



# Tier 1 Carriers

## Performance Report

July, 2021

[www.noction.com](http://www.noction.com)

**Disclaimer:**

The data presented in this report card is intended for information purposes only and is not to be interpreted as any form of promotion or debasement for carriers herein named. Information is obtained from the Intelligent Routing Platform Lite instances, where the compulsory consent of the legal entities for collection of such information is part of the Terms and Conditions document.

The data collection method comprises of a Netflow collector looking at destinations an installed network is speaking to and the explorer component then performing periodic probing via ICMP, UDP, and TCP\_Syn, checking the performance metrics. The presented data is well sampled, as most of the IRP Lite enhanced networks are typically speaking to around a third of the routing table each day.

The presented report offers network professionals a first-hand view into the general Internet performance as well as the performance of specific internet carriers. It can be used as a trustworthy reference when negotiating and/or developing a mature multihoming strategy for the Internet Connectivity.

a base for comparison. The control group aggregates the average for all transit providers in a network, including Tier 1 carriers.

We combat bias by utilizing the types of data mentioned above as opposed to third party surveys or the information provided by the carriers themselves.

The report focuses on Tier 1 carriers performance results in the US for the month of July 2021. Rare data points from distant locations e.g. Alaska or Hawaii have been omitted. The analysis is presented based on the following four levels of aggregation:

**1.8**  
billion probes

The statements in the paper that follows are data-driven and based on the analysis of **1.8 billion** successful probes performed by Noction IRP Lite instances. All data is aggregated per carrier on a daily basis and accounts for many thousands of successful probes. A control group (labeled C) is used as



**Worldwide**



**National**



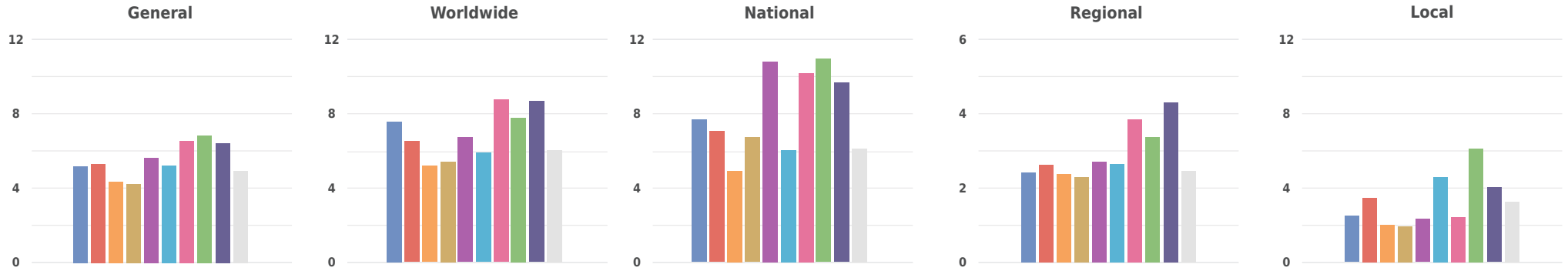
**Regional**



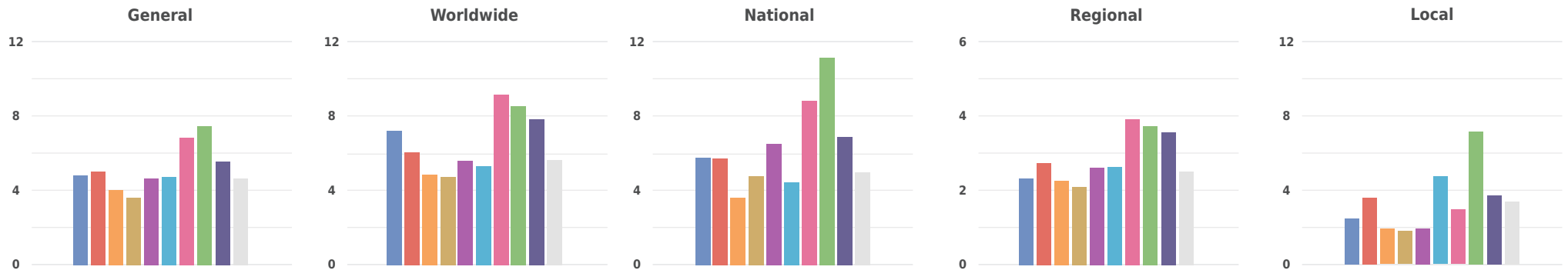
**Local**

## Average packet loss analysis (%)

The charts include a control group C (gray) to allow cross comparison.



### June Data:



■ CenturyLink 
 ■ Cogent 
 ■ GTT 
 ■ Level 3 
 ■ NTT 
 ■ Telia 
 ■ XO 
 ■ Zayo 
 ■ Hurricane Electric 
 ■ C

**General:**

- Level 3 has obtained the leading position. GTT followed it;
- A higher level of average Loss has been recorded for Zayo, followed by XO and Hurricane Electric;
- When comparing July and June data, we notice some improvement in results registered for Zayo and XO.

**Worldwide:**

- Level 3 has registered a better average packet loss than the control GTT has registered the lowest level of average packet loss;
- The highest average packet loss among the analyzed carriers has been recorded by XO, Hurricane Electric, followed by Zayo, and CenturyLink;
- When comparing July and June data, we notice that all carriers have worsened their average packet loss, except for Zayo and XO.

**National:**

- All carriers, except for GTT and Telia, have registered worse average packet loss than the control group level;
- There have been registered improvements in results at the national level for XO and Zayo in July vs. June.

