Reducing the carbon footprint of data centers while improving their security

by

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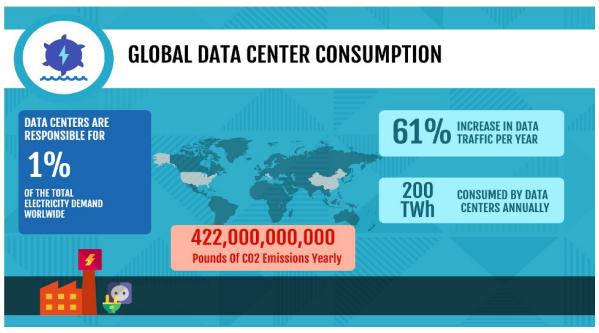
CONTEXT AND MOTIVATION



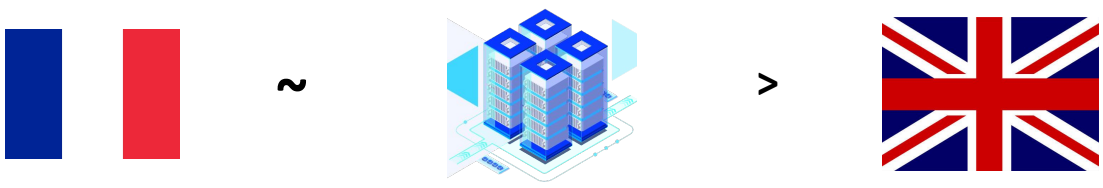
Increase in the number of data centers worldwide

2012	2021
500K	> **8M**

Environmental Issue: Gas Emissions

Data centers are a real scourge for the environment. Servers in a data center are almost always ON, which leads to huge energy consumption: data centers today consume 3% of the world's electricity production and, with 2% of gas emissions their carbon footprint is comparable to that of air transport.

483 TeraWatt hours ~ **416 TeraWatt hours** > **300 TeraWatt hours**



2016 Power consumption of data centers compared to France and UK

OBJECTIVE

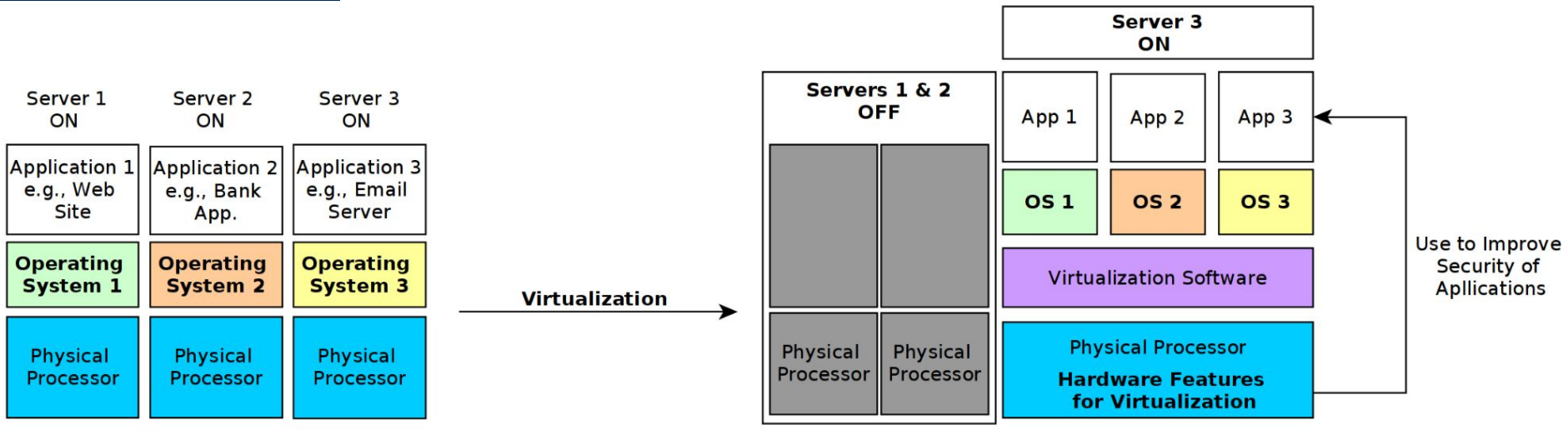
Reduce Power consumption and Gas emissions

To ensure the availability and continuity of cloud services, servers in data centers need to be ON almost all the time, resulting in high power consumption (50 to 70% of overall data center expenses) and carbon emissions (estimated to reach 14% by 2040).
The goal is to reduce the number of running servers in a data center as much as possible, which will reduce the overall power consumption of the data center.

Improve Security of data

Another concern with the cloud is the security of our data and every year, we witness numerous attacks and hacks.
The methods used to reduce the power consumption of data centers will raise other issues related to the security of applications running on the servers. The 2nd objective is therefore to continue to guarantee the same level of security for data centers.

METHODS



CONCLUSION

In the context of virtualization in the cloud, we propose techniques and solutions that aim to co-locate as many services on as few servers as possible to reduce the number of servers that need to be running in data centers and thus reduce their power consumption and carbon emissions.

But sharing resources means security risks. This is why we rely on hardware features, already introduced for virtualization, to guarantee the security of applications in that context.

REFERENCES

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