RETN®

2023

# Contingency plans for network service providers.

## How to survive the major crisis and keep going

By Olena Lutsenko, MD of RETN Black Sea Region,

Milko Ilari, RETN Product, Peering & Network Manager

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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+**

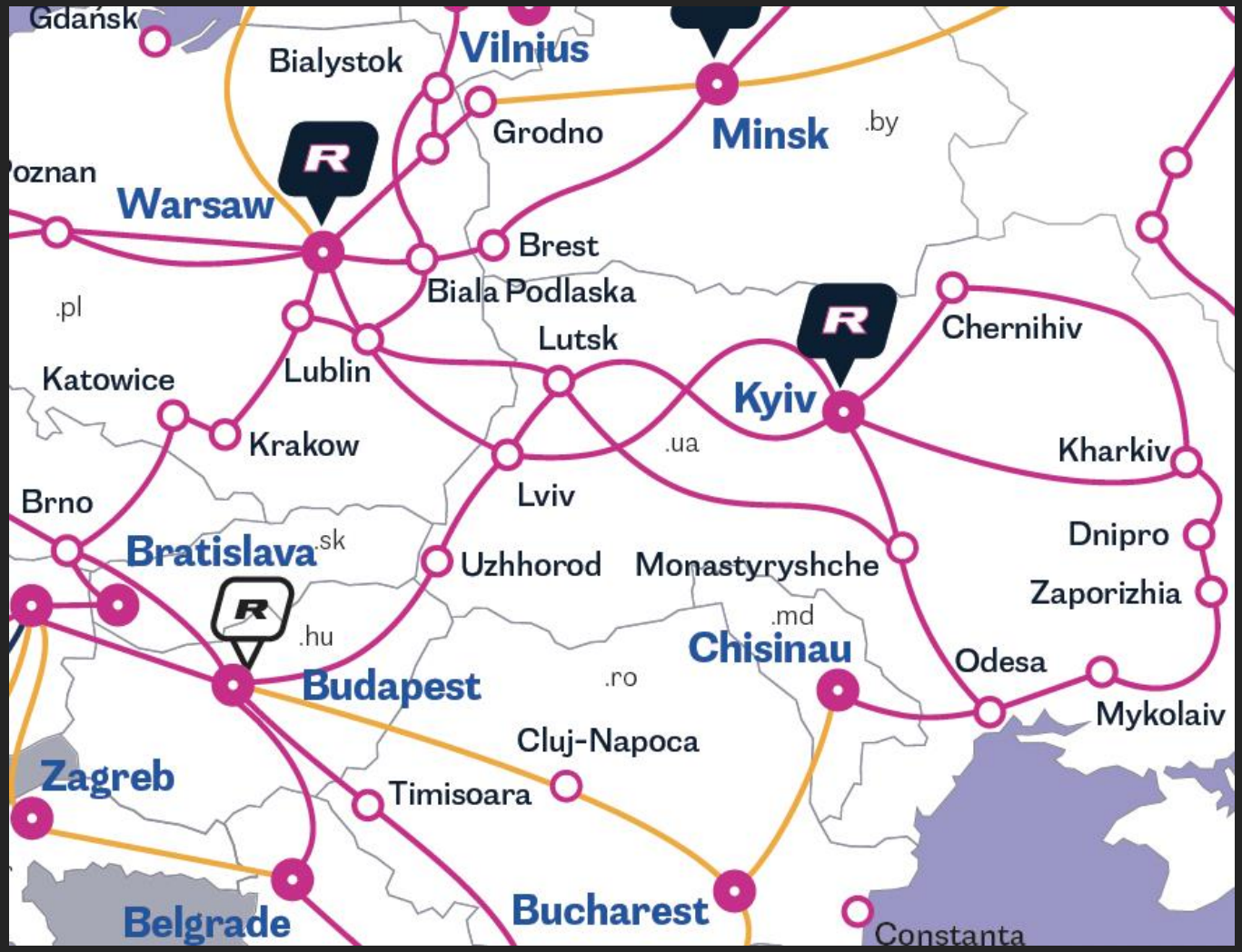
km of lit fibre

**42**

on-net buildings

**50+**

amplifier sites



# Challenges RETN faces as an NSP

1. Fibre cuts and POPs isolation from the network
2. Lack of external power to the site
3. Equipment faults and spare management
4. Traffic can suddenly appear in locations where you never expect it
5. Internal and external communications

