

Proof that

the Energy efficiency of best effort task when
Interactive and Best Effort are scheduled together
is different to the DELTA energy of the hole
system

Case 1 : Nothing else is added on the phone : Only interactive tasks are still present on the phone

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workload_of_Interactive_tasks

Energy_of_Interactive_tasks

Fixed experiment duration

A horizontal double-headed arrow with blue arrowheads at both ends, indicating a fixed duration.

Case 1 : Nothing else is added on the phone : Only interactive tasks are still present on the phone

Case 1 : Nothing else is added on the phone :
Only interactive tasks are still present on the phone

workload_of_Interactive_tasks

Energy_of_Interactive_tasks

Fixed experiment duration

workload_of_Interactive_tasks_1 = W_{Int_1}

Energy_of_Interactive_tasks_1 = E_{Int_1}

Case 1 : Nothing else is added on the phone : Only interactive tasks are still present on the phone

Case 1 : Nothing else is added on the phone :
Only interactive tasks are still present on the phone

workload_of_Interactive_tasks

Energy_of_Interactive_tasks

Fixed experiment duration

workload_of_Interactive_tasks_1= W_Int_1

Energy_of_Interactive_tasks_1 = E_Int_1

$$efficiency_{System} = e_1 = \frac{E_{Inter\ 1}}{W_{Inter\ 1}}$$

Case 2 : Best effort task is added on the phone : interactive tasks and the best effort task are present on the phone

Case 1 : Nothing else is added on the phone :
Only interactive tasks are still present on the phone

workload_of_Interactive_tasks

Energy_of_Interactive_tasks

Fixed experiment duration

workload_of_Interactive_tasks_1= W_{Int_1}

Energy_of_Interactive_tasks_1 = E_{Int_1}

$$efficiency_{System} = e_1 = \frac{E_{Inter\ 1}}{W_{Inter\ 1}}$$

Case 2: A best effort task is added on the phone :
interactive tasks and the best effort task are present on the phone

Interactive_tasks_wokload

Interactive_tasks_Energy

Case 2 : Best effort task is added on the phone : interactive tasks and the best effort task are present on the phone

Case 1 : Nothing else is added on the phone :
Only interactive tasks are still present on the phone

workload_of_Interactive_tasks

Energy_of_Interactive_tasks

Fixed experiment duration

workload_of_Interactive_tasks_1= W_{Int_1}

Energy_of_Interactive_tasks_1 = E_{Int_1}

$$efficiency_{System} = e_1 = \frac{E_{Inter\ 1}}{W_{Inter\ 1}}$$

Case 2: A best effort task is added on the phone :
interactive tasks and the best effort task are present on the phone

Interactive_tasks_wokload

Interactive_tasks_Energy

workload_of_Interactive_tasks_1= W_{int_2}

Energy_of_Interactive_tasks_1 = E_{Int_2}

Case 2 : Best effort task is added on the phone : interactive tasks and the best effort task are present on the phone

Case 1 : Nothing else is added on the phone :
Only interactive tasks are still present on the phone

workload_of_Interactive_tasks

Energy_of_Interactive_tasks

Fixed experiment duration

workload_of_Interactive_tasks_1= W_Int_1

Energy_of_Interactive_tasks_1 = E_Int_1

$$efficiency_{System} = e_1 = \frac{E_{Inter\ 1}}{W_{Inter\ 1}}$$

Case 2: A best effort task is added on the phone : interactive tasks and the best effort task are present on the phone

Interactive_tasks_wokload

Interactive_tasks_Energy

Workload_of_Best_effort_task_2 = W_Be_2

Energy_of_Best_effort_tasks_2 = E_Be_2

workload_of_Interactive_tasks_1= W_int_2

Energy_of_Interactive_tasks_1 = E_Int_2

Case 2 : Best effort task is added on the phone : interactive tasks and the best effort task are present on the phone

Case 1 : Nothing else is added on the phone :
Only interactive tasks are still present on the phone

workload_of_Interactive_tasks

Energy_of_Interactive_tasks

Fixed experiment duration



workload_of_Interactive_tasks_1= W_Int_1

Energy_of_Interactive_tasks_1 = E_Int_1

$$efficiency_{System} = e_1 = \frac{E_{Inter\ 1}}{W_{Inter\ 1}}$$

Case 2: A best effort task is added on the phone : interactive tasks and the best effort task are present on the phone