**Regional:**

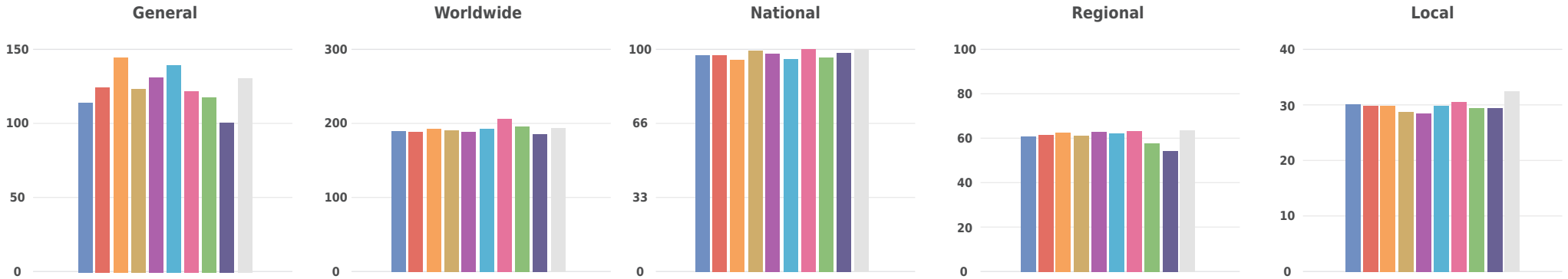
- Level 3 showed the lowest average packet loss among the analyzed carriers. GTT and CenturyLink followed it;
- Hurricane Electric, XO, and Zayo registered a higher average packet loss compared to other carriers;
- When comparing July and June data, we've noticed that Zayo, Cogent, and XO carriers have slightly improved their results.

**Local:**

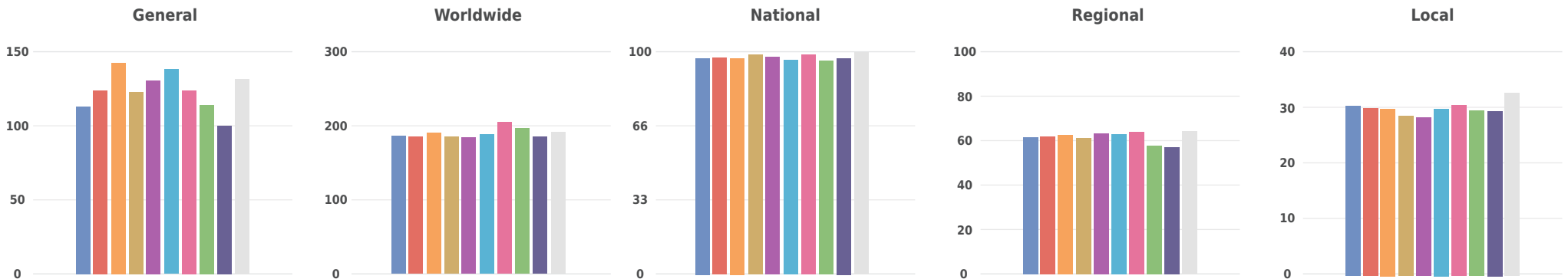
- Level 3, GTT, XO, and CenturyLink showed the best results in terms of average packet loss among the analyzed carriers;
- Zayo, Telia, Hurricane Electric, and Cogent have registered the higher average packet loss among the analyzed carriers;
- Comparing July and June data, we have registered a slight improvement in results for Zayo and XO.

### Average latency analysis (ms)

The charts include a control group C (gray) to allow cross comparison.



### June Data:



■ CenturyLink 
 ■ Cogent 
 ■ GTT 
 ■ Level 3 
 ■ NTT 
 ■ Telia 
 ■ XO 
 ■ Zayo 
 ■ Hurricane Electric 
 ■ C

**General:**

- Hurricane Electric kept the best result in terms of average Latency. CenturyLink and Zayo followed it;
- The highest average Latency compared to the control group level has been registered by GTT, Telia, and NTT;
- We noticed a worsening in the average packet latency for all carriers when comparing July and June data, except for XO.

**Worldwide:**

- All Tier1 carriers have shown better average packet latency than the control group, except for XO and Zayo;
- Hurricane Electric showed the best average latency result, followed by Cogent and NTT;
- XO registered the highest level of average Latency among the analyzed carriers;
- We notice improvements in average packet latency for Hurricane Electric, Zayo, and XO when comparing July and June data.

**National:**

- GTT and Telia registered the lowest average packet latency among the analyzed carriers;
- XO showed the highest average packet latency;
- When comparing the average packet latency results for July and June, we noticed that all carriers, except for Telia and GTT, have worsened their statistics.

**Regional:**

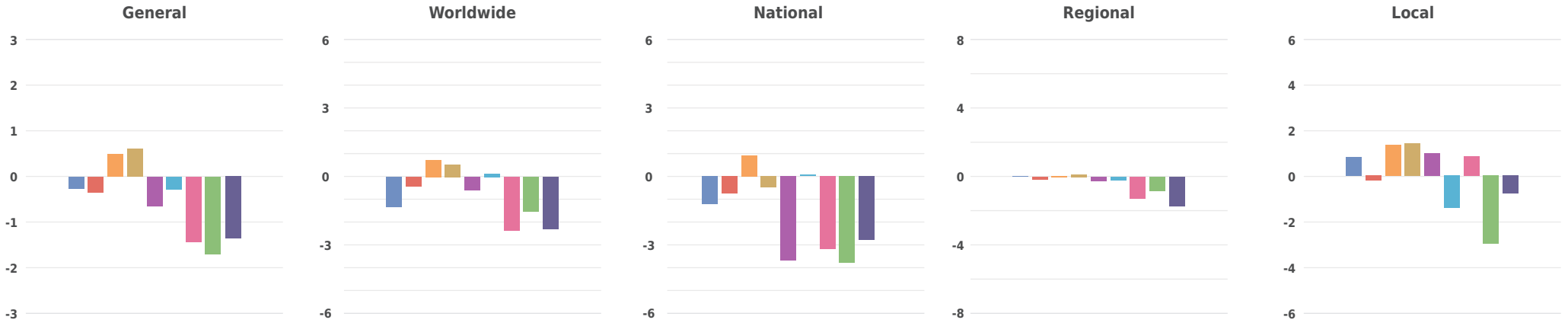
- Hurricane Electric showed the lowest average packet latency among the analyzed carriers, followed by Zayo, CenturyLink, and Level 3;
- XO has registered the highest result among the analyzed carriers;
- All carriers showed worse average packet latency results in July when compared to June data, except for Hurricane Electric and XO.

