

# A Year in Lockdown: COVID-19 Pandemic and the Internet

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**Gaia Workshop**

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**European Research Council**  
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# Can the Internet Survive COVID-19?

## User Activity Shifts?

The New York Times

The Coronavirus Outbreak >

LIVE

Latest Updates

Maps and Cases

Vaccine Tracker

Experts Fear Winter

Answers to You

## The Virus Changed the Way We Internet

By Ella Koeze and Nathaniel Popper April 7, 2020

Stuck at home during the coronavirus pandemic, with movie theaters closed and no restaurants to dine in, Americans have been spending more of their lives online.

But a New York Times analysis of internet usage in the United

The Washington Post

Democracy Dies in Darkness

TECH  
The internet is under huge strain because of the coronavirus. Experts say it can cope — for now  
PUBLISHED FRI, MAR 27 2020-8:02 AM EDT | UPDATED FRI, MAR 27 2020-8:02 AM EDT

Technology

## Your Internet is working. Thank these Cold War-era pioneers who designed it to handle almost anything

Coronavirus may have forced people to stay at home, but the Internet these scientists envisioned long ago is keeping the world connected

# Fantastic Multi-Institutional Team



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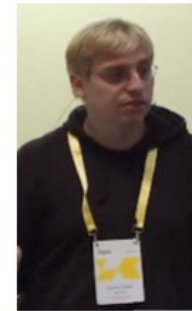
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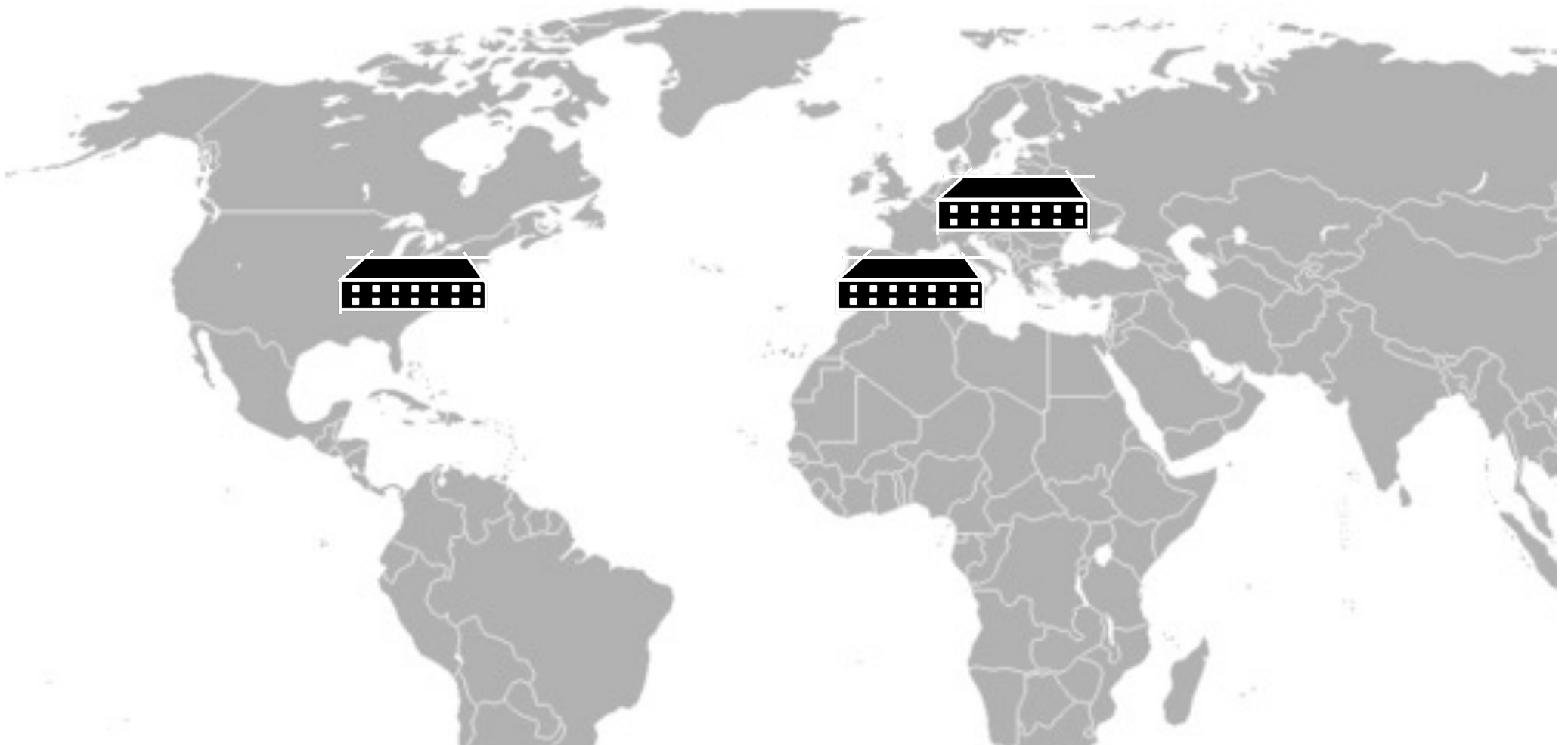
# ISP and Mobile Operator Vantage Points



## ISP and Mobile Operator Vantage Points

- The ISP is a large Central European ISP that provides service to more than **15 million fixed line subscribers** and operates a transit network (Tier-1).
- The mobile operator also located in Europe with more than **40 million customers**.