Interactive_tasks_wokload

Interactive_tasks_Energy

Workload_of_Best_effort_task_2 = W_Be_2

Energy_of_Best_effort_tasks_2 = E_Be_2

workload_of_Interactive_tasks_1= W_int_2

Energy_of_Interactive_tasks_1 = E_Int_2

$$efficiency_{System} = \frac{E_{Inter\ 2} + E_{Be\ 2}}{W_{Inter\ 2} + W_{Be\ 2}}$$

Case 2 : Best effort task is added on the phone : interactive tasks and the best effort task are present on the phone

Case 1 : Nothing else is added on the phone :
Only interactive tasks are still present on the phone

workload_of_Interactive_tasks

Energy_of_Interactive_tasks

Fixed experiment duration

workload_of_Interactive_tasks_1= W_Int_1

Energy_of_Interactive_tasks_1 = E_Int_1

$$efficiency_{System} = e_1 = \frac{E_{Inter\ 1}}{W_{Inter\ 1}}$$

Case 2: A best effort task is added on the phone : interactive tasks and the best effort task are present on the phone

Interactive_tasks_wokload

Interactive_tasks_Energy

Workload_of_Best_effort_task_2 = W_Be_2

Energy_of_Best_effort_tasks_2 = E_Be_2

workload_of_Interactive_tasks_1= W_int_2

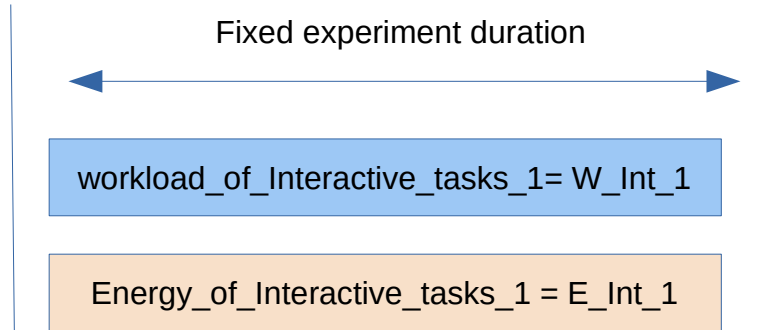
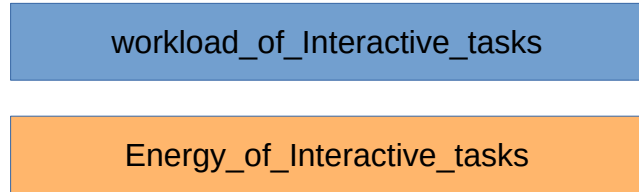
Energy_of_Interactive_tasks_1 = E_Int_2

$$efficiency_{System} = \frac{E_{Inter\ 2} + E_{Be\ 2}}{W_{Inter\ 2} + W_{Be\ 2}}$$

$$e_2 = \frac{E_{Inter\ 2} \times \frac{W_{Inter\ 2}}{W_{Inter\ 2}} + E_{Be\ 2} \times \frac{W_{Be\ 2}}{W_{Be\ 2}}}{W_{Inter\ 2} + W_{Be\ 2}}$$

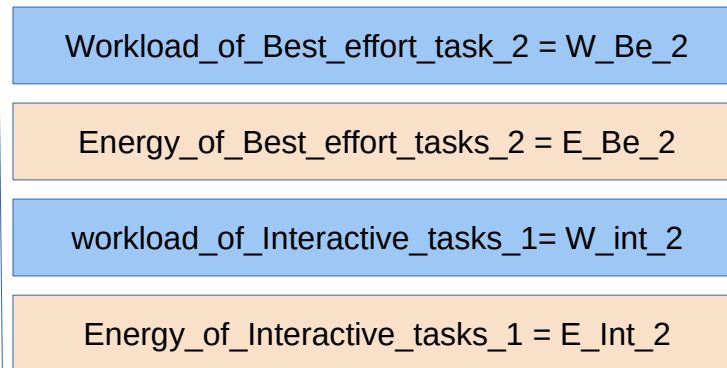
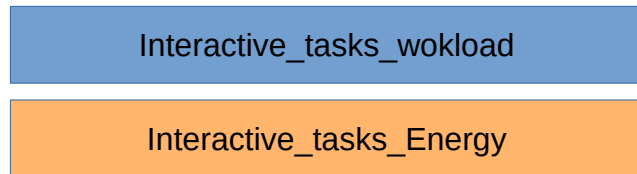
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Case 2: A best effort task is added on the phone : interactive tasks and the best effort task are present on the phone



