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Integrating Ecovisor into Mosaik Co-Simulation

Simulate the virtual energy grid

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- integrate Ecovisor into the Mosaik simulation tool
- ➔ provide an easy way to test a virtual grid

Further Questions:

- multiple (interconnected) Ecovisor systems
- impact of different workload profiles
- ...

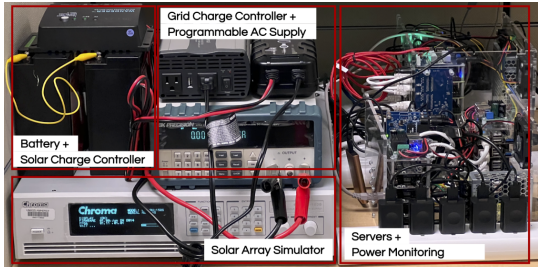

Figure: Ecovisor physical prototype

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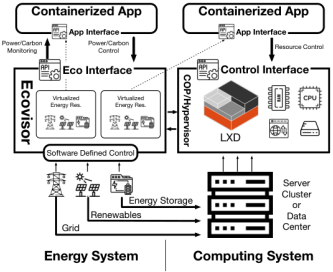

Figure: Ecovisor: a virtual energy system for carbon-efficient applications

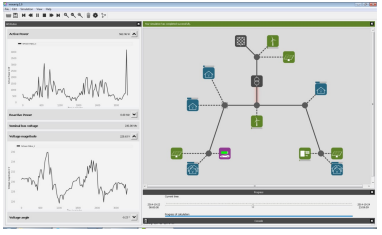

Figure: Mosaik: a flexible Smart Grid co-simulation framework

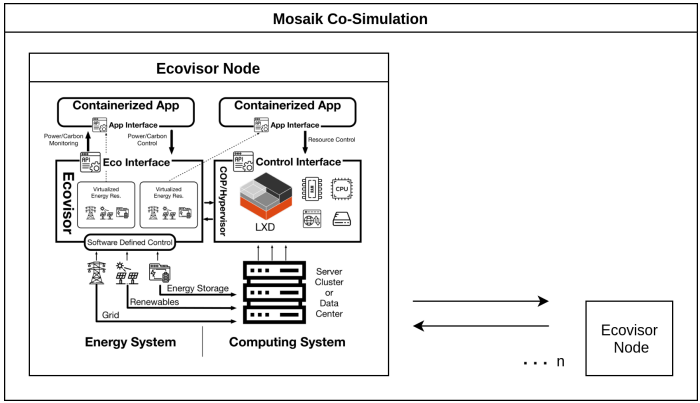

Figure: Ecovisor simulated within Mosaik Co-Simulation; adapted from Souza et al. [1]

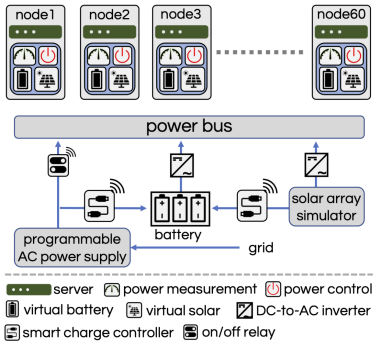

Figure: Ecovisor energy system

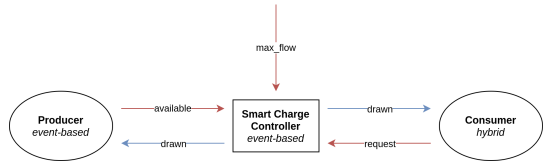

Figure: Smart-charge-controller

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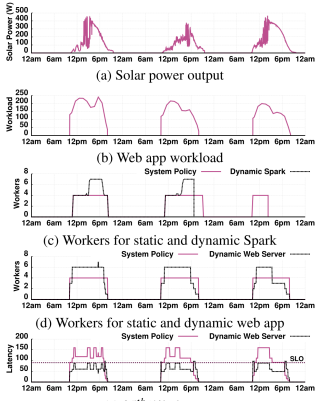

Figure: Workload simulation

Function Name	Type	Input	Return Value	Description
`set_container_powercap()`	Setter	ContainerID, kW	N/A	Set a container's power cap
`set_battery_charge_rate()`	Setter	kW	N/A	Set battery charge rate until full
`set_battery_max_discharge()`	Setter	kW	N/A	Set max battery discharge rate
`get_solar_power()`	Getter	N/A	kW	Get virtual solar power output
`get_grid_power()`	Getter	N/A	kW	Get virtual grid power usage
`get_grid_carbon()`	Getter	N/A	$g \cdot CO_2/kW$	Get current grid carbon intensity
`get_battery_discharge_rate()`	Getter	N/A	kW	Get current rate of battery discharge
`get_battery_charge_level()`	Getter	N/A	kWh	Get energy stored in virtual battery
`get_container_powercap()`	Getter	ContainerID	kW	Get a container's power cap
`get_container_power()`	Getter	ContainerID	kW	Get a container's power usage
`tick()`	Notification	N/A	N/A	Invoked by ecovisor every Δt

Figure: Ecovisor API

Questions?

And thank you for your attention

- figures adapted from:

A. Souza, N. Bashir, J. Murillo, W. Hanafy, Q. Liang, D. Irwin, and P. Shenoy, "Ecovisor: A virtual energy system for carbon-efficient applications," *arXiv preprint arXiv:2210.04951*, 2022.

- title page adapted from `https://mosaik.offis.de/`