**Local:**

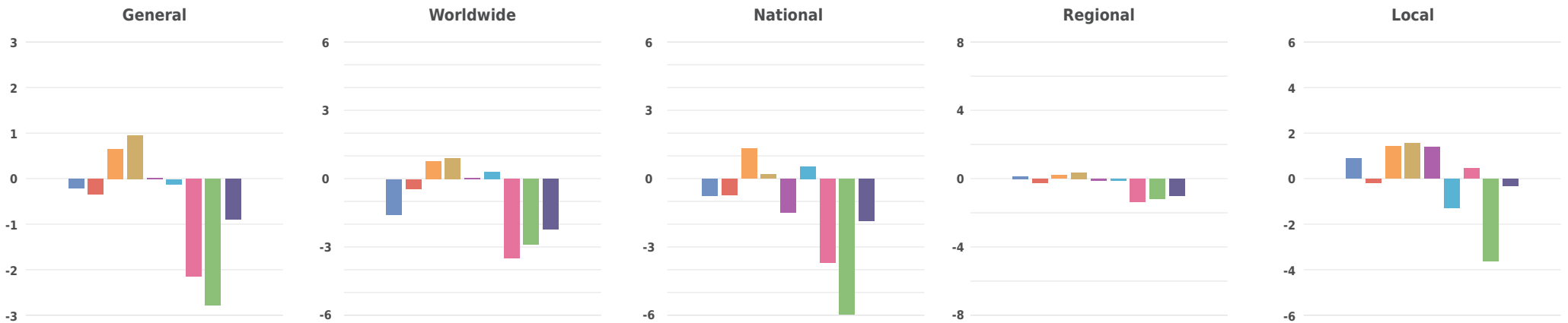
- All Tier1 carriers have registered better average packet latency than the control group level;
- NTT showed the lowest average packet latency among the analyzed carriers;
- XO and CenturyLink registered the worse average packet latency results among the analyzed carriers;
- When comparing July and June data, we notice that all carriers have registered worse results for the average packet latency.

## Performance of each carrier in comparison to the control group

Better or worse loss by provider (%) (higher is better)



### June Data:



■ CenturyLink 
 ■ Cogent 
 ■ GTT 
 ■ Level 3 
 ■ NTT 
 ■ Telia 
 ■ XO 
 ■ Zayo 
 ■ Hurricane Electric

### General:

- Zayo showed worse results over the control group level (4.7%) by ~1.8%, followed by XO ~ 1.6%, and Hurricane Electric ~ 1.5%;
- Level 3 and GTT showed better results than the control group by ~ 0.5%-0.6%;
- When comparing July and June data, we notice a difference in results for all Tier 1s. Zayo and XO registered improvements in their results.

### Worldwide:

- GTT, Level 3, and Telia showed an advantage in packet loss average over the control group level by ~ 0.8%, ~ 0.6%, and ~ 0.2%, respectively;
- XO's results exceeded the control group average by 2.6%, Hurricane Electric by ~ 2.5%, Zayo by ~ 1.7%, CenturyLink by ~ 1.5%, respectively;
- When comparing July and June data, we see that the average packet loss has decreased for Zayo by 1.2 p.p., and XO by 0.9 p.p., respectively.

### National:

- Zayo showed the worst results in terms of Loss, exceeding the packet loss average of the control group by ~3.8%, followed by NTT ~3.7%, XO ~3.2%, and Hurricane Electric ~2.8%;
- Zayo's packet loss average value in July was lower by ~2.2 p.p. compared to June data.

### Regional:

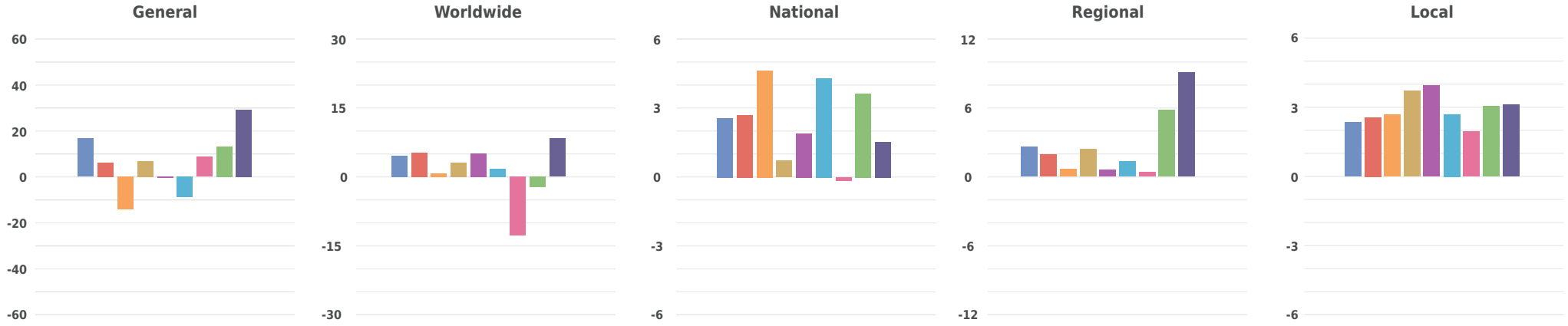
- Hurricane Electric, XO, Zayo, Telia, NTT, and Cogent showed the worst results in terms of Loss, exceeding the packet loss average of the control group by ~1.9%, ~1.4%, ~0.9%, ~0.2%, ~0.2%, ~0.2%, respectively;
- Level 3 and GTT registered the best results in terms of packet loss. These carriers registered an advantage of ~ 0.2%, and ~ 0.1%, respectively, towards the control group packet loss average (2.5%);
- When comparing July and June data, we see that all carriers, except for Zayo and Cogent, improved their results by ~ 0.1 - 0.8 p.p.