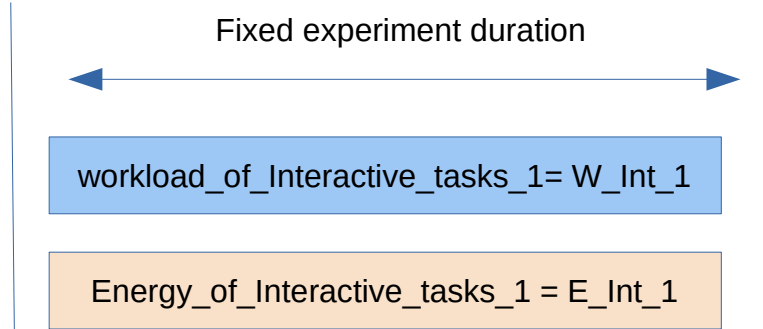
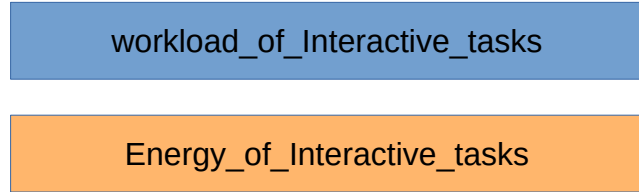
$$efficiency_{System} = \frac{E_{Inter\ 2} + E_{Be\ 2}}{W_{Inter\ 2} + W_{Be\ 2}}$$

$$e_2 = \frac{E_{Inter\ 2} \times \frac{W_{Inter\ 2}}{W_{Inter\ 2}} + E_{Be\ 2} \times \frac{W_{Be\ 2}}{W_{Be\ 2}}}{W_{Inter\ 2} + W_{Be\ 2}}$$

$$e_2 = \frac{efficiency_{Inter\ 2} \times W_{Inter\ 2} + efficiency_{Be\ 2} \times W_{Be\ 2}}{W_{Inter\ 2} + W_{Be\ 2}}$$

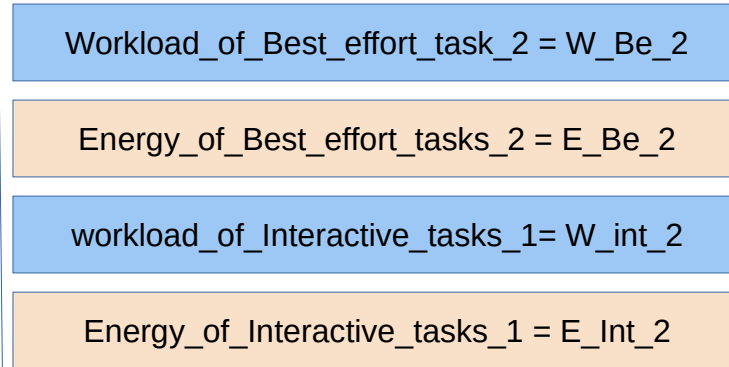
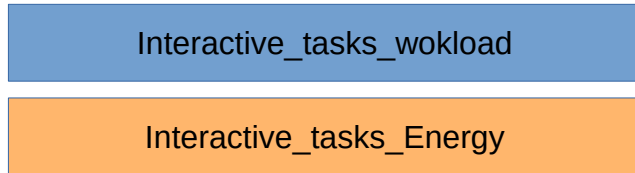
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$$efficiency_{System} = e_1 = \frac{E_{Inter\ 1}}{W_{Inter\ 1}}$$

Case 2: A best effort task is added on the phone : interactive tasks and the best effort task are present on the phone



$$efficiency_{System} = \frac{E_{Inter\ 2} + E_{Be\ 2}}{W_{Inter\ 2} + W_{Be\ 2}}$$