# IXPs Vantage Points

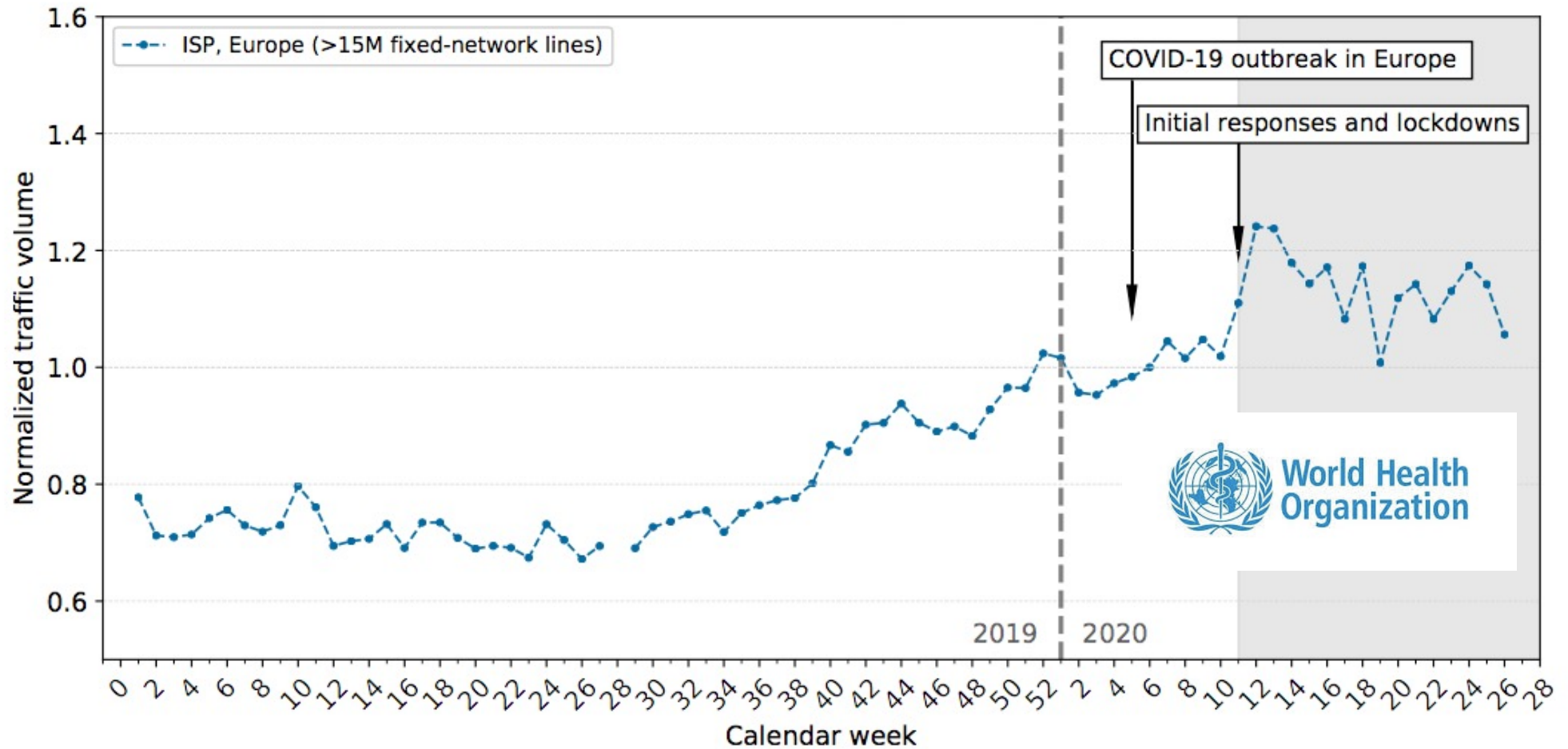


## IXP Vantage Points

- We consider three major Internet Exchange Points (IXPs) in our study.
  - The first one has more than **900 members**, located in **Central Europe** (IXP-CE) and has peak traffic of more than **8 Tbps**.
  - The second one has more than **170 members**, located in **Southern Europe**.
  - The third one has **250 members**, is located at the **US East Coast**.