### Local:

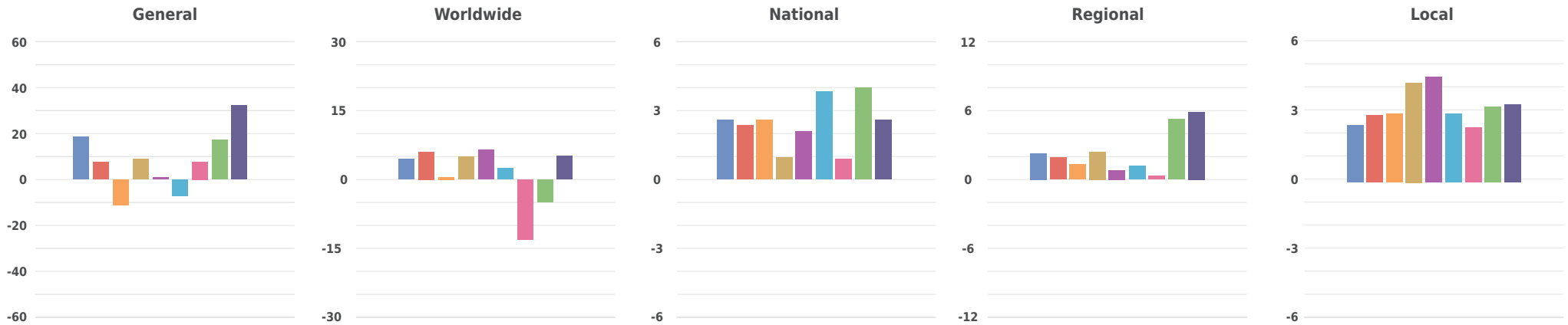
- Zayo showed the worst results in terms of Loss. Its disadvantage over the control group was at ~ 2.8%;
- Level 3, GTT, and NTT showed a lower average packet loss value than the control group value (3.2%) by ~ 1.3%, ~1.2%, and ~ 0.9%, respectively;
- NTT and Hurricane Electric increased their average packet loss by ~ 0.5 p.p. and ~ 0.4 p.p., in July compared to June data.



Better or worse latency by provider (ms) (higher is better)



*June Data:*



■ CenturyLink 
 ■ Cogent 
 ■ GTT 
 ■ Level 3 
 ■ NTT 
 ■ Telia 
 ■ XO 
 ■ Zayo 
 ■ Hurricane Electric

### General:

- Hurricane Electric obtained the leading position in terms of Latency with an advantage of ~29.6 ms over the control group level (131.2 ms). CenturyLink and Zayo followed it with advantages being ~16.8 ms and ~13.3 ms, respectively;
- GTT showed worse results than the control group by 14.3 ms, followed by Telia with 8.9 ms;
- We see that all carriers, except for XO, have worsened their average packet latency when comparing July and June data.

### Worldwide:

- All carriers, except for Zayo and XO, registered better results in terms of Latency in comparison to the control group average (191.1 ms);
- The highest advantage over the control group was registered by Hurricane Electric ~8.1 ms, followed by Cogent ~5.0 ms, NTT ~4.9 ms, CenturyLink ~4.4 ms;
- We see an improvement in results for Hurricane Electric, Zayo, and XO in July compared to June data.

### National:

- All carriers, except for XO, have registered better latency results than the control group level. GTT, Telia, Zayo, Cogent, CenturyLink, NTT, and Hurricane Electric obtained the leading positions in terms of average packet latency 4.6 ms, 4.3 ms, 3.6 ms, 2.7 ms, 2.6 ms, 1.9 ms, and 1.5 ms, respectively;
- XO showed worse average packet latency results when compared to the control group level, its disadvantage being 0.2 ms;
- GTT, Telia, and Cogent showed better average packet latency when comparing July and June data.

### Regional:

- All carriers have registered better latency results than the control group level. Hurricane Electric, Zayo, CenturyLink, Level 3, Cogent, Telia, GTT, NTT, and XO obtained the leading positions in terms of average packet latency showing better results than the average control group value (63.3 ms) by 9.1 ms, 5.8 ms, 2.6 ms, 2.4 ms, 1.9 ms, 1.3 ms, 0.7 ms, 0.6 ms, and 0.4 ms, respectively;
- When comparing July and June data, we observed a worsening in Hurricane Electric, Zayo, and GTT results.