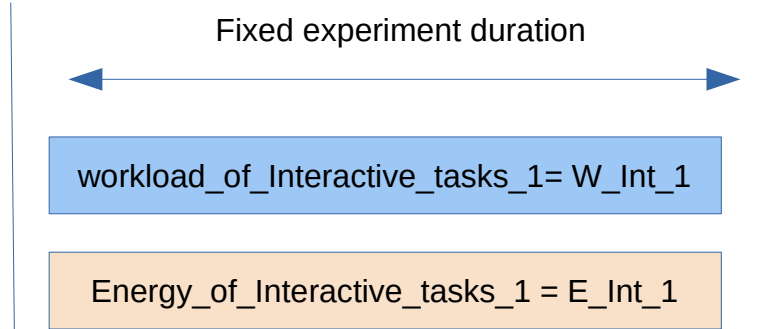
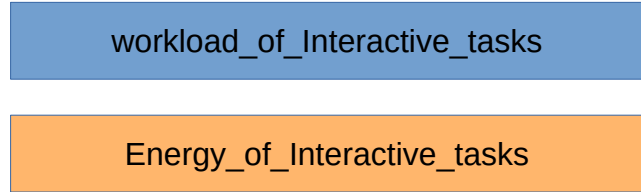
$$e_2 = \frac{E_{Inter\ 2} \times \frac{W_{Inter\ 2}}{W_{Inter\ 2}} + E_{Be\ 2} \times \frac{W_{Be\ 2}}{W_{Be\ 2}}}{W_{Inter\ 2} + W_{Be\ 2}}$$

$$e_2 = \frac{efficiency_{Inter\ 2} \times W_{Inter\ 2} + efficiency_{Be\ 2} \times W_{Be\ 2}}{W_{Inter\ 2} + W_{Be\ 2}}$$

$$efficiency_{ofSystem} = e_2 = efficiency_{Inter\ 2} \times \% W_{Inter\ 2} + efficiency_{Be\ 2} \times \% W_{Be\ 2}$$

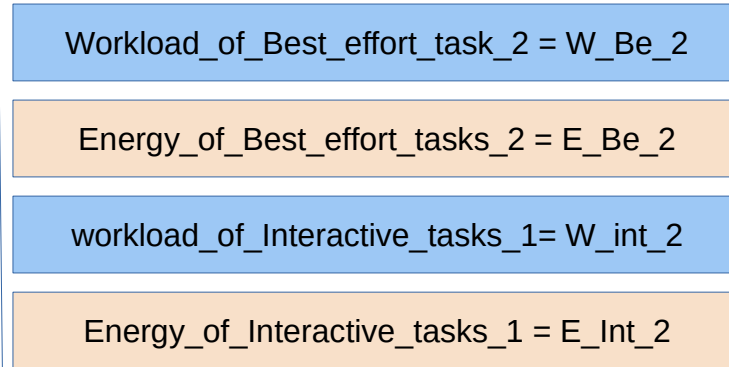
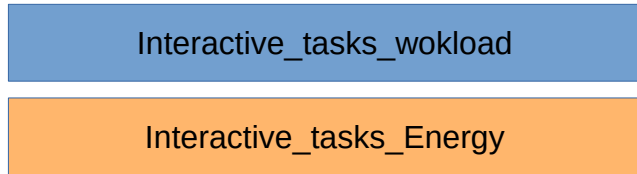
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$$efficiency_{System} = e_1 = \frac{E_{Inter\ 1}}{W_{Inter\ 1}}$$

Case 2: A best effort task is added on the phone : interactive tasks and the best effort task are present on the phone



$$efficiency_{System} = \frac{E_{Inter\ 2} + E_{Be\ 2}}{W_{Inter\ 2} + W_{Be\ 2}}$$

$$e_2 = \frac{E_{Inter\ 2} \times \frac{W_{Inter\ 2}}{W_{Inter\ 2}} + E_{Be\ 2} \times \frac{W_{Be\ 2}}{W_{Be\ 2}}}{W_{Inter\ 2} + W_{Be\ 2}}$$

