Smith

"The only limiting factor of the Linux operating system is its user."

(C) Linus Torvalds
Linux? Control Groups!

The first step to start learning about cgroups is to read `linux/Documentation/cgroups.txt`.

The main traits to emphasize:

- hierarchical tree-like cgroups layout
- modular extensive set of resource and isolation controllers: freezers, CPU sets, RAM memory, swap memory, CPU slices, real-time priority, block I/O, network I/O etc.
- cgroups can be set up and tasks can be operated immediately from shell.
cgroups + proc connector = N900 success, see /usr/share/policy/etc/current/syspart.conf

Tortured knowledge:
• proc connector reports may be too late
• task nice level shouldn't be touched ever
• cgroup hierarchy layout is important
• task I/O ought to be limited by cgroups
• optimal shape of RAM/swap memory filling curve is unknown
• virtual memory overcommit allowance leads to asynchronous OOM happenings
• OOM is a mess even worse than expected
Opportunities and Unsolved Problems

- Cgroup partition change of a process under OOM circumstances
- Analysis and elimination of performance bottlenecks while moving processes between arbitrary cgroups
- Cgroup aliases?
- Power consumption per task controlled by cgroups
- Create a supported by community application, which utilizes proc connector to dynamic cgroups closing
- etc.
Ask questions
Thank you!

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