The Lockdown Effect
Implications of the COVID-19 Pandemic on Internet Traffic

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euronews.

Coronavirus: Half of humanity now on lockdown as 90 countries call for confinement

The New York Times

Working From Home: How Coronavirus Could Affect the Workplace

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The Internet is essential in all these efforts, but how well does it cope?
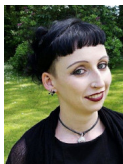
Lots of data, lots of data crunchers

- Edge network: Large European ISP
- Core networks: 3 IXPs in Central Europe, Southern Europe, and US East Coast
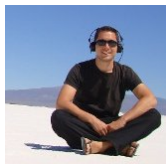- Academic network: REDIMadrid university network in Madrid
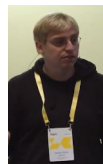
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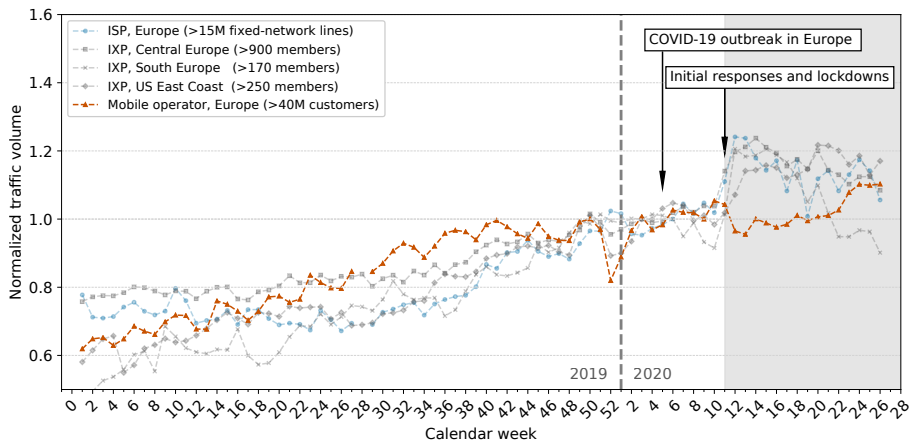
Traffic changes from January 2019 to June 2020
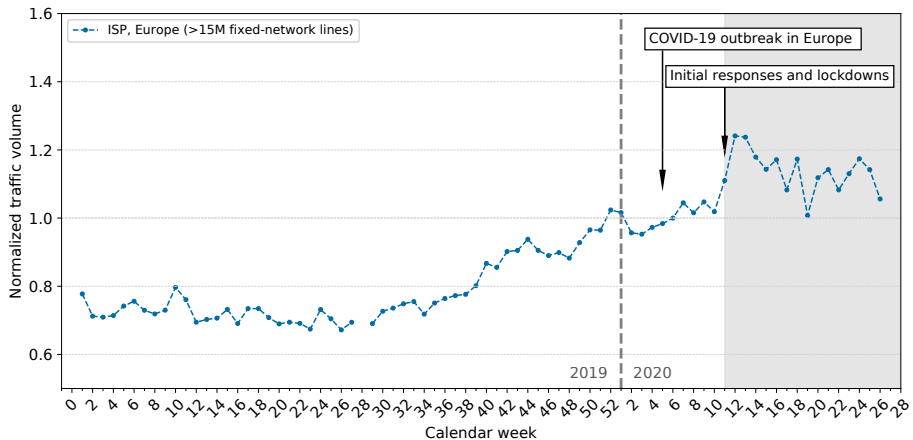
Once the lockdown started the ISP saw a +30% increase in traffic which normally spans over multiple months.
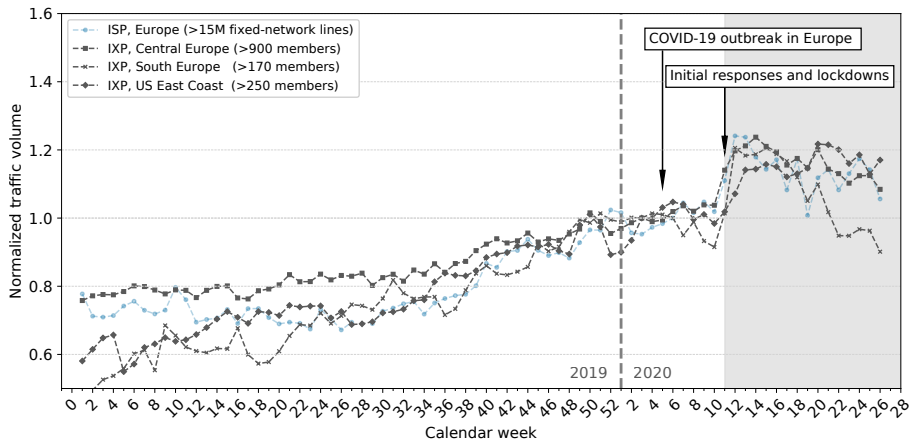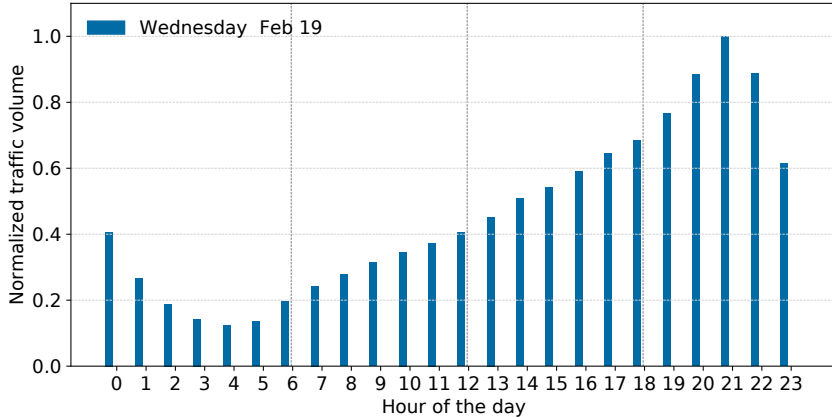
Similar behavior for the IXPs; for the IXP CE and IXP US the traffic levels remain elevated.
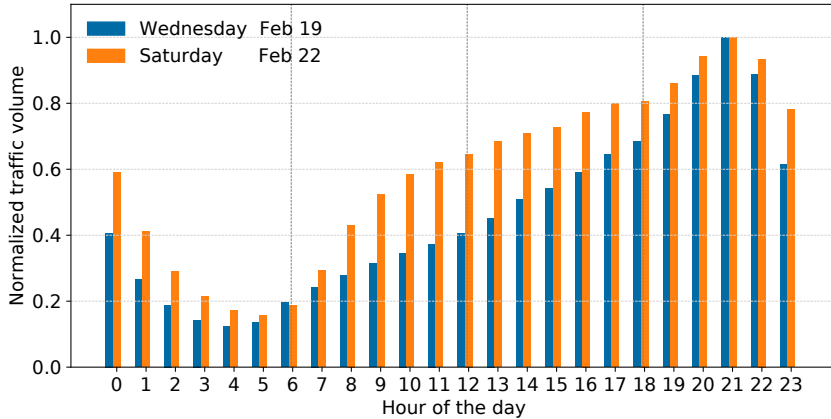
Traffic changes from January 2019 to June 2020