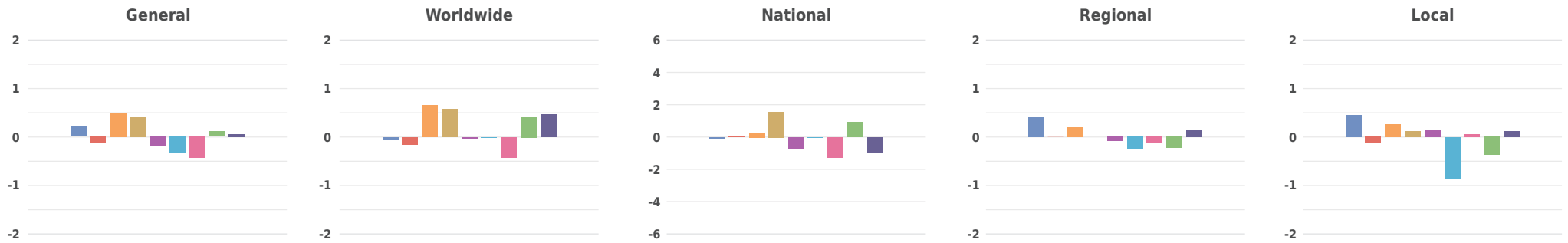
### Local:

- All the analyzed carriers have registered better average Latency than the control group. NTT showed an advantage over the control group level (32.6 ms) by ~ 4.0 ms, followed by Level 3 ~3.8 ms, Hurricane Electric ~ 3.2 ms, Zayo ~ 3.1 ms, Telia ~ 2.8 ms, GTT~ 2.8 ms, Cogent ~ 2.6 ms, CenturyLink ~ 2.4 ms, and XO ~ 2.0 ms;
- When comparing July and June data, we observed worsened results for all carriers except for CenturyLink and Zayo.

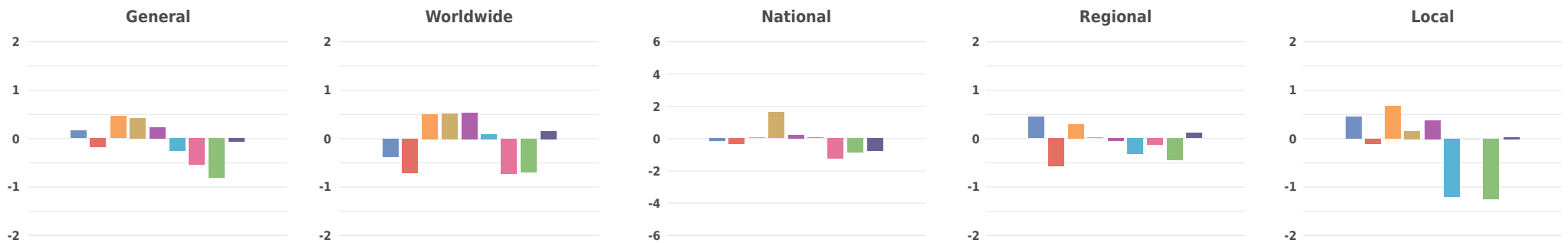
## Packet Loss

Abnormally high losses were registered for a large number of datapoints. As was mentioned in previous reports we consider excessive an average above 4.5% packet loss. Given the fact that Tier 1 carriers are characterized by both low loss values for some networks and abnormally high losses for the other networks, the conclusion is that high loss values are not caused by the carriers themselves but rather are caused by the networks they service or the networks they peer with. Whether the true cause is poor design, over-provisioned links or deficiencies in the peering governance - this report cannot tell. What we can mention is that for many networks, whether permanently or sporadically, there is definitely an opportunity to improve things.

Average packet loss gain/loss by carrier (%) (all)

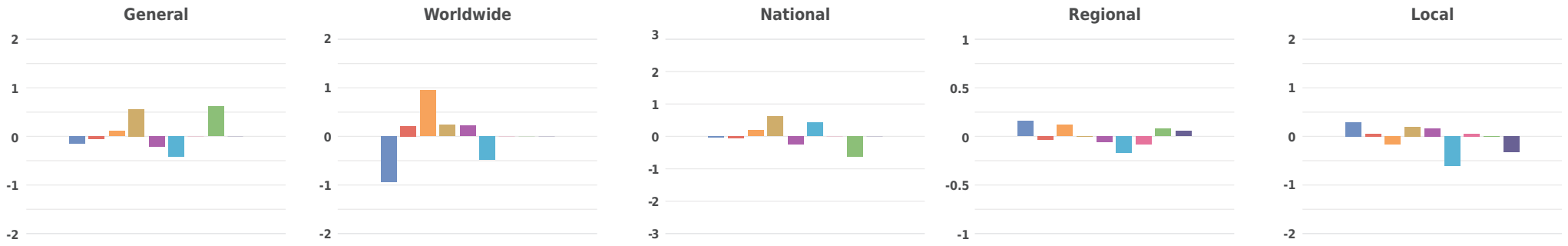


### June Data:

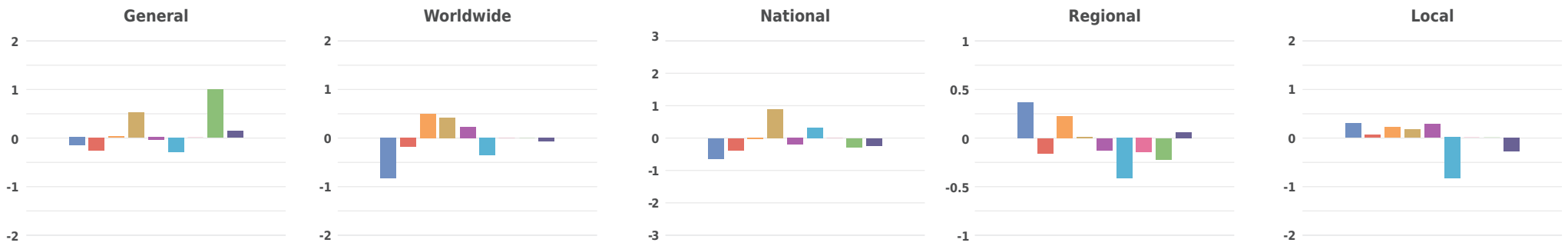


■ CenturyLink 
 ■ Cogent 
 ■ GTT 
 ■ Level 3 
 ■ NTT 
 ■ Telia 
 ■ XO 
 ■ Zayo 
 ■ Hurricane Electric

