

Advances in CPU Idle Time Management

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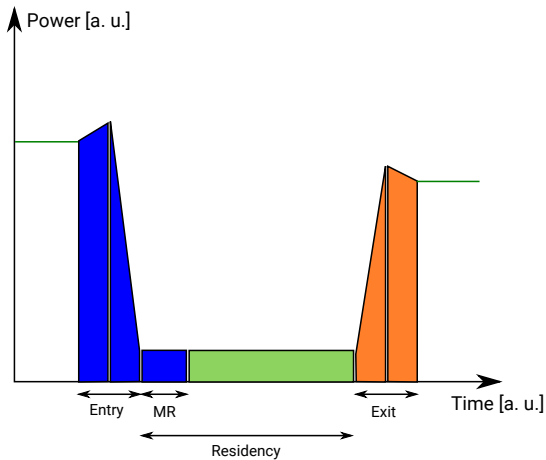
Intel Open Source Technology Center

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CPUs: Busy Vs Idle

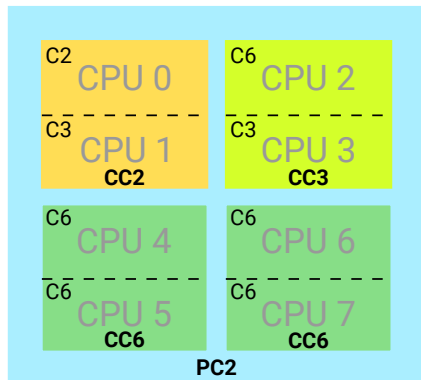


CPU Idle States Properties

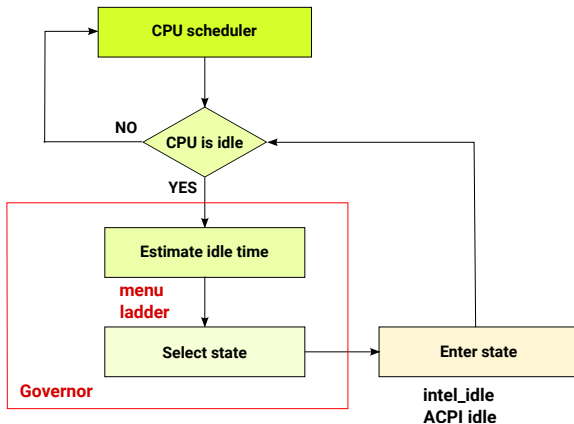


CPU Idle States Example: C-states on Intel Hardware

MWAIT <HINT>



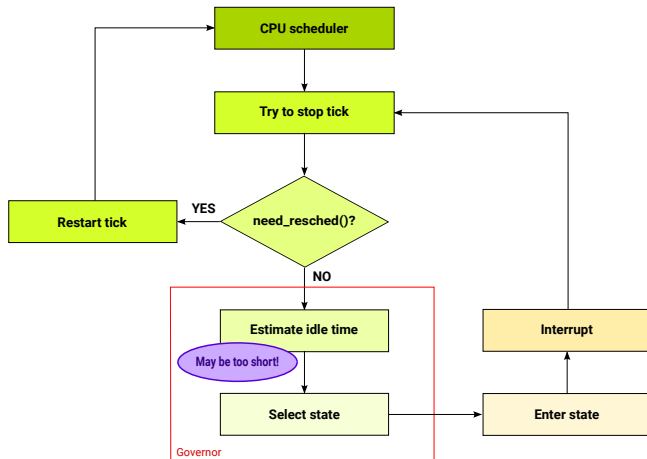
High-level CPU Idle Time Management Control Flow



Complication: CPU Scheduler Tick Timer



Original Idle Loop Design Issue



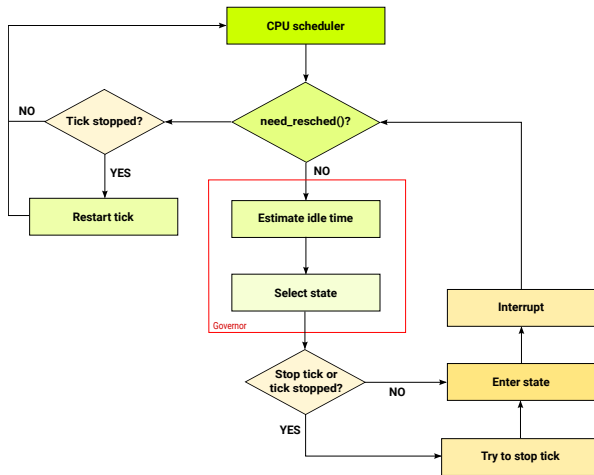
Short Idle Duration Prediction Problem

Actual Predicted	Long Idle	Short Idle
	Long Idle	Short Idle
Long Idle	WIN	LOSS
Short Idle	LOSS	LOSS

