

Contingency plans for network service providers.

How to survive the major crisis and keep going

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2022 in a few slides - the year of war in Ukraine



2021: Ukrainian
telecommunication
market overview
right before the war

~ 4.75 EUR

ARPU

~ 221 Mln EUR

Total revenue by 2021

4 781 (real ~620)

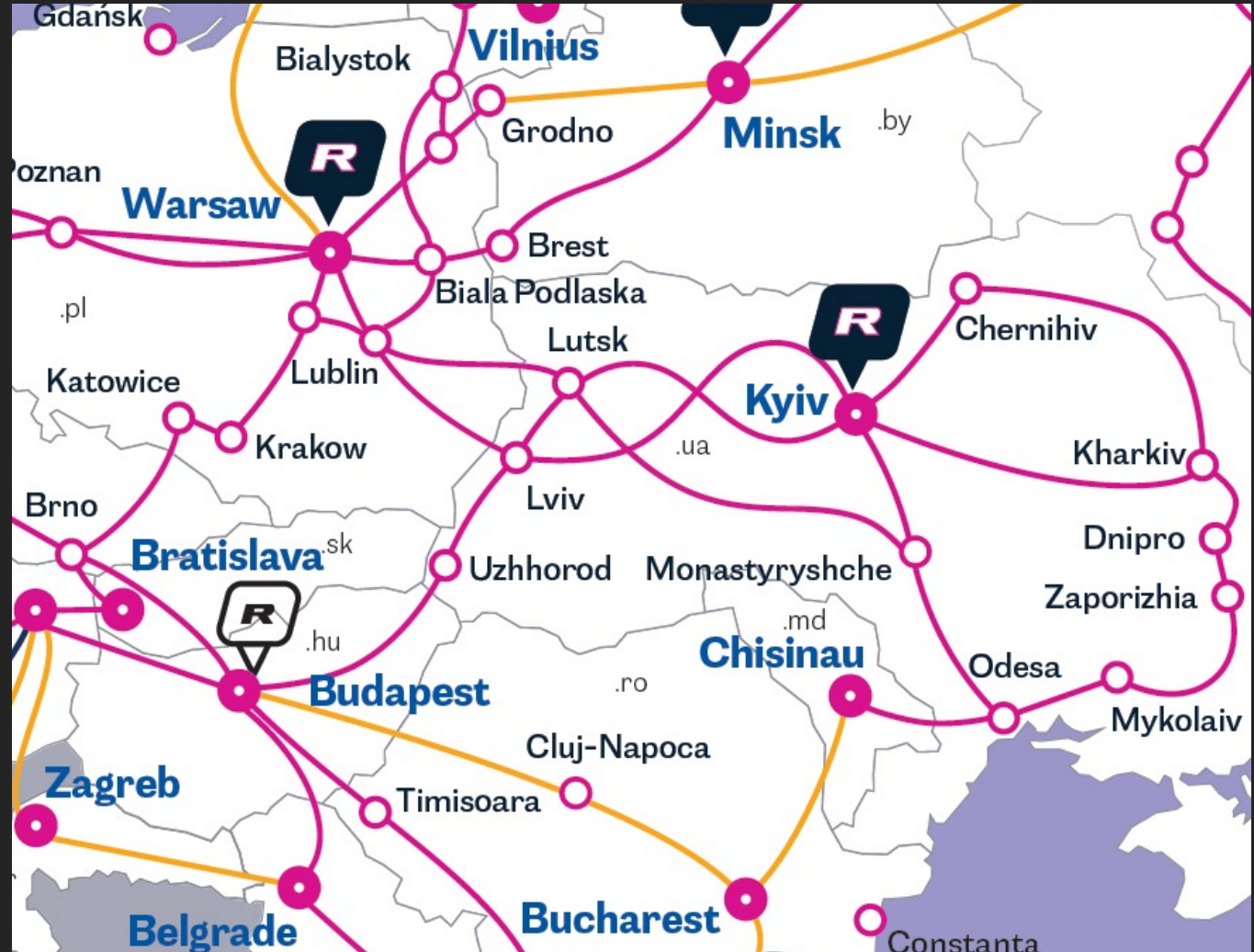
ISP in UA by Register

Our network in Ukraine

6000+
km of lit fibre

42
on-net buildings

50+
amplifier sites



Challenges RETN faces as an NSP

- Fibre cuts and POPs isolation from the network
- Lack of external power to the site
- Equipment faults and spare management
- Traffic can suddenly appears in locations where you never expect it
- Internal and external communications

Challenge #1

March 2022: the worst SLA

Fibre cuts and
POP/city isolation
from the rest of the
network

46% more fibre cuts vs 2021

Average time to fix outages increase for 38%

Solution

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
- Plan spectrum carefully
- 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)

Solution

POP/CITY ISOLATION FROM THE REST OF THE NETWORK

- Deploy at least two core POPs at every key city you operate
- Protecting 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 your metro networks as well

Challenge #2 - lack of external power to the site

BLACK Q4 2022

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

NOW... WHITE Q1 2023

! MOST ROCKETS HAD BEEN SHOT DOWN BY THE UKRAINIAN DEFENDERS

- **~ 5%** no electricity – working on batteries
- **121 hours** - total time of diesel generation

Solution

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 #3 equipment faults and spare management

Decreased lifetime of batteries

Minimum 7 days delivery of anything to Ukraine
Curfew: 5 am – 11 pm access instead of 24/7

You can't predict where and what kind of equipment
you'll need

Solution

EQUIPMENT FAULTS AND POPS ACCESS

- 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 #4

TRAFFIC CAN SUDDENLY
APPEAR IN LOCATIONS WHERE
YOU NEVER EXPECT IT

On 24.02.2022 never seen before and never repeat again **daily peak usage at 7.20 am**

Multiplicative failures at the same time and increase in traffic concentration in untypical locations, for example, first months in West of Ukraine

Blocking of Russia affiliated **642** ASNs (decree of National Centre of Management for Telecommunication)

Solution

TRAFFIC CAN SUDDENLY APPEAR IN LOCATIONS WHERE YOU NEVER EXPECT IT

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

Challenge #5

INTERNAL AND EXTERNAL COMMUNICATION

Nobody faced war before:

At the same time people need to organise safe places for families and care about network

Each ISP needs to triple the available bandwidth

you can lose the contact with somebody of your team at any moment

Solution

INTERNAL AND EXTERNAL COMMUNICATION

- Keep in contact with your teammates and work together on problems the business faces
- 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

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

- Constant network recovery as a daily routine
- Protection of network – any number of routes is never enough
- **US\$3B** is the calculated loss of Ukrainian operators during 1st year of the war
- Network development and business are growing

Q1
2023

No IP POP **was** completely **isolated**
from the rest of the network
in Q4 2022 and Q1 2023

No DWDM route **was down** due to lack of power at ILA site in Q3-Q4 2022

None of RETN staff in the country was harmed

100% availability of RETN IP Transit
for Ukrainian IP customers in **December 2022**
& **First Quarter of 2023**

RETN[®]

2023