

Everyone Virtualizes Everything But Time

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joint work with
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16 April 2009

Everyone (conventional RTOS)...

Scheduling

- Static time slicing
- Priorities
- EDF

No temporal isolation

What about protection?

- Single address space
- Co-located OS

No spatial isolation

POSIX API or non standard API?

...virtualizes everything...

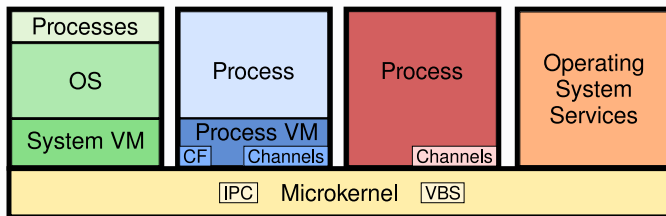
Benefits

- Legacy software
- We need not re-implement device drivers
- Strict spatial isolation

...but time.

No temporal isolation

Tiptoe (<http://tiptoe.cs.uni-salzburg.at>)



...virtualizes everything...

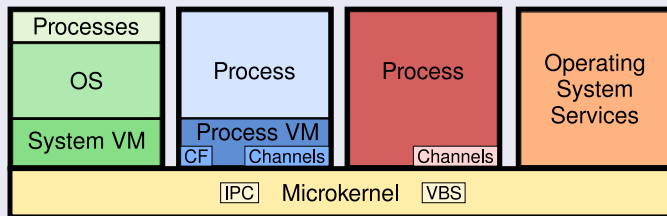
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Temporal Isolation

What is it?

Execution of an action is temporally isolated if the response time is determined by the code itself and its inputs independent of any concurrent activity

We want more

- Change the speed of the processes
- Action is a piece of program code
- Actions run at different speeds

VBS

Generalization of constant bandwidth servers (CBS) where processes can dynamically adjust periods and limits.

Memory Management and I/O Channels

Compact-fit (CF) memory management [ATC'08]

- Predictable in time and space

Integration goal

Processes specify allocation rate instead of CPU time and are controlled by the VBS scheduler

Communication link between two processes with a bandwidth cap

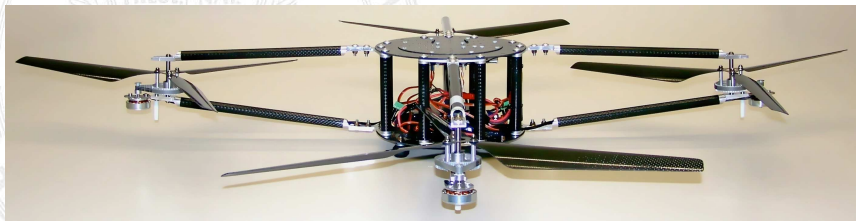
- Data transfer is like an action

Integration goal

Processes specify transfer rate of a data transfer and are controlled by VBS scheduler

Current work

Fly the JAviator with Tiptoe



Homepage

<http://javiator.cs.uni-salzburg.at>

Thank you!