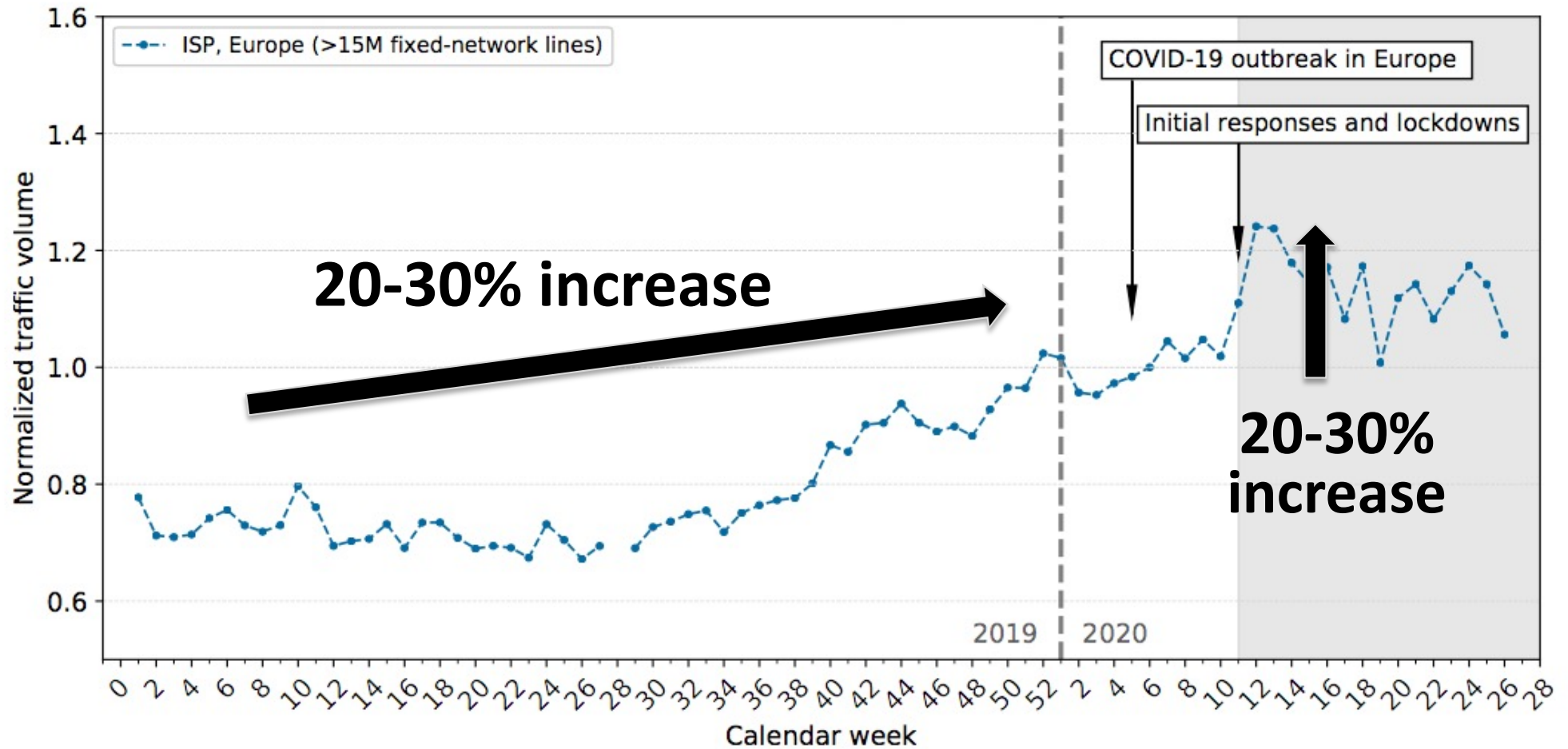


# COVID-19: Impact on the Internet Traffic

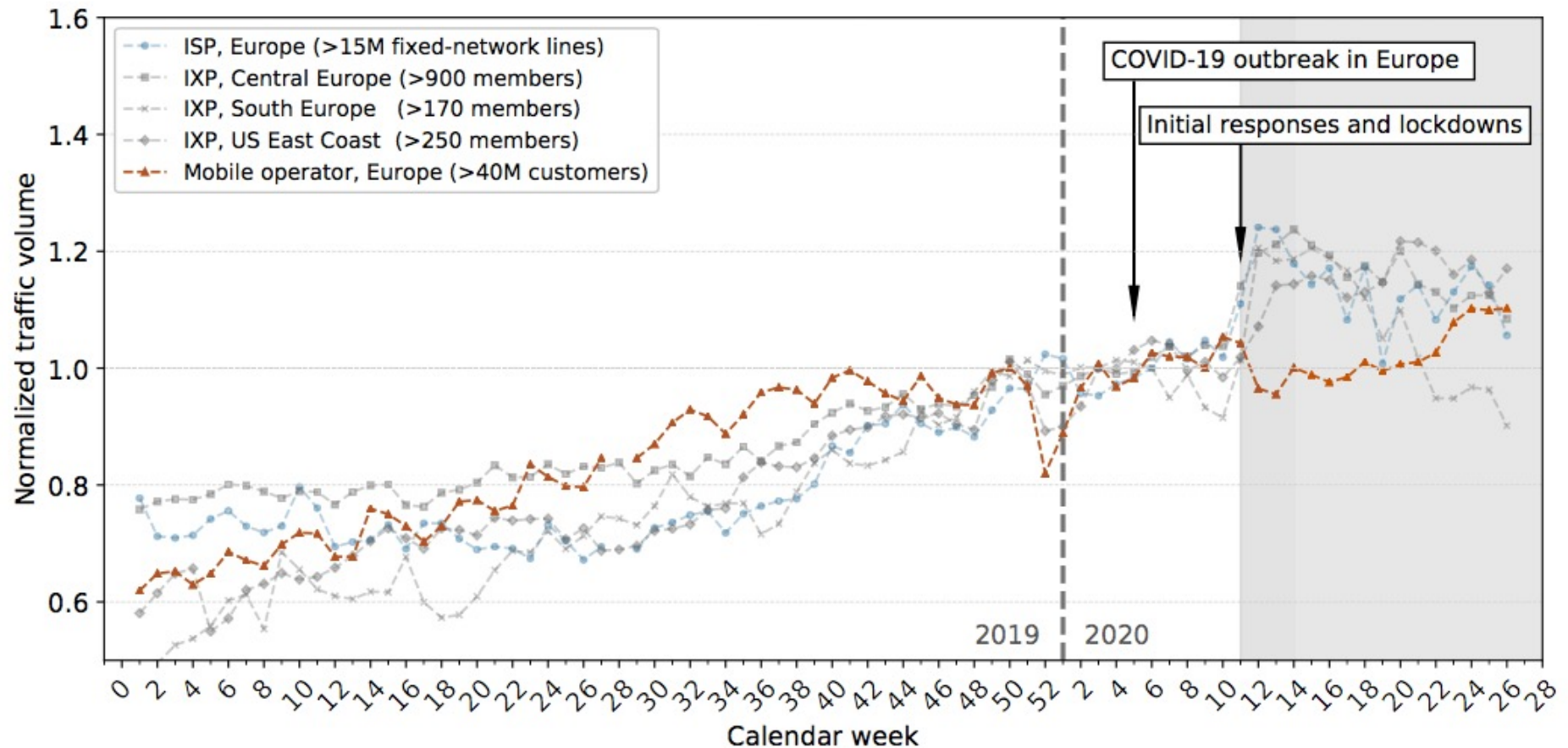




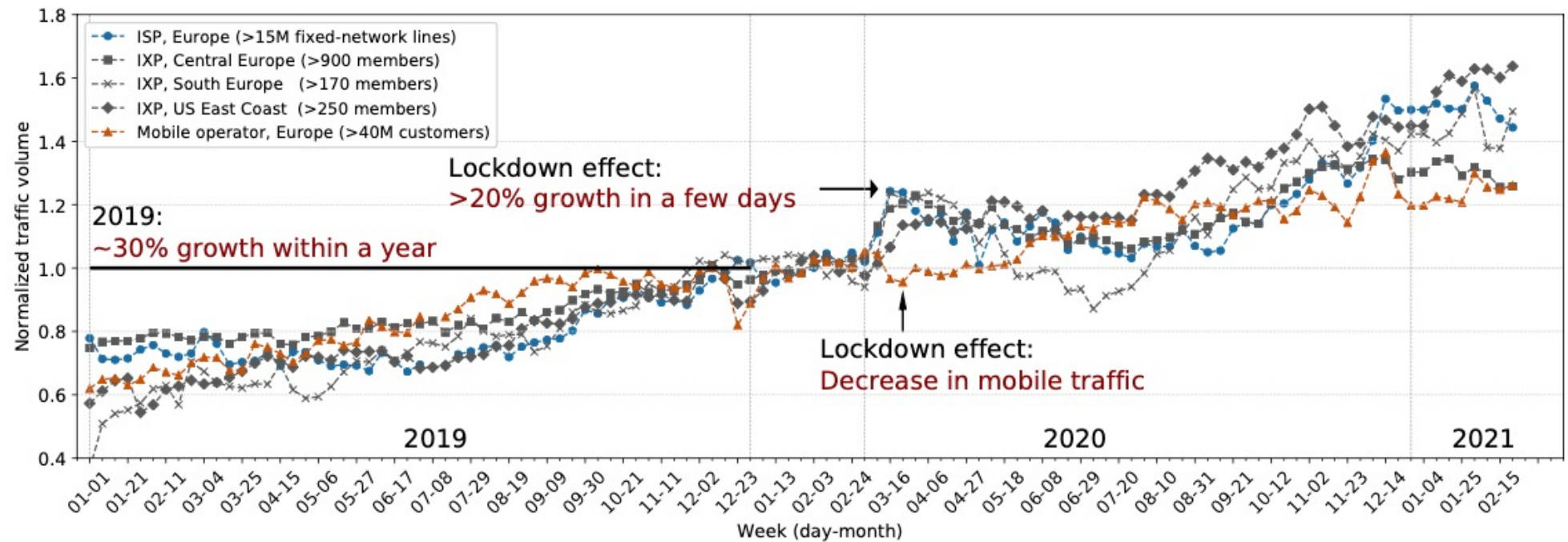
