

Oracle Hospitality OPERA Cloud Services



Network and Communications Guidelines

OPERA Cloud Services is a cloud-based mobile-enabled platform for next generation hotel management that can scale from small single property environments to large hotel chains with many thousands of rooms using the same underlying architecture.

To connect to OPERA Cloud, the hotel operator needs to select an internet service with sufficient bandwidth to support the operational needs of a hotel operation. Attempting to deploy OPERA Cloud over an unreliable or slow network will result in slow application performance, low staff productivity, and ultimately a poor user experience.

The Oracle logo, consisting of the word "ORACLE" in white capital letters on a red rectangular background.

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Architecture

The architecture of OPERA Cloud has been designed to operate securely using the public Internet from redundant and highly scalable Oracle Cloud Data Centers. This ensures that users with different form factors like desktop, tablet, or mobile can access the same data.

For OPERA Cloud to perform well there are a number of network considerations that must be satisfied.

To ensure application performance is as expected, you must consider three main areas:

- Latency
- Available Bandwidth
- Jitter/Loss

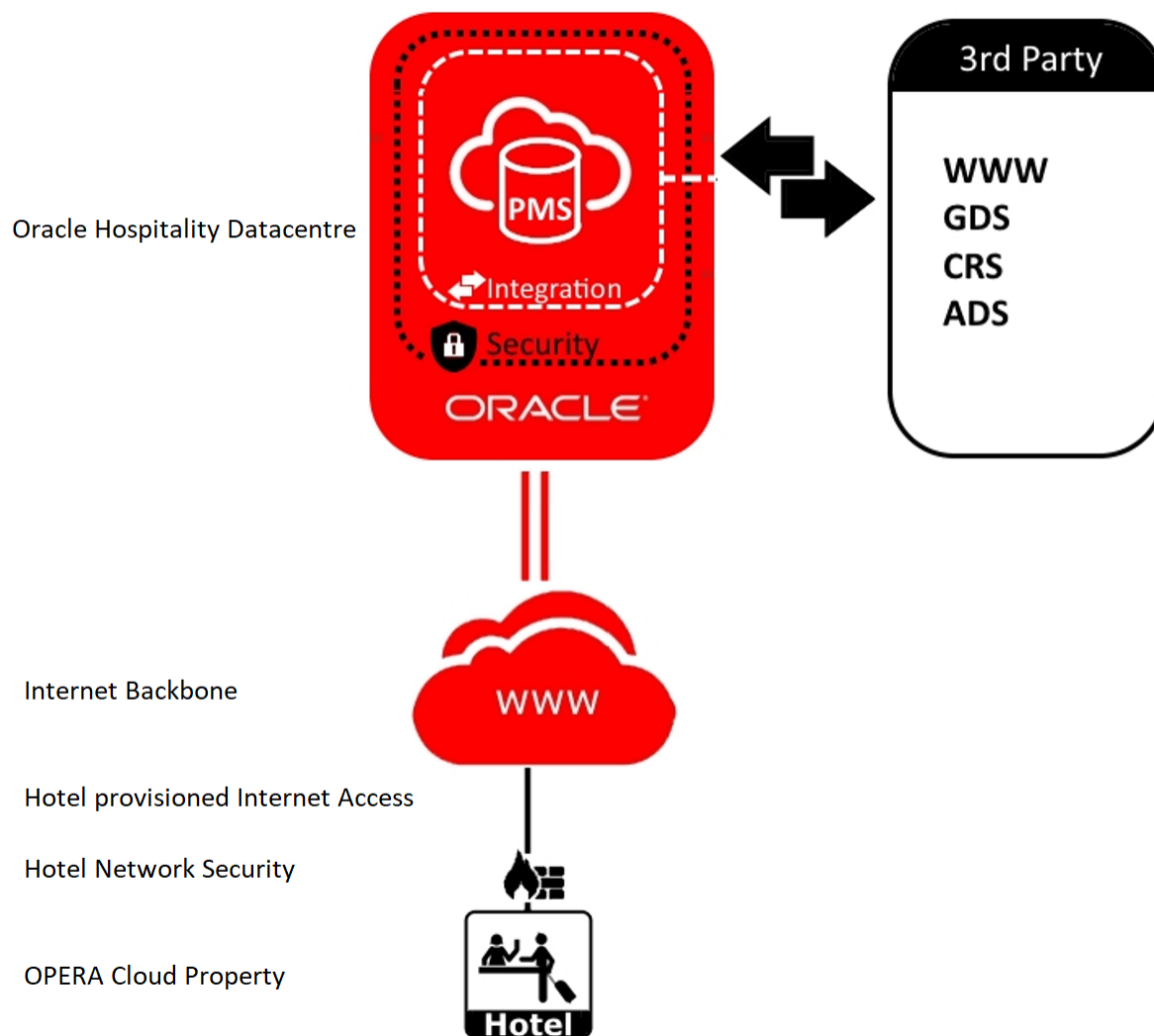


Figure 1. Showing the orientation of the data center, backbone networks and subscribing hotels.

Latency

Latency is the measurement of time taken for network packets to traverse a network and is a function of a number of factors, most notably distance from the data center, access technology, last-mile bandwidth, and network contention. It is the single biggest factor that affects perceived application performance and can easily be tested from the proposed site by running a web-based speed test.

Table 1 below indicates recommended latency limitations when using OPERA Cloud. This should also take into account the type of hotel operation considered.

For example, high transactional operations with a heavy peak check-in/out workload should have an average latency to the data center under 250 ms. Beyond this, while the application continues to run, the user experience will degrade.

Latency	Business Class hotel High Transactional Volume	Resort Style Medium Transactional Volume	Small and Boutique Style Low Transactional Volume
1–250 ms	✓	✓	✓
251–300+ ms		✓	✓

Table 1. Recommended latency limitations for OPERA Cloud.