# Challenge #1

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

March 2022: the worst SLA

46% more fibre cuts vs 2021

Average time to fix outages increase for 38%

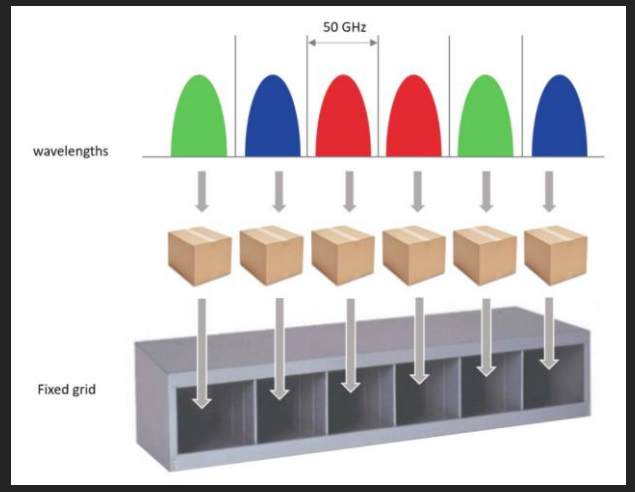
# Solution

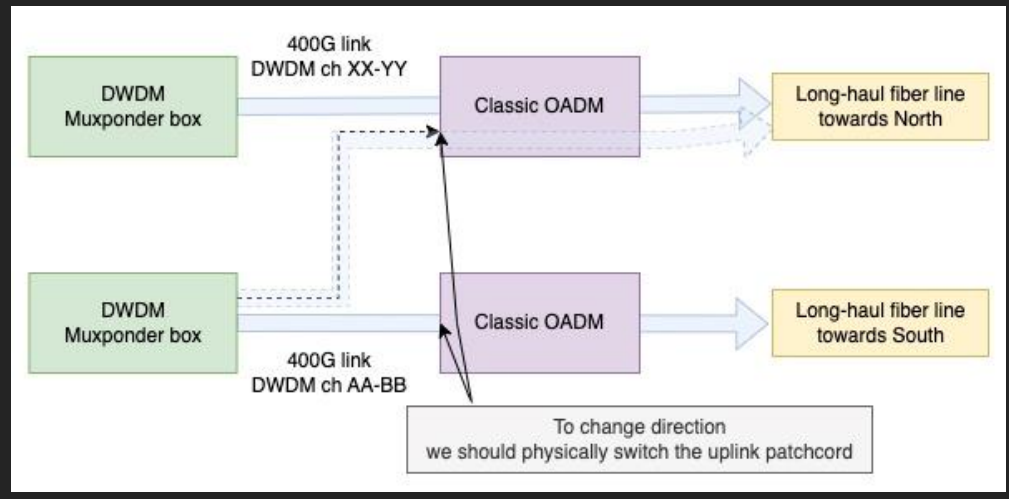
## FIBRE CUTS

- 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)

# FixedGrid vs FlexGRID

## FIXED GRID




Classic OADM systems were built around a fixed grid system where every wavelength was assigned a spectral width of 50 GHz. The OADM system carved the optical band spaced in 50 GHz “cubbyholes” where each wavelength could be mapped.

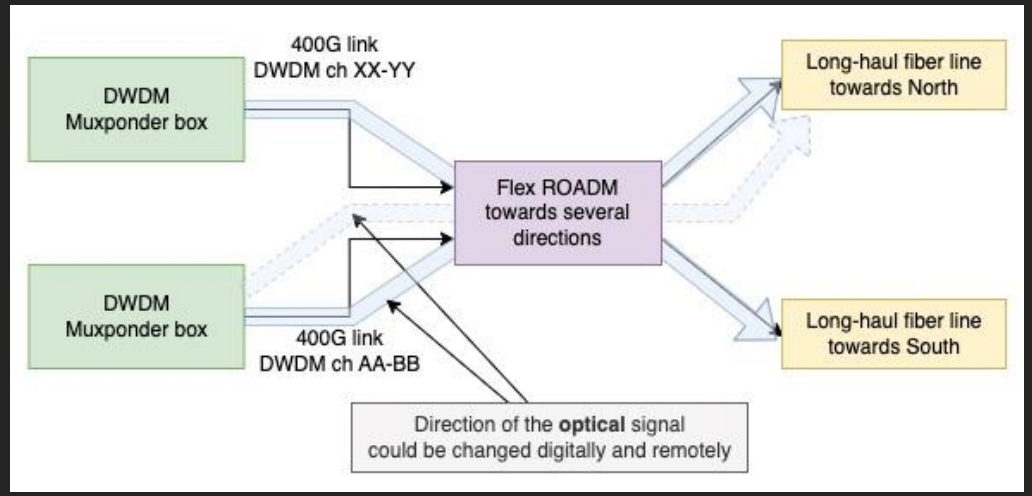
This kind of system has several problems:

- Solid design hard to be changed
- Not optimize the spectrum
- Local manual operation required
- Longer deploy time
- Higher cost for hardware upgrade

# FixedGrid vs FlexGRID

## FLEXGRID


Flex-grid removes the fixed cubbyhole walls and lets the service provider define the spectral width of each wavelength independently. The service provider can carve individual spectral slots to meet the spectral width of each individual wavelength.