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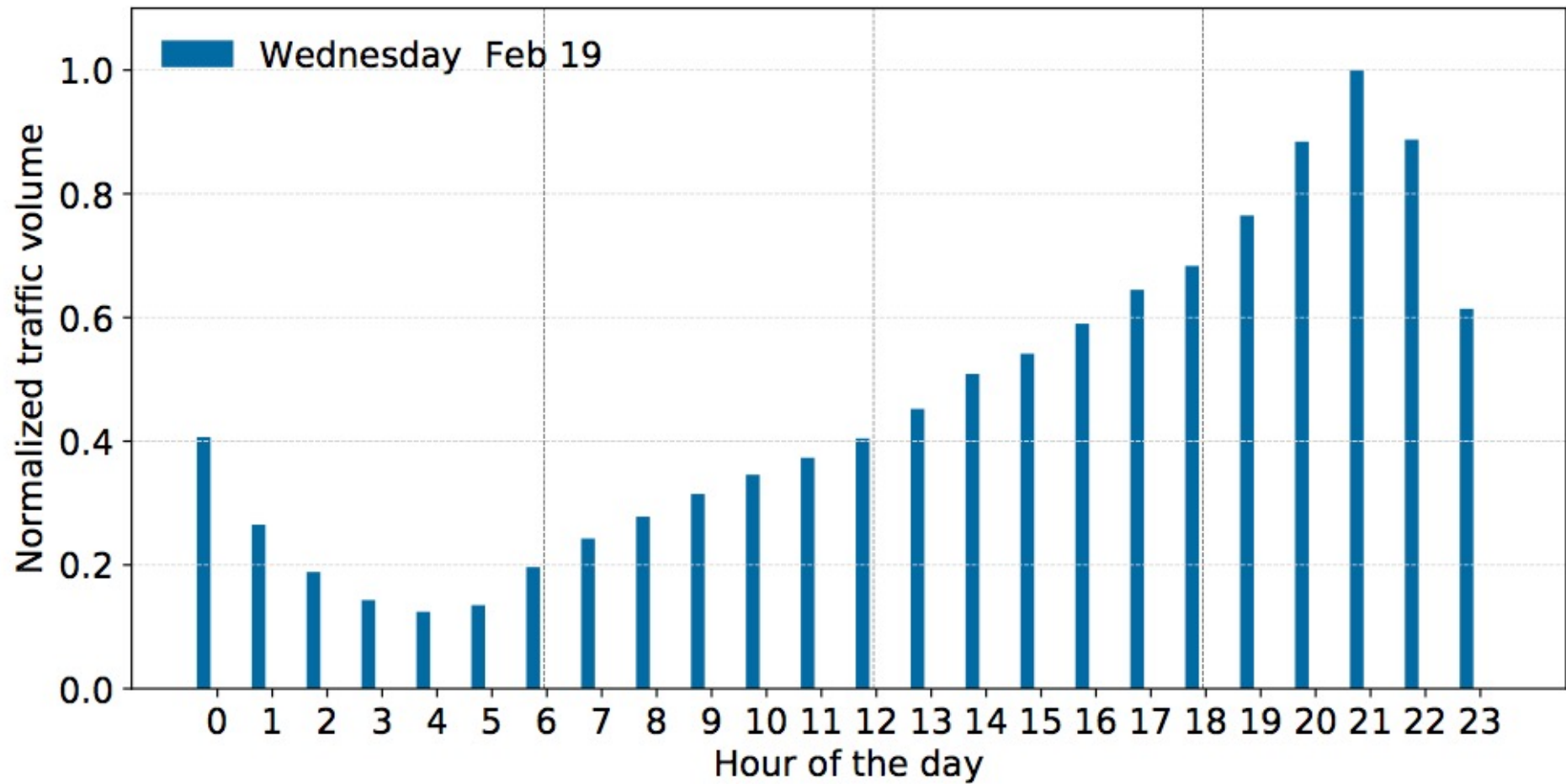
# COVID-19: Impact on the Internet Traffic