How should latency be measured?

Latency can be measured in two ways, either by running a ping test or by running a Traceroute to the proposed datacenter for your hotel or chain.

Both tests measure network latency from the client network to the datacenter over the public Internet as shown in figure 2. This test also confirms that the client site is using the most efficient path available.

Oracle Hospitality
Cloud Data Center

INTERNET

Hotel Network

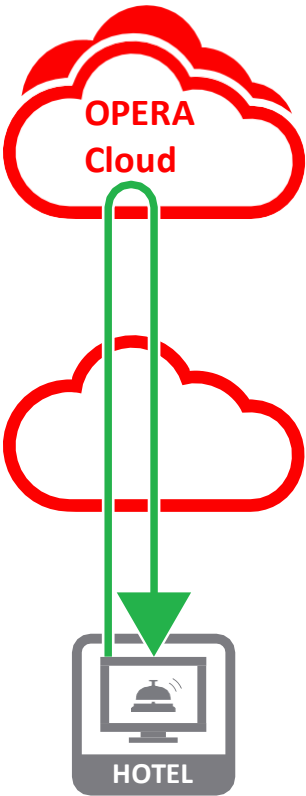


Figure 2. Showing packet originating from subscribing hotel to facility edge. By using either ping or the traceroute command, the network latency to the datacenter will be displayed.

Which Oracle Data Centers should be used?

When testing latency using ping or traceroute commands, latencies to the following facilities only should be recorded:

North America & Latin America – Ashburn, VA USA
(Washington DC): 129.213.130.222

Europe, Middle East, and Africa – Frankfurt, Germany:
130.61.231.171

Asia Pacific – Sydney, Australia: 152.67.119.2

Asia Pacific - Singapore: 138.2.87.181

Asia Pacific – Mumbai, India: 140.238.254.31

Globally, OPERA Cloud will be available from major regional locations with each major regional presence (US, EMEA & AP) leveraging a minimum of two geographically redundant data centers to ensure that full geographic failover can be provided if required. A consistent design approach also allows all regions to adhere to a globally consistent service-level agreement depending on user requirements.

Oracle Hospitality's infrastructure team will determine which regional data center facilities to use by taking into account the geographic location of the hotel chain, the

type of hotel operations and, most importantly, the network performance between the subscribing hotels and the hosting data center facility.

It is also possible to use multiple facilities; however, this can add to the cost and complexity and depends on the hotel's size, growth strategy, and existing central reservation systems.



Figure 3. Geographic location of OPERA Cloud data centers.

How to perform Latency testing?

The following provides instructions to guide you in completing latency testing between your property and Oracle Cloud Infrastructure Region(s). It is intended solely to help you assess the network feasibility for your move to OPERA Cloud and to plan your Information Technology projects.

Information is supplied for both Windows and Mac Operating Systems.