Average packet loss gain/loss by carrier (%) (up to 4,5% average)



*June Data:*



■ CenturyLink 
 ■ Cogent 
 ■ GTT 
 ■ Level 3 
 ■ NTT 
 ■ Telia 
 ■ XO 
 ■ Zayo 
 ■ Hurricane Electric

**General:**

- Based on ALL data points, GTT, Level 3, CenturyLink, Zayo, and Hurricane Electric obtained better positions in terms of Loss for each packet compared with the control group. Their advantages being 0.5%, 0.4%, 0.2%, 0.1%, and 0.1%, respectively. After the cut-off at the 4.5% control group level has been applied, the carrier rankings have not been modified essentially. CenturyLink migrated into the winner group. XO has registered the same result as the control group.

**Worldwide:**

- GTT, Level 3, Zayo, and Hurricane Electric registered better results than the control group in terms of Loss for each packet. The cut-off at the 4.5% control group level did not generate a considerable change in the distribution of results.

**National:**

- Based on ALL data points, Level 3, Zayo, GTT, and Cogent showed lower loss values for each packet compared with the control group level. After the cut-off at the 4.5% control group level has been applied, Zayo's, NTT's, Cogent's results exceeded the average packet loss of the control group by ~0.6%, ~0.3%, and ~0.1%, respectively.

**Regional:**

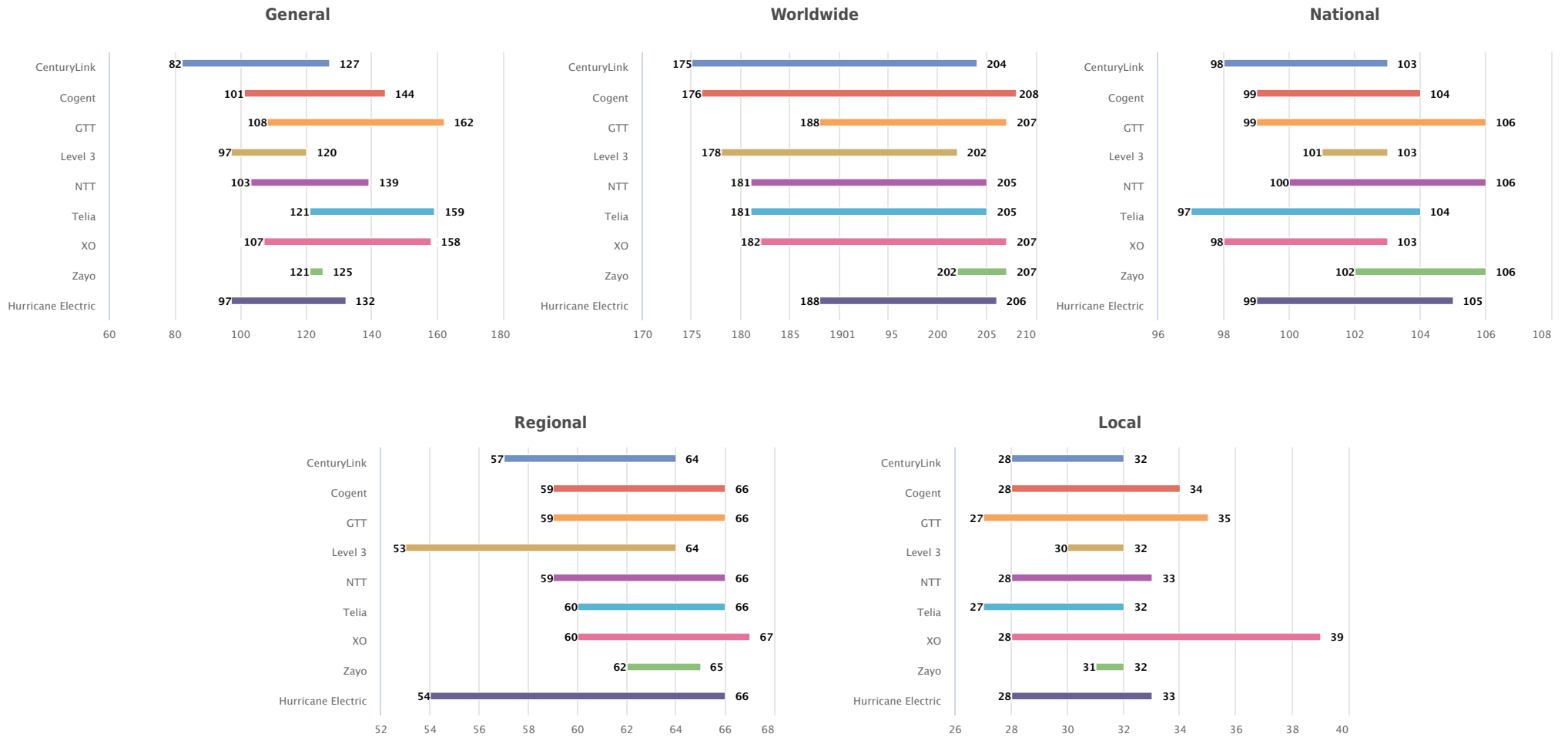
- Based on ALL data points, all Tier 1 carriers, except for Zayo, Telia, XO, and NTT, showed better loss results for each packet compared to the control group. After the cut-off at the 4.5% control group level has been applied, Zayo has migrated to the winning group.