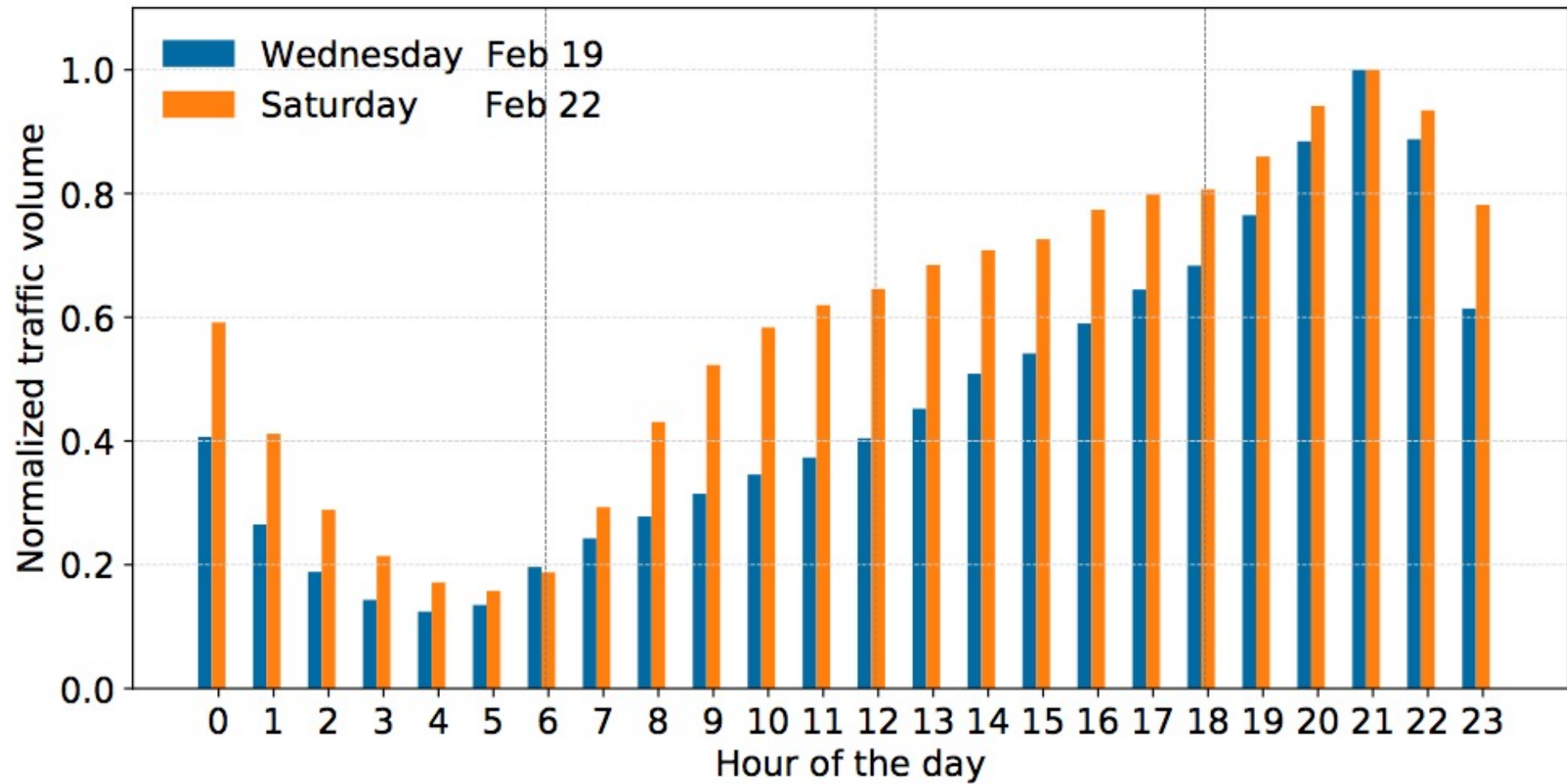
# COVID-19: Long-term Impact on the Internet Traffic