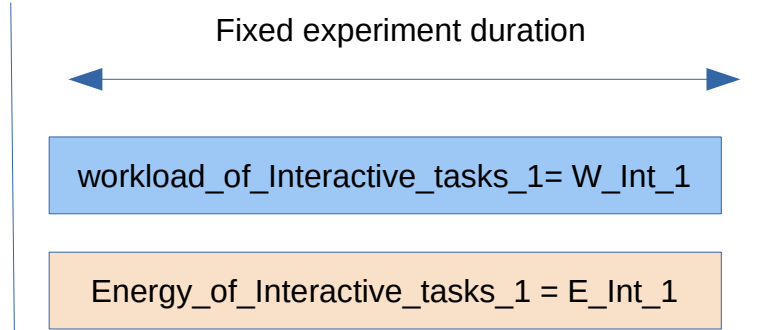
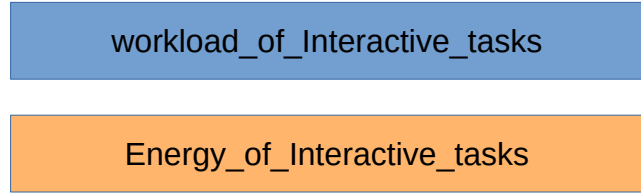
$$e_2 = \frac{efficiency_{Inter\ 2} \times W_{Inter\ 2} + efficiency_{Be\ 2} \times W_{Be\ 2}}{W_{Inter\ 2} + W_{Be\ 2}}$$

$$e_2 - e_1 = efficiency_{Inter\ 2} \times \% W_{Inter\ 2} + efficiency_{Be\ 2} \times \% W_{Be\ 2} - efficiency_{Inter\ 1}$$

$$efficiency_{ofSystem} = e_2 = efficiency_{Inter\ 2} \times \% W_{Inter\ 2} + efficiency_{Be\ 2} \times \% W_{Be\ 2}$$

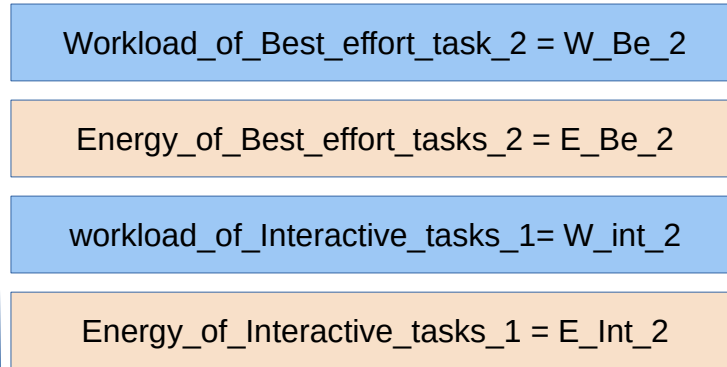
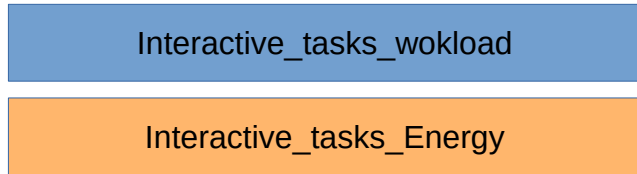
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$$efficiency_{System} = e_1 = \frac{E_{Inter\ 1}}{W_{Inter\ 1}}$$

Case 2: A best effort task is added on the phone : interactive tasks and the best effort task are present on the phone



$$efficiency_{System} = \frac{E_{Inter\ 2} + E_{Be\ 2}}{W_{Inter\ 2} + W_{Be\ 2}}$$

$$e_2 = \frac{E_{Inter\ 2} \times \frac{W_{Inter\ 2}}{W_{Inter\ 2}} + E_{Be\ 2} \times \frac{W_{Be\ 2}}{W_{Be\ 2}}}{W_{Inter\ 2} + W_{Be\ 2}}$$

$$e_2 = \frac{efficiency_{Inter\ 2} \times W_{Inter\ 2} + efficiency_{Be\ 2} \times W_{Be\ 2}}{W_{Inter\ 2} + W_{Be\ 2}}$$

$$e_2 - e_1 = efficiency_{Inter\ 2} \times \% W_{Inter\ 2} + efficiency_{Be\ 2} \times \% W_{Be\ 2} - efficiency_{Inter\ 1} \neq \frac{E_{Be\ 2}}{W_{Be\ 2}}$$

$$efficiency_{ofSystem} = e_2 = efficiency_{Inter\ 2} \times \% W_{Inter\ 2} + efficiency_{Be\ 2} \times \% W_{Be\ 2}$$