Issues With The menu Idle Governor



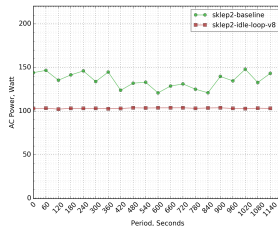
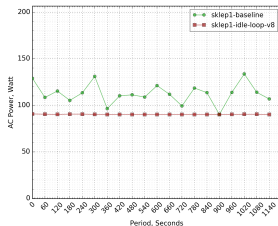
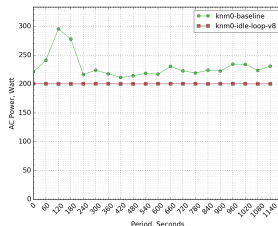
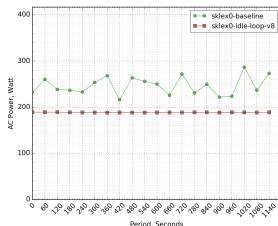
Redesigned Idle Loop (Linux* 4.17 And Later)



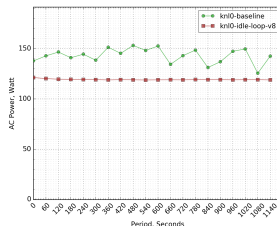
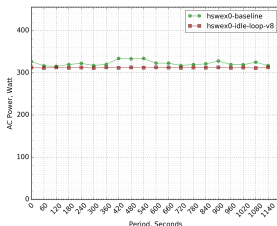
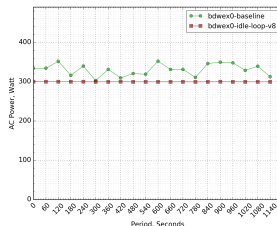
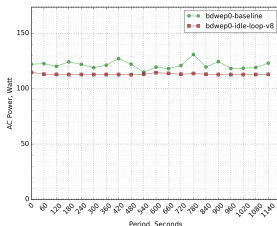
Short Idle Duration Prediction Problem Mitigated

Actual Predicted	Long Idle	Short Idle
Long Idle	WIN	LOSS
Short Idle	Neutral	WIN

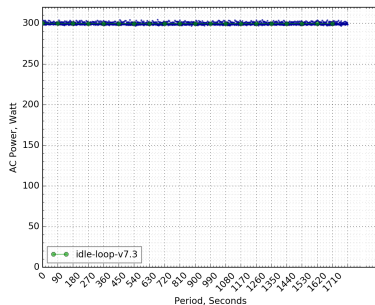
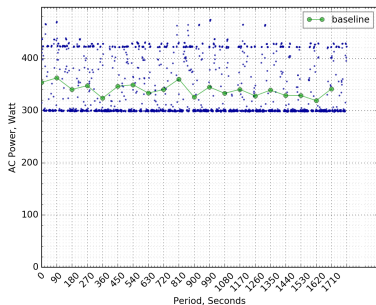
Idle Power (Intel OTC Server Power Lab)



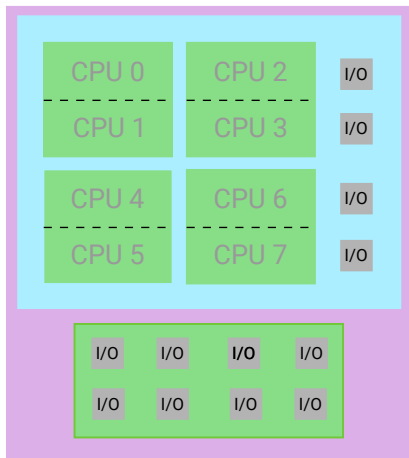
Idle Power (Intel OTC Server Power Lab) Continued



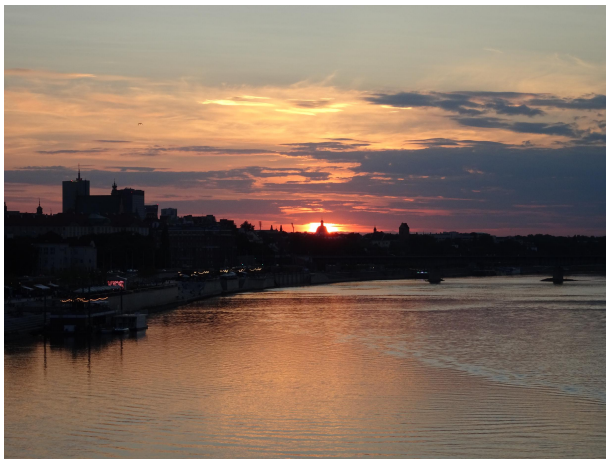
Idle Power (Intel OTC Server Power Lab) Continued



CPU Idle Time Management And Power Domains



Questions?



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References



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