# Impact on the Internet Traffic: Deep Dive

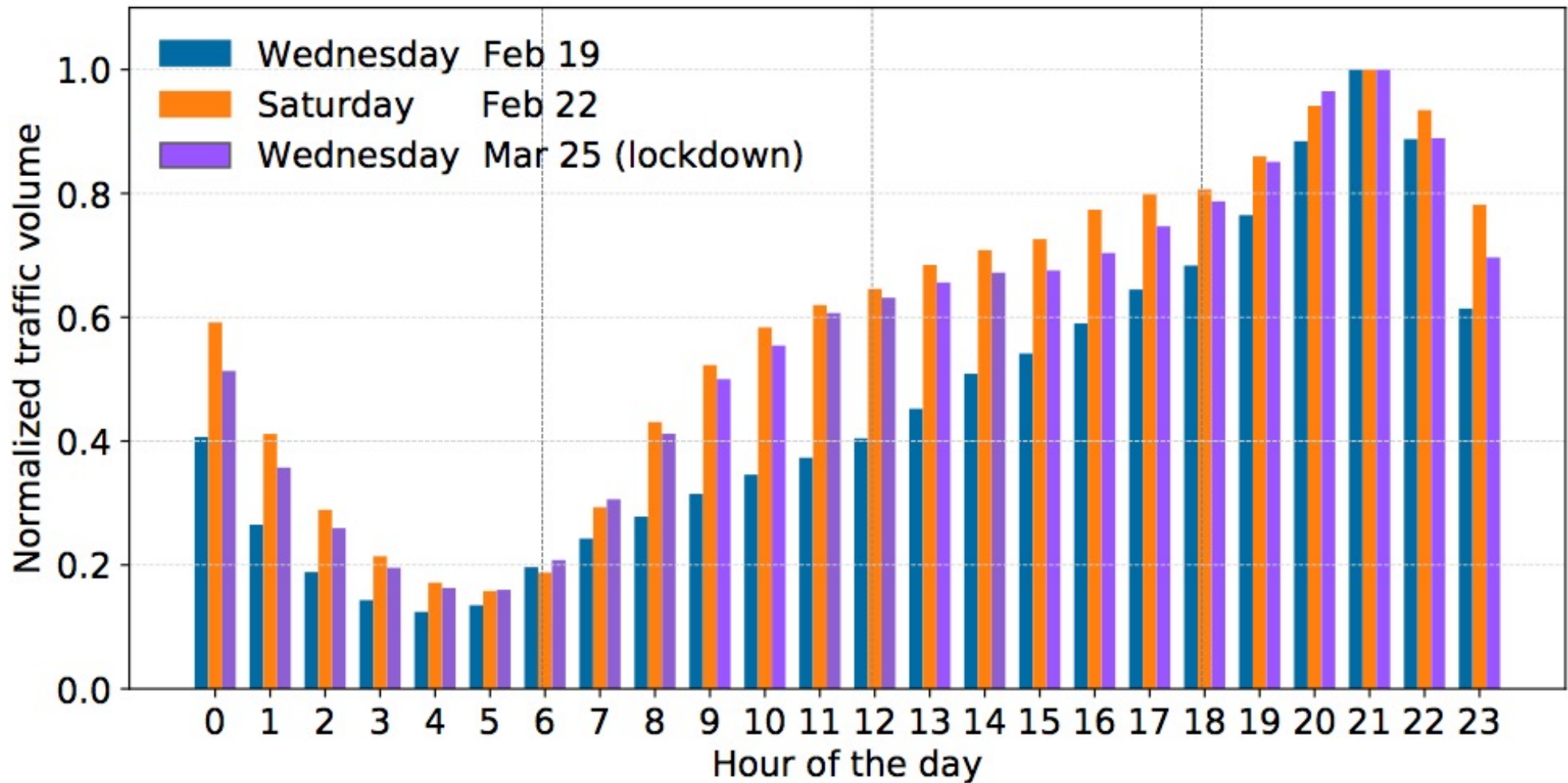


# Impact on the Internet Traffic: Deep Dive

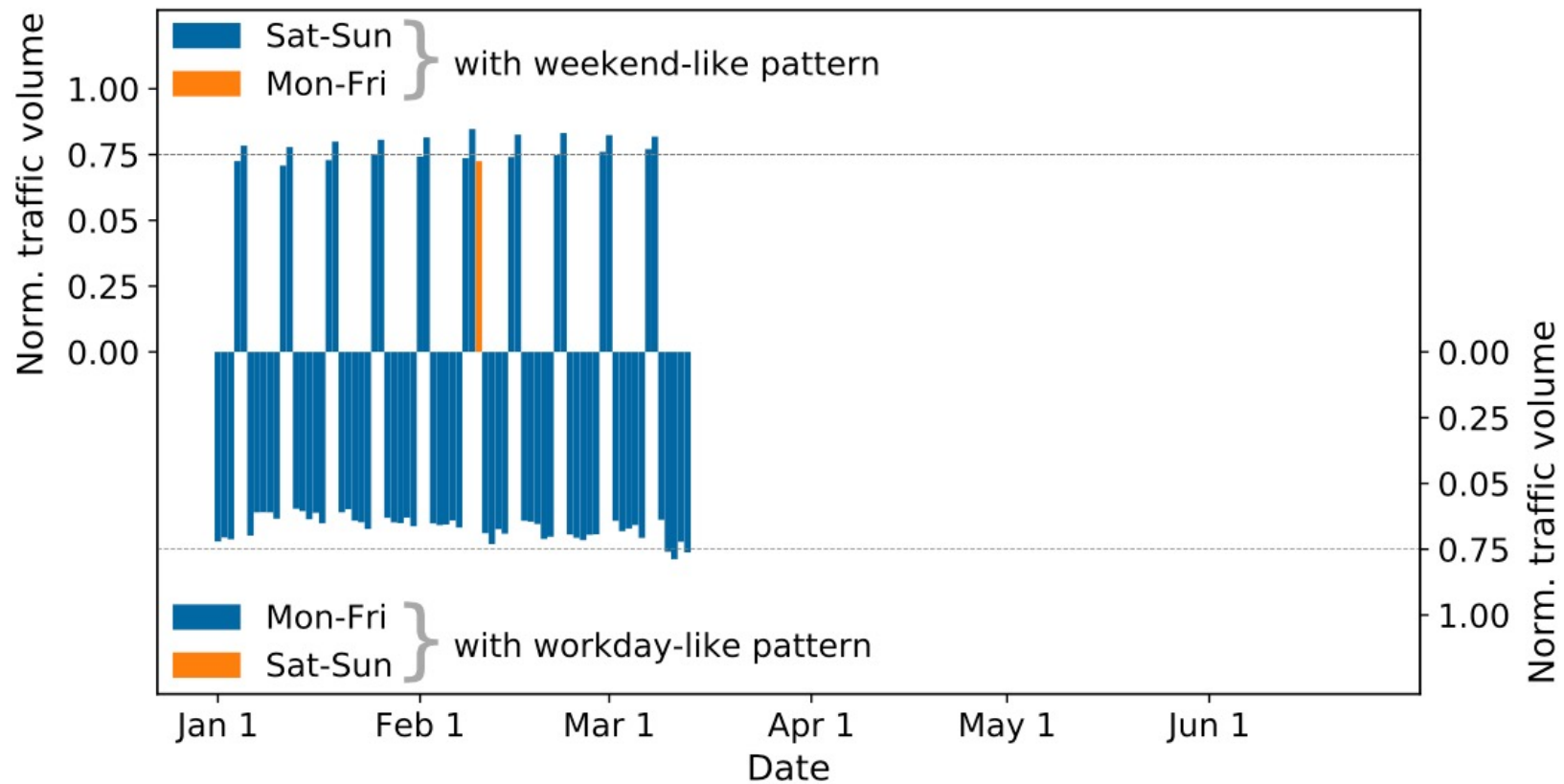




# Impact on the Internet Traffic: Deep Dive

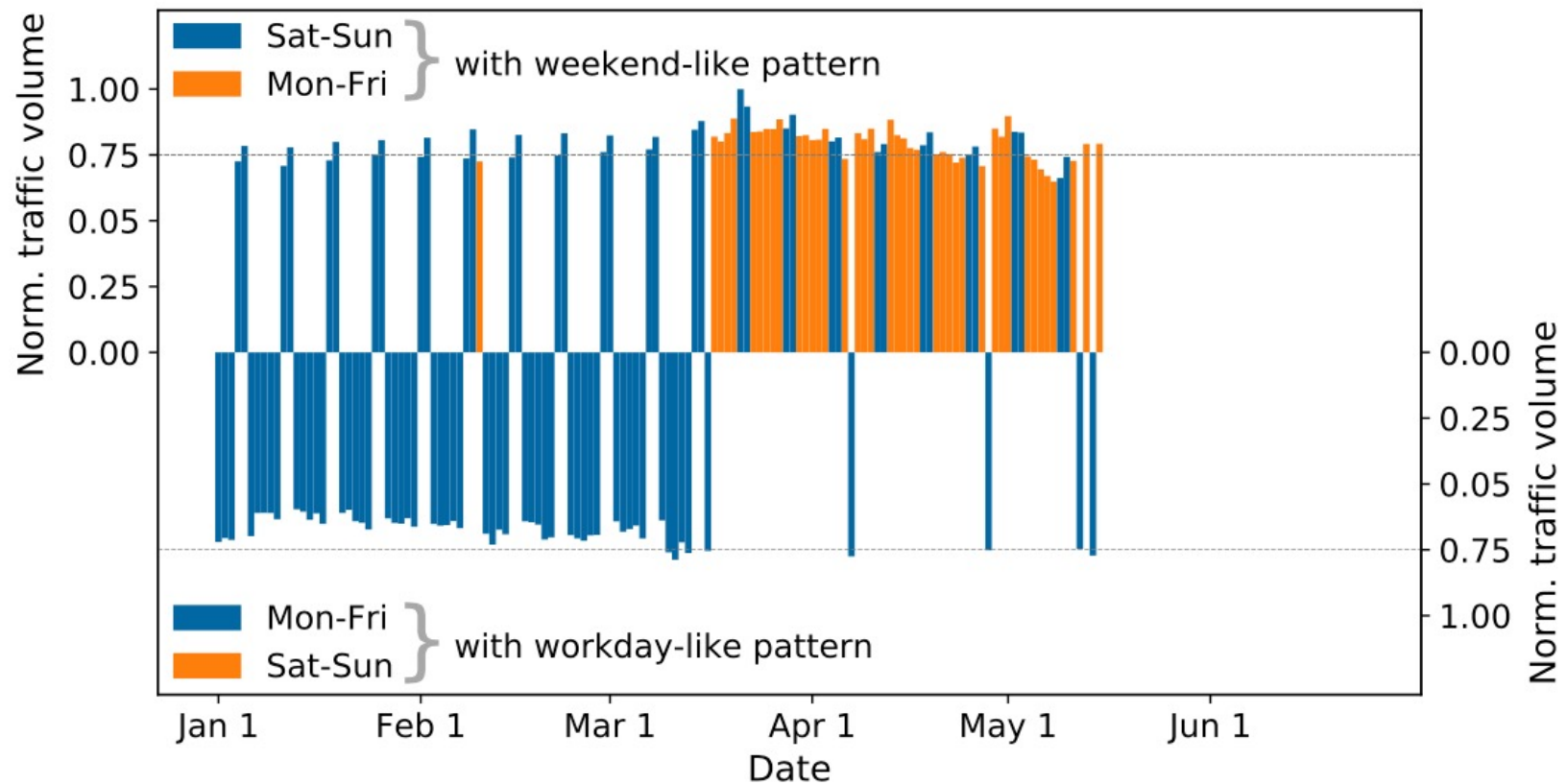


# Endless Weekend

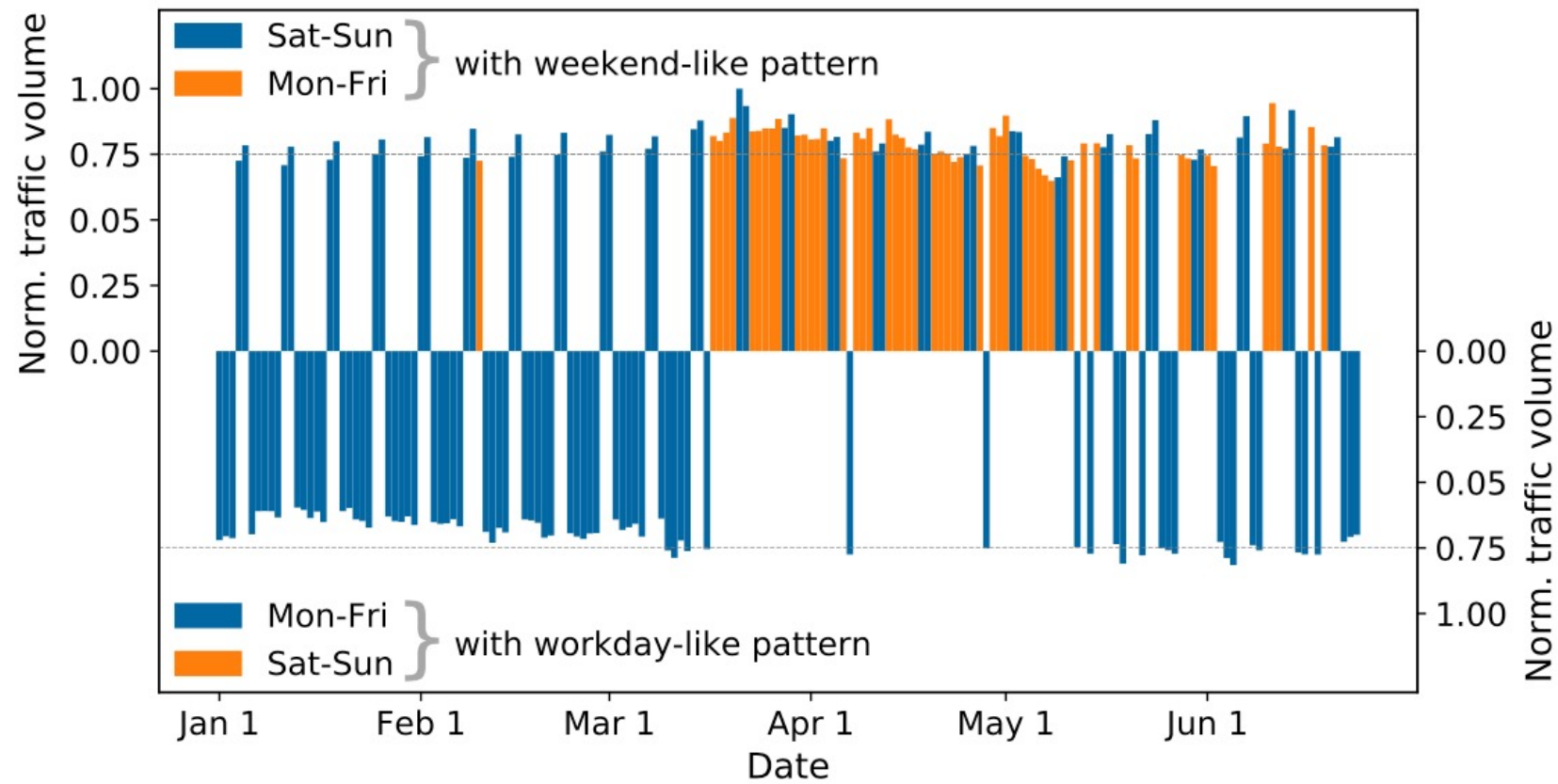