Once the lockdown started mobile traffic decreased measurably and increased again with the first relaxations in mid April.
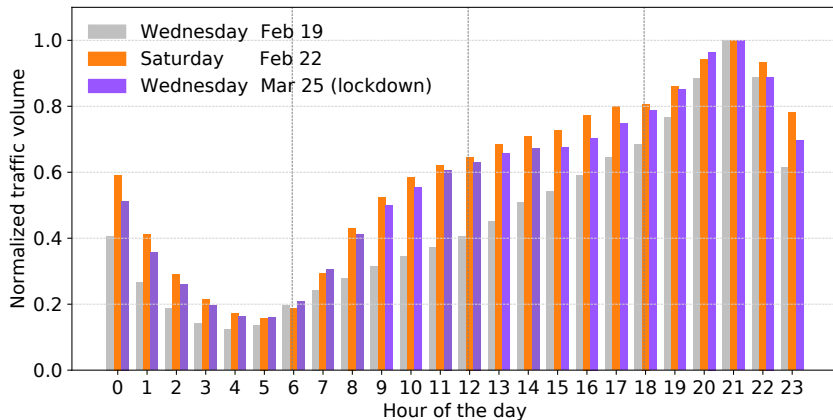
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Changes in workday vs. weekend patterns at the ISP

- Regular patterns
  - Workday: Strong increase in evening hours
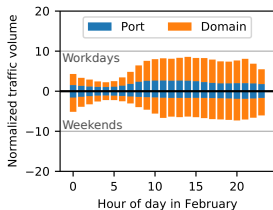
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Changes in workday vs. weekend patterns at the ISP

- Regular patterns
  - Workday: Strong increase in evening hours
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- During lockdown: Workdays look more like weekends

VPN identification

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- Domain-based: For TCP/443 traffic, IPs labeled `*vpn*`, but not `www.`

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- Port-based: Well known port/proto combinations exclusively used by VPN services
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- **200% increase in VPN traffic in March during working hours**
- Slight decrease in April & June

People change → traffic changes

- Traffic increase of 15-30% within a few days
- Difference between workday and weekend vanishes
- Applications for remote work, education, VPN, and video conferencing see significant increase in traffic

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More in our *The Lockdown Effect* IMC 2020 paper

- Changes in transport ports
- Different traffic classes
- Educational network
- Hypergiants vs. non-hypergiants
- …

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