This kind of system has several advantages:

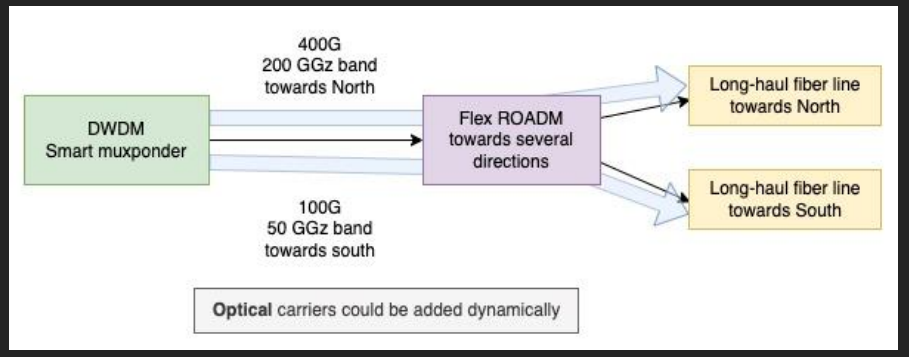
- Optimization of spectrum utilization
- More flexible
- Spectrum can freely used out of strict grid
- No physical patchcord switching required
- Faster deploy in emergency situations

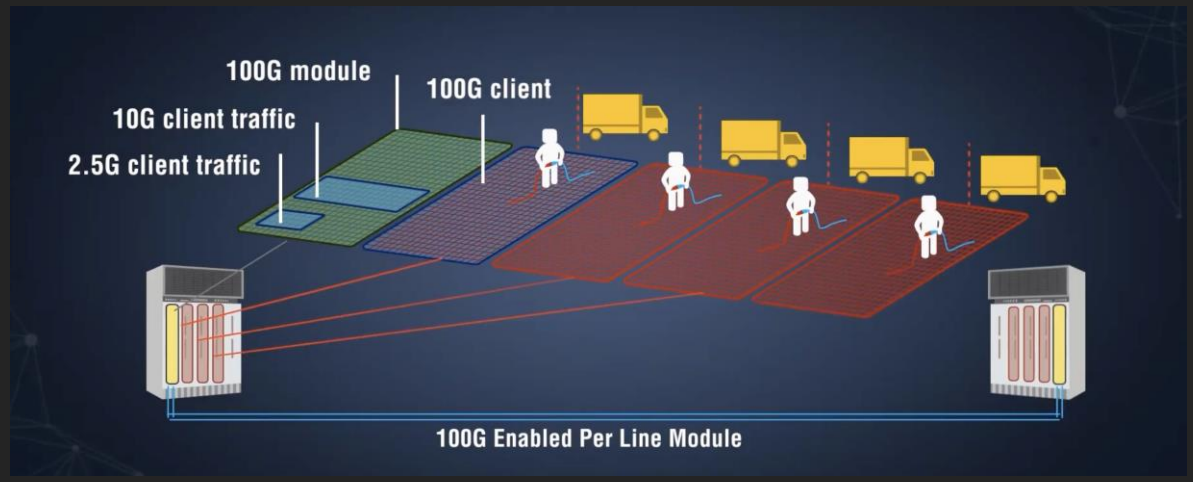
# Instant Bandwidth

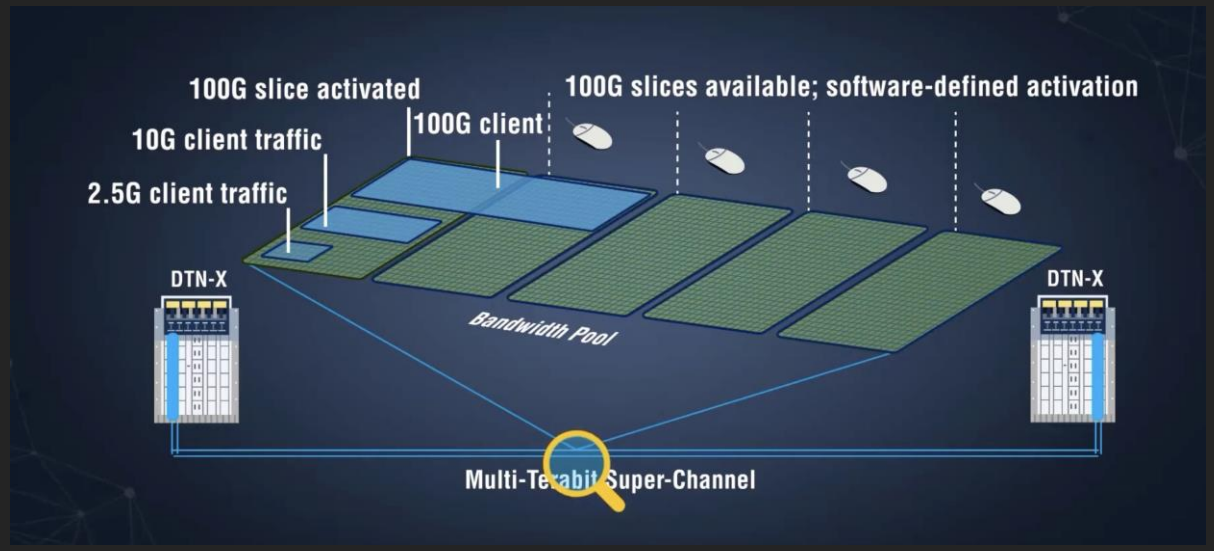
## INSTANT BANDWIDTH

Instant bandwidth is a software-based function that allows service providers to activate slices
of superchannel capacity in various increments:

- Multi-Terabit line cards
- Valid up to 100G