# Endless Weekend

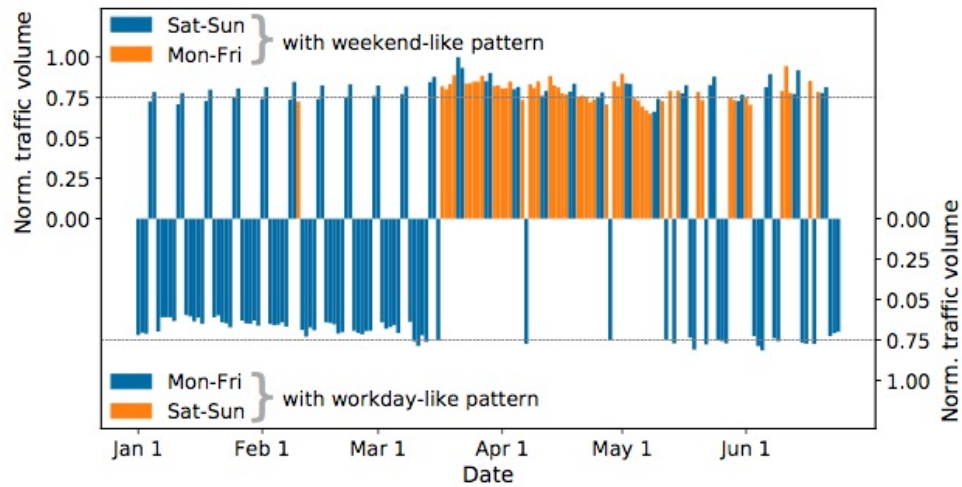


# Endless Weekend

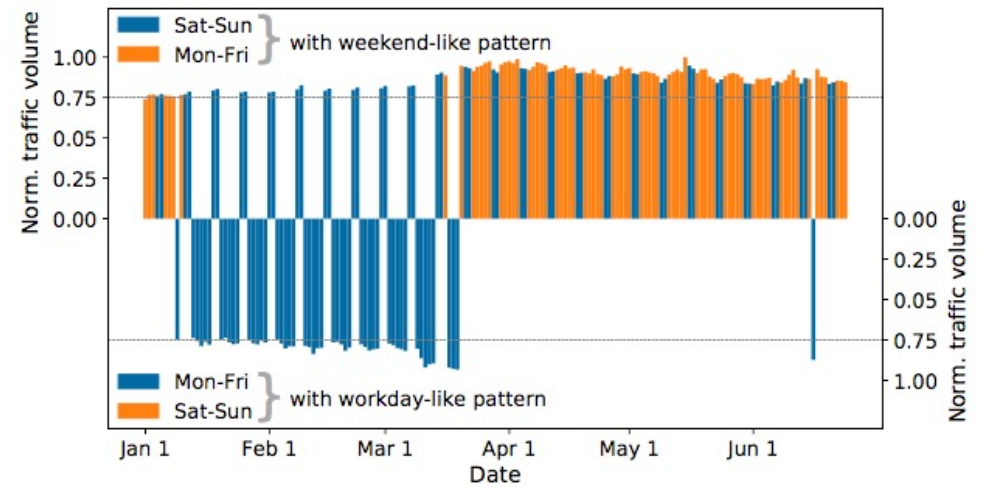


# Endless Weekend?

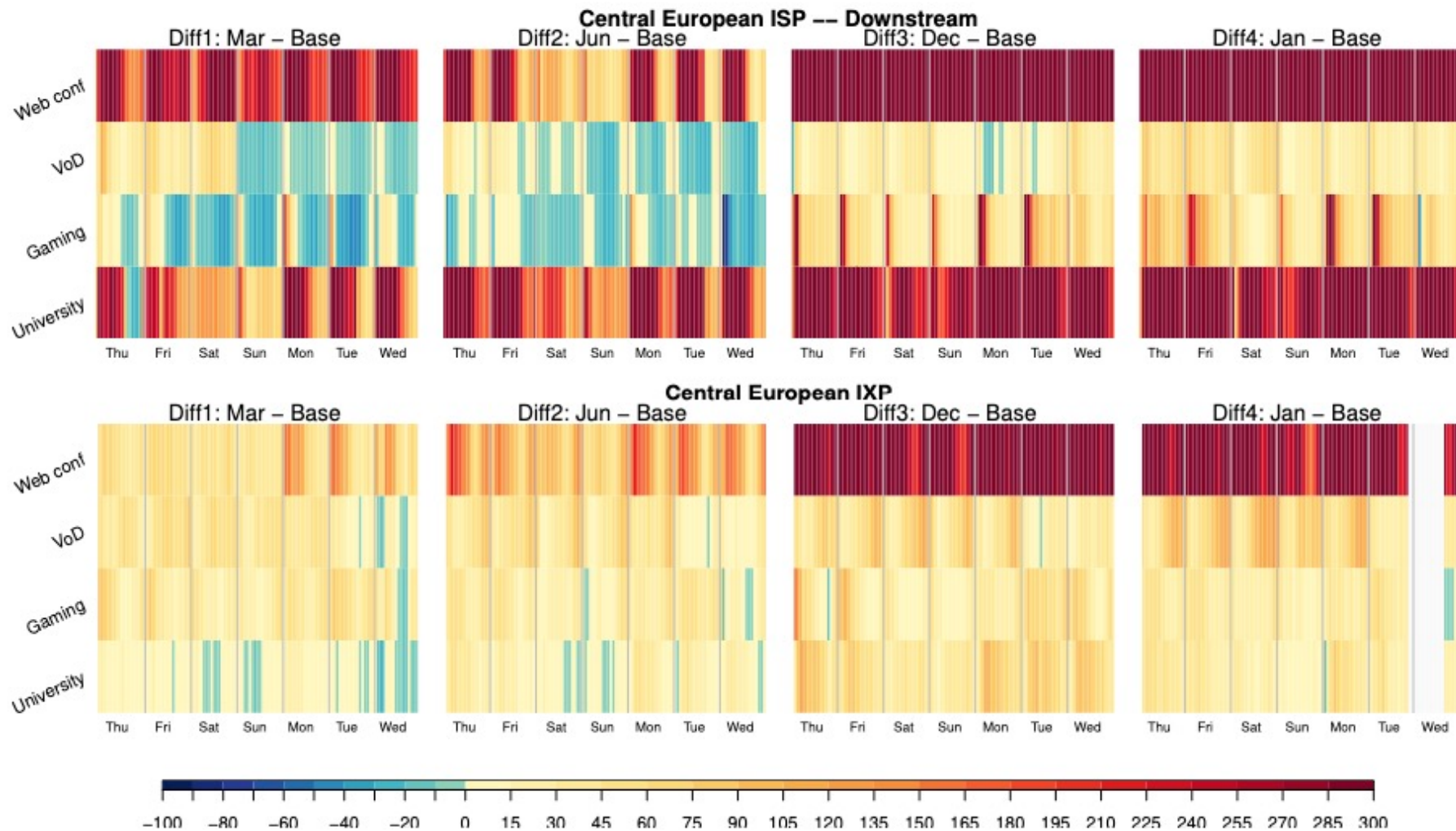
## ISP



## IXP



# Effect on Applications



# Summary

Overall traffic increase: 15-30% within a few days

Higher than expected annual traffic growth

Increase of traffic, typically, during off-peak periods

Network Provisioning, Cloud, IXPs, and Automation were keys to react fast and efficiently

Still, we observed significant increase in some applications, that is here to stay



Find more about this work  
in the CACM July 2021 issue.

Thank you for your attention!