**Local:**

- Based on ALL data points, Telia, Zayo, and Cogent have registered worse results than the control group. After the cut-off at the 4.5% control group level has been applied, the distribution of per-packet loss value has not significantly changed. GTT has shown worse results. Zayo has registered the loss value for each packet the same as the control group.

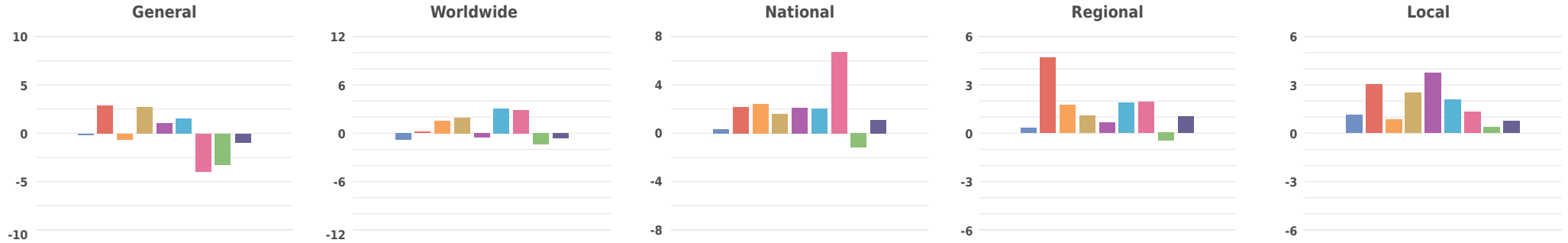
# Latency

Tier 1 Carriers have been mostly present within the following latency diapazons (ms):

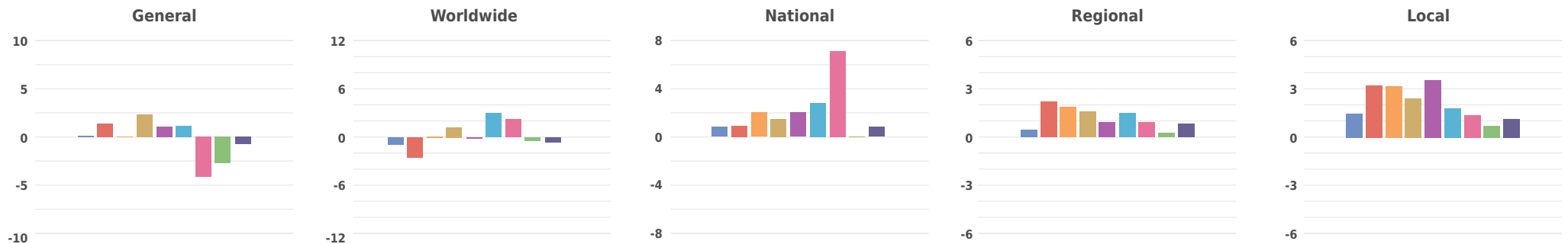


## Average latency gain/loss by carrier (ms) (higher is better)

The differences in latency from the control group level shown below are averaged with the expectation that better or worse performance will cancel out if the differences are caused by the measurement noise.



### June Data:



■ CenturyLink 
 ■ Cogent 
 ■ GTT 
 ■ Level 3 
 ■ NTT 
 ■ Telia 
 ■ XO 
 ■ Zayo 
 ■ Hurricane Electric

**General:**

- Cogent, Level 3, Telia, and NTT showed better latency results than the control group for each packet, transiting them.

**Worldwide:**

- All carriers, except for Zayo, CenturyLink, Hurricane Electric, and NTT, showed better Latency for each packet compared to the control group. Telia showed an advantage of ~ 3.0 ms to the Latency for each packet, XO about 2.8 ms, Level 3 about 1.9 ms, GTT about 1.6 ms, and Cogent about 0.2 ms.

**National:**

- All Tier 1 carriers, except for Zayo, showed better latency results for each packet when compared to the control group;
- The best results were registered by XO, which recorded the advantage of about 6.6 ms to each packet's RTT compared with the control group level.

**Regional:**

- All Tier 1 carriers, except for Zayo, showed better latency results for each packet when compared to the control group;
- Cogent, XO, Telia, GTT, and Level 3 showed better RTT for each packet compared to the control group by ~4.7 ms, ~1,9 ms, ~1,9 ms, ~1.7 ms, and ~1,1 ms, respectively;

**Local:**

- All carriers registered better average Latency for each packet than the control group;
- The best result was registered by NTT, Cogent, Level 3, and Telia, which showed better results by ~ 3.7 ms, ~ 3.0 ms, ~ 2.5 ms, ~ 2.1 ms, respectively, for each packet's RTT in comparison to the control group.