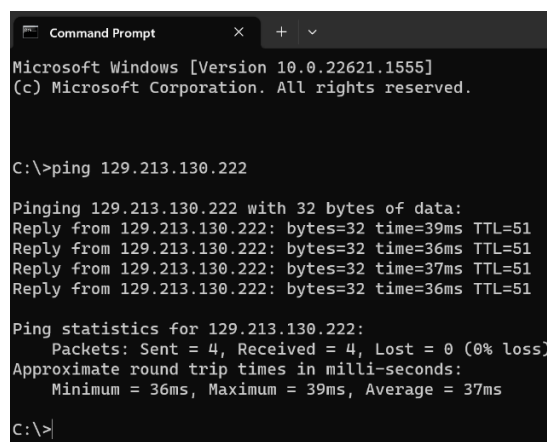
When running your latency testing, please ensure you use the correct Oracle Cloud Infrastructure (OCI) region(s) public IP address listed below as your endpoint.

Windows Operating System

The below provides instructional steps to run Ping and Traceroute tests from your Windows Operating System machine.

Ping Test

- 1) Open a Command Prompt window
 - a. Search > cmd
- 2) Type the following
 - a. Ping <<enter Oracle Cloud Infrastructure Region public IP Address>>
 - i. Example (North America Ashburn): C:\>ping 129.213.130.222
- 3) Record Results as screenshot
 - a. Example (North America Ashburn)



```

Microsoft Windows [Version 10.0.22621.1555]
(c) Microsoft Corporation. All rights reserved.

C:\>ping 129.213.130.222

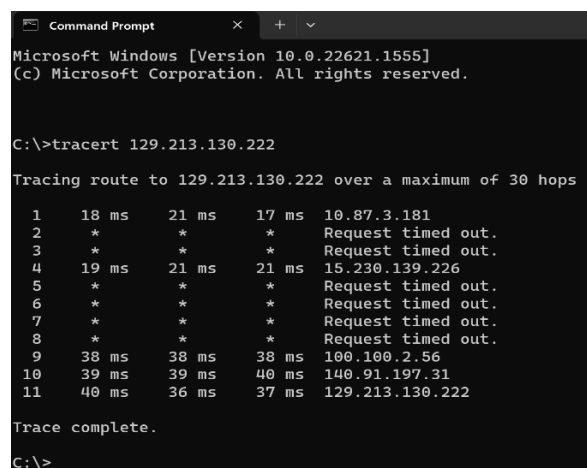
Pinging 129.213.130.222 with 32 bytes of data:
Reply from 129.213.130.222: bytes=32 time=39ms TTL=51
Reply from 129.213.130.222: bytes=32 time=36ms TTL=51
Reply from 129.213.130.222: bytes=32 time=37ms TTL=51
Reply from 129.213.130.222: bytes=32 time=36ms TTL=51

Ping statistics for 129.213.130.222:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 36ms, Maximum = 39ms, Average = 37ms

C:\>
  
```

Traceroute Test

- 1) Open a Command Prompt window
 - a. Search > cmd
- 2) Type the following
 - a. tracert <<enter Oracle Cloud Infrastructure Region public IP Address>>
 - i. Example (North America Ashburn): C:\>tracert 129.213.130.222
- 3) Record Results as screenshot
 - a. Example (North America Ashburn)



```

Microsoft Windows [Version 10.0.22621.1555]
(c) Microsoft Corporation. All rights reserved.

C:\>tracert 129.213.130.222

Tracing route to 129.213.130.222 over a maximum of 30 hops:

  0  18 ms  21 ms  17 ms  10.87.3.181
  1  *      *      *      Request timed out.
  2  *      *      *      Request timed out.
  3  *      *      *      Request timed out.
  4  19 ms  21 ms  21 ms  15.230.139.226
  5  *      *      *      Request timed out.
  6  *      *      *      Request timed out.
  7  *      *      *      Request timed out.
  8  *      *      *      Request timed out.
  9  38 ms  38 ms  38 ms  100.100.2.56
 10  39 ms  39 ms  40 ms  140.91.197.31
 11  40 ms  36 ms  37 ms  129.213.130.222

Trace complete.

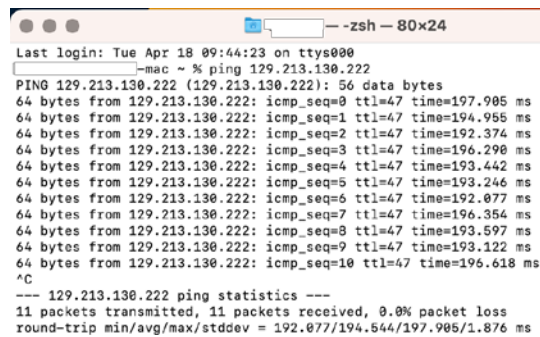
C:\>
  
```

Mac Operating System

The below provides instructional steps to run Ping and Traceroute tests from your Mac Operating System machine.

