RETN

2023

Contingency plans for network service providers.

How to survive the major crisis and keep going

2021: Ukrainian telecommunication market

~ 4.75 EUR

ARPU

~ 221 Mln EUR

Total revenue by 2021

4 781 (real ~620)

ISP in UA by Register

2022: the change is coming

Our network in Ukraine

6000+

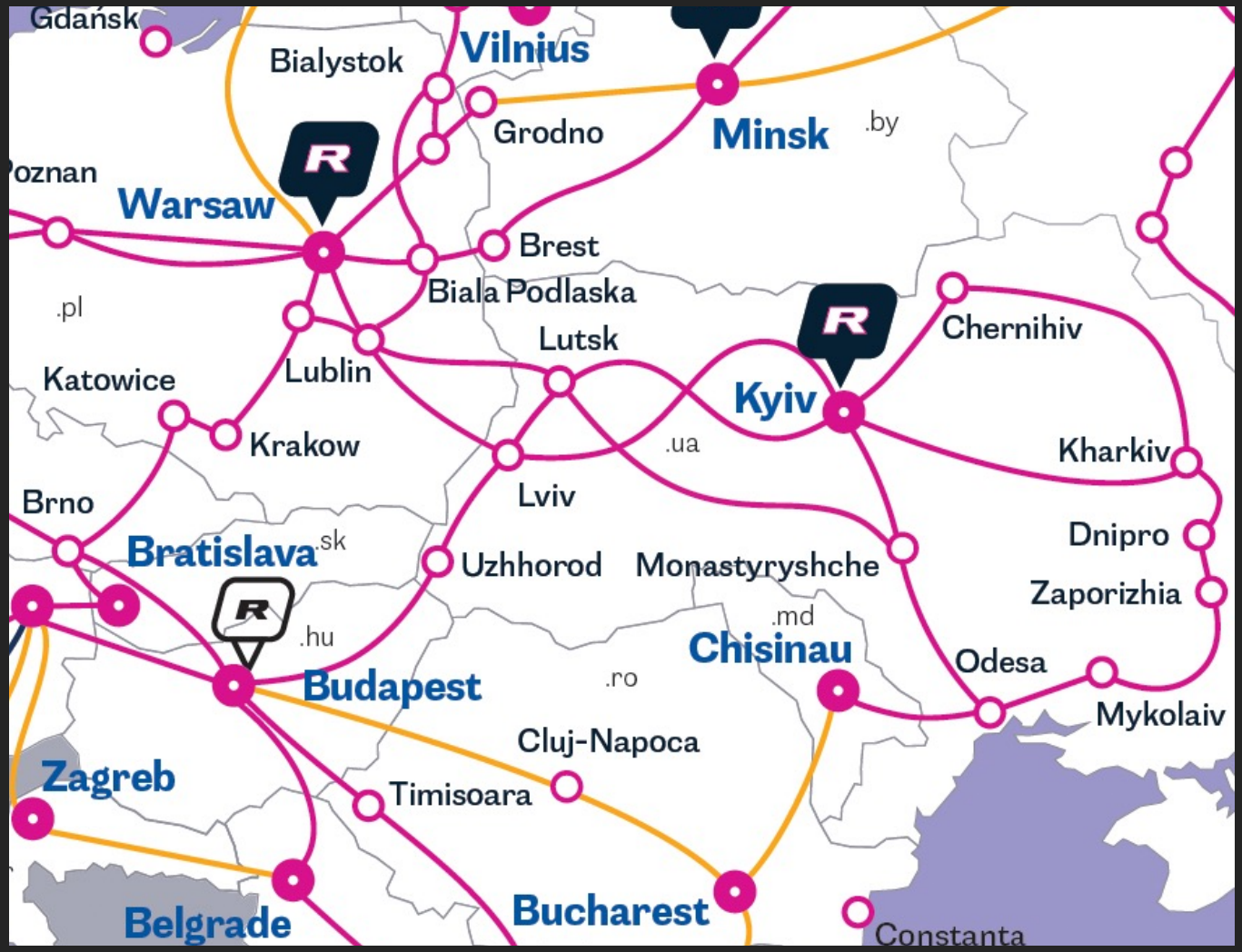
km of lit fibre

42

on-net buildings

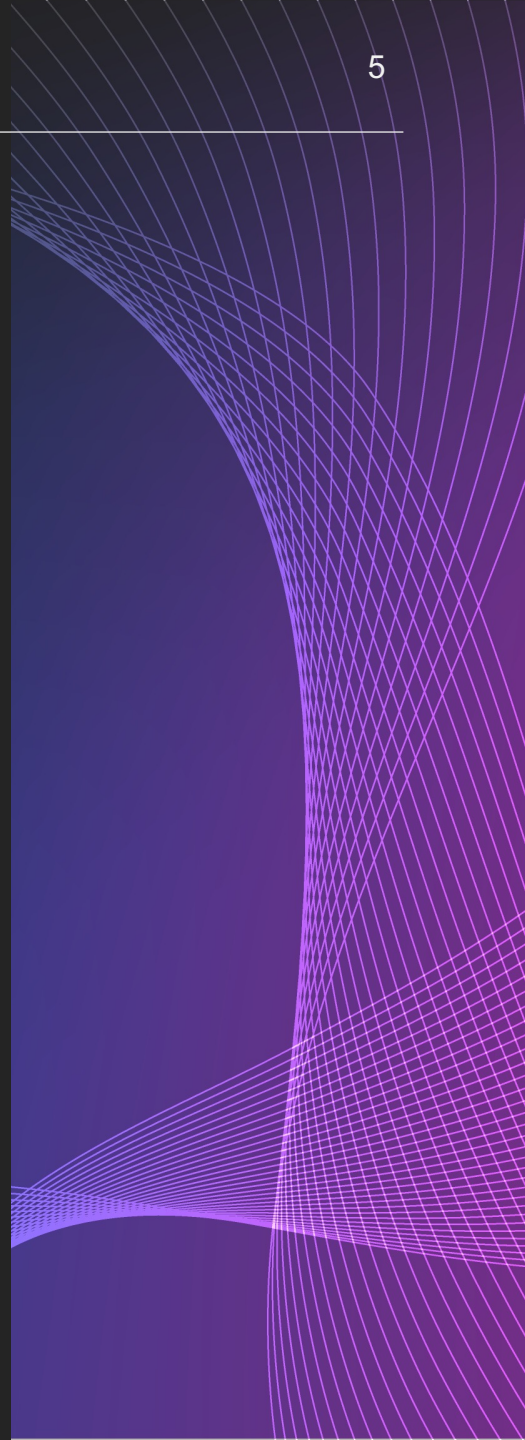
50+

amplifier sites



Typical problems for NSP

- Fibre cuts and capacity
- IP Connectivity
- Power and electricity on PoPs
- Network Security
- Warehouse and equipment
- Access to PoP



Fibre cuts and limits of capacity

March 2022: the worst SLA

46% more fibre cuts vs 2021

Average time to fix outages increase for 38%

Power issues: black Q4 2022

OCTOBER, NOVEMBER, DECEMBER

- **635 rockets** had been attacked for Ukrainian electricity infrastructure
- **~ 40% of time** - no electricity – working on batteries
- **3331 hours** - total time of diesel generation

Warehouse equipment, access to PoP

Decreased lifetime of batteries

Minimum 7 days delivery of anything to Ukraine

Curfew: 5 am – 11 pm access instead of 24/7

100% availability of RETN IP Transit for Ukrainian IP customers in November, December 2022 & January 2023

What's the situation with Ukrainian Telco **now**?

- Constant network recovery as a daily routine
- Protection of network – any amount of routes is never enough
- **US$2.6B** is the calculated loss of Ukrainian operators during **8 months**
- Network development and business growing

RETN

2023

One year gave us the lesson

100% SLA for IP customers **during the war is real**

Challenges RETN faces as an NSP

- Fibre cuts
- POPs isolation from the network
- Lack of external power to the site
- Equipment faults
- Spare management
- Logistics issues

Challenge #1

FIBRE CUTS

- Two diverse routes to key locations might not be enough sometimes
- Spare capacity of IP/MPLS network in proportion 2:1 or even higher is not a waste of CAPEX
- Spectrum requires careful planning
- FlexGRID in a combination with OTN rules - most of capacity could be rerouted from the affected route or converted into protected mode in a matter of minutes without DC visit