*Packet Loss and Latency spread charts highlighting individual Tier 1 carriers results are available upon request.*

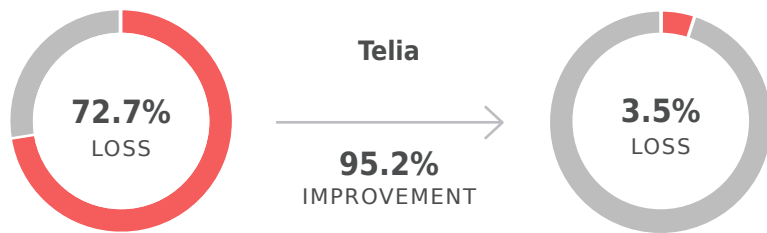


## IRP Improvement

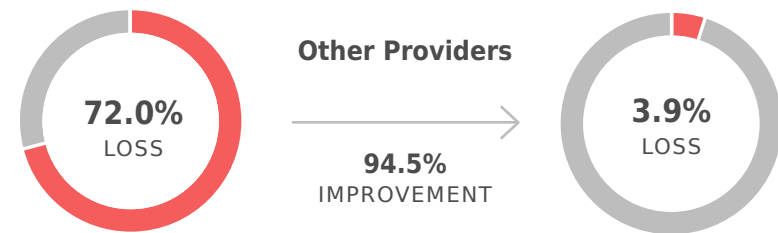
The following analysis level highlights the performance of our Intelligent Routing Platform for Noction customers at the general level. Telia registered the best average packet loss among the Tier 1 carriers for July 2021.

The presented data is based on the aggregated statistics of our customers.

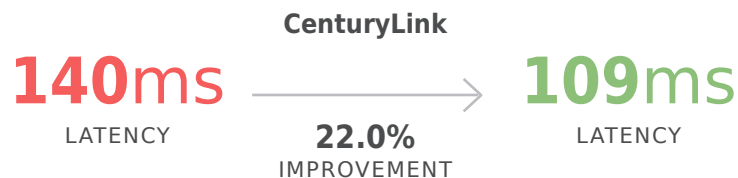
When IRP improved outbound traffic by Loss and Telia was selected as the best route among other providers, the average packet loss value improved by ~95.2 % (from 72.7% to 3.5%)



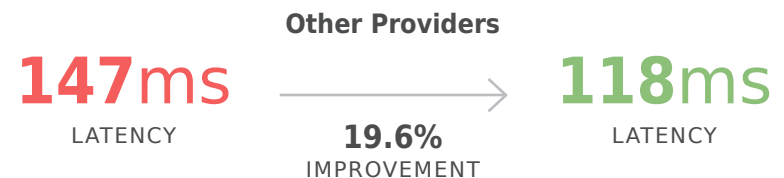
When other providers were selected as best routes, the packet loss improvement was at 94.5% (from 72.0% to 3.9%).

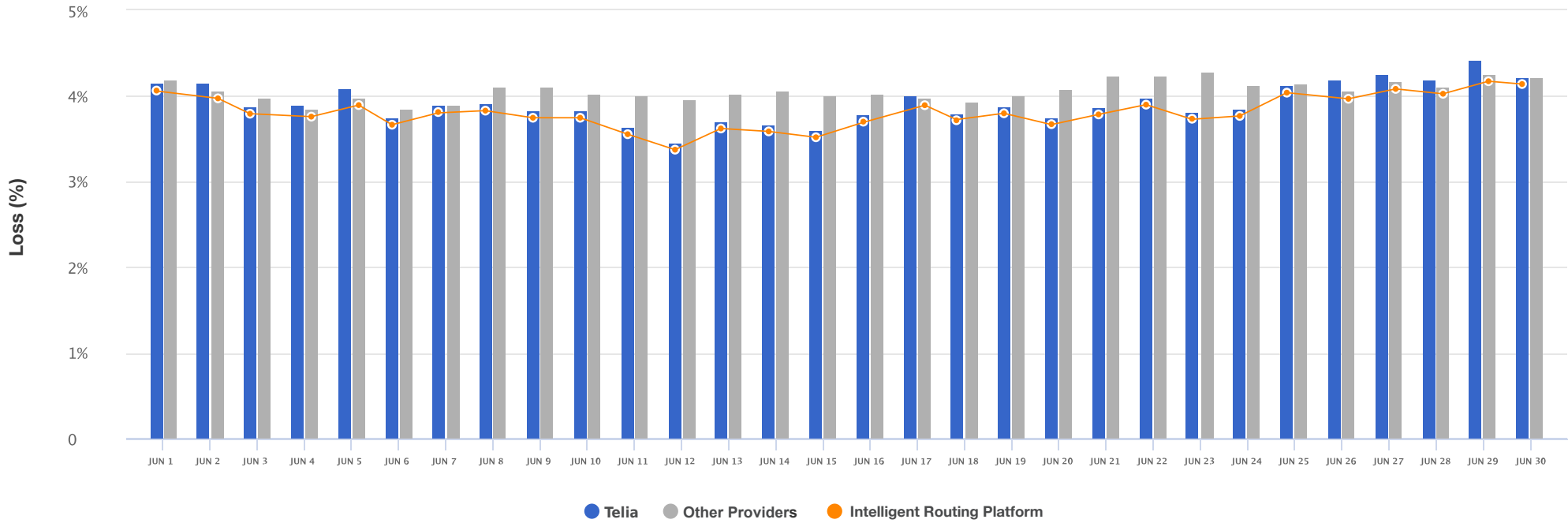


When Latency was the cause of improvement and CenturyLink was selected as the best route among other providers, the average latency value improved by ~ 22.0% (a drop from 140.1 ms to 109.3 ms).



In the rest of the cases, when IRP selected other providers, the latency improvement level was at ~ 19.6% (a drop from 146.8 ms to 118.1 ms).





The chart above represents a detailed view of the daily average latency values as well as the Intelligent Routing Platform performance when optimizing traffic for our customers.



This report was brought to you by [Noction](#).

Noction Intelligent Routing Platform enables enterprises and service providers to maximize end-to-end network performance and safely reduce infrastructure costs. The platform evaluates critical network performance metrics in real-time and responds quickly by automatically rerouting traffic through a better path to avoid outages and congestion.

Request a free trial today and see how IRP can boost your network performance.

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