- No requirement of on-field operations
- Speed up of deploy operations
- Maximize the utilization of existing fiber pairs



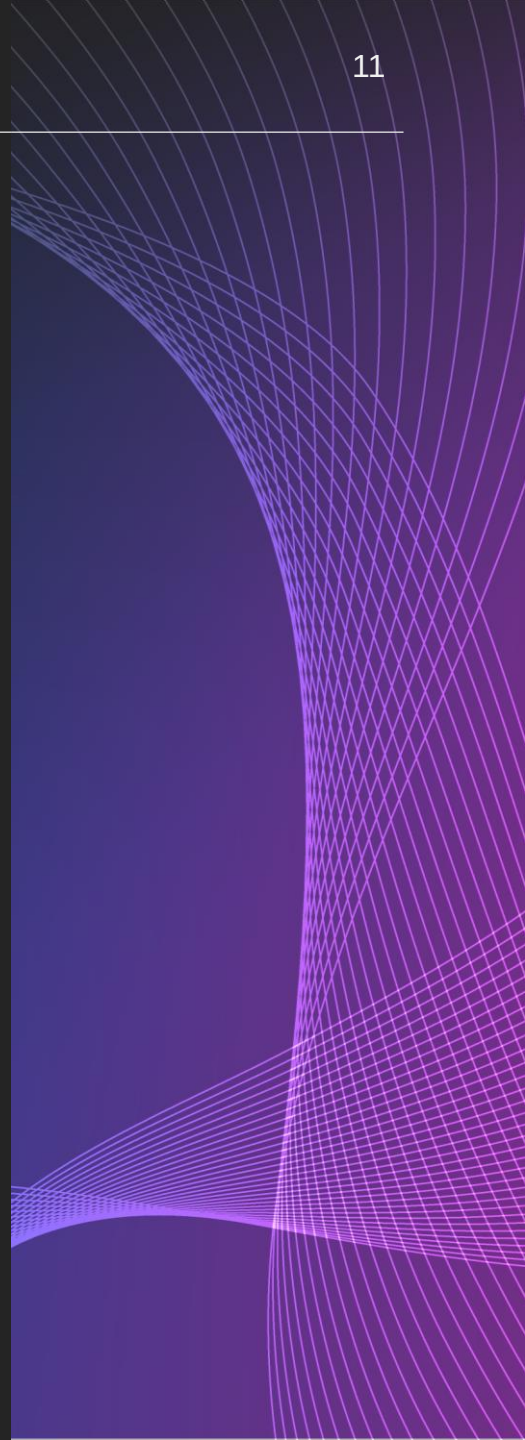



# Solution

## 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

Each moment you can lose the connection with somebody of your team

# 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 war
- Network development and business are growing

**Q1**
**2023**

# None of RETN staff in the country was harmed

# Outcomes:

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

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