- Instant bandwidth transponders bring more benefits than we usually think
- Network development should not be stopped (it can be paused only)

Challenge #2

POP/CITY ISOLATION FROM THE REST OF THE NETWORK

- Deploy at least two core POPs at every key city you operate
- Same as above - two fibre routes to the site might not be enough
- Protect your DWDM network with leased capacity is not a bad thing to do
- Not only international capacity needs to be protected with new routes, look after metro networks as well

Challenge #3

NO EXTERNAL ELECTRICITY MOST PART OF THE DAY AT SOME LOCATIONS

Constantly monitor UPS battery health and its capacity. Any issue - replace straight away

Use high capacity batteries for ILA site so it can operate up to 3 days without external power

Keep your diesel generator with a full tank, always

Challenge #4

ACCESS TO SITES AND SPARE PARTS

- Keep as many ports pre-cabled to equipment as you can;
- Avoid the situation when your router has no spare port / slot left;
- Two DWDM chassis at the same location is never a bad idea;
- Keep a bunch of transceivers / patches and other materials on site if possible;
- Always keep stock of commonly used hardware close to your POPs;

Challenge #5

TRAFFIC CAN SUDDENLY APPEAR IN LOCATIONS WHERE YOU NEVER EXPECT IT

Plan your POPs with potential upgrades in mind

…and again - keep devices in stock so they can be shipped to the site when you need it

By using Instant Bandwidth transponders you can activate new services in a matter of minutes when needed

Challenge #6

INTERNAL AND EXTERNAL COMMUNICATION

Keep in contact with your teammates and work together on problems business face with

Open communication with your competitors and partners will help to keep your network running

Open communication with your customers on reasons behind the incident keeps their loyalty

Outcomes

- Luckily, none of our colleagues in the country were harmed (safety of the staff was the top priority for us)
- No IP POP was completely isolated from the network during 2022
- Thanks to FlexGRID hardware we've managed to keep all capacity services up and running as long as it was possible to do
- No DWDM route was down due to lack of power on ILA site

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