Ping Test

- 1) Open Terminal App
 - b. Finder > Applications > Terminal (may be in Utilities folder)
- 2) Type the following
 - a. Ping <<enter Oracle Cloud Infrastructure Region public IP Address>>
 - b. Control + c may be required to stop ping test
 - c. Example (North America Ashburn):
x@x-mac ~ % ping 129.213.130.222
- 3) Record Results as screenshot
 - a. Example (North America Ashburn)

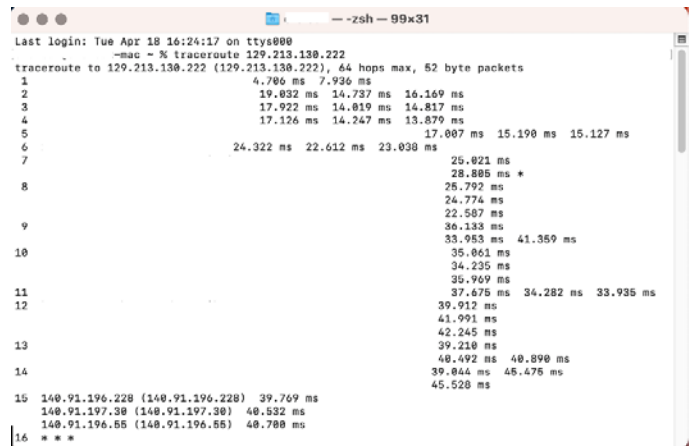


```

Last login: Tue Apr 18 09:44:23 on ttys000
~ % ping 129.213.130.222
PING 129.213.130.222 (129.213.130.222): 56 data bytes
64 bytes from 129.213.130.222: icmp_seq=0 ttl=47 time=197.905 ms
64 bytes from 129.213.130.222: icmp_seq=1 ttl=47 time=194.955 ms
64 bytes from 129.213.130.222: icmp_seq=2 ttl=47 time=192.374 ms
64 bytes from 129.213.130.222: icmp_seq=3 ttl=47 time=196.298 ms
64 bytes from 129.213.130.222: icmp_seq=4 ttl=47 time=193.442 ms
64 bytes from 129.213.130.222: icmp_seq=5 ttl=47 time=193.246 ms
64 bytes from 129.213.130.222: icmp_seq=6 ttl=47 time=192.077 ms
64 bytes from 129.213.130.222: icmp_seq=7 ttl=47 time=196.354 ms
64 bytes from 129.213.130.222: icmp_seq=8 ttl=47 time=193.597 ms
64 bytes from 129.213.130.222: icmp_seq=9 ttl=47 time=193.122 ms
64 bytes from 129.213.130.222: icmp_seq=10 ttl=47 time=196.618 ms
^C
--- 129.213.130.222 ping statistics ---
11 packets transmitted, 11 packets received, 0.0% packet loss
round-trip min/avg/max/stddev = 192.077/194.544/197.985/1.876 ms
  
```

Traceroute Test

- 1) Open Terminal App
 - a. Finder > Applications > Terminal (may be in Utilities folder)
- 2) Type the following
 - a. Traceroute <<enter Oracle Cloud Infrastructure Region public IP Address>>
 - i. Example (North America Ashburn): x@x-mac ~ % traceroute 129.213.130.222
- 3) Record Results as screenshot
 - a. Example (North America Ashburn)



```

Last login: Tue Apr 18 16:24:17 on ttys000
~ % traceroute 129.213.130.222
traceroute to 129.213.130.222 (129.213.130.222), 64 hops max, 52 byte packets
 1  4.780 ms  7.936 ms
 2  19.832 ms  14.737 ms  16.169 ms
 3  17.922 ms  14.819 ms  14.817 ms
 4  17.126 ms  14.247 ms  13.879 ms
 5
 6  24.322 ms  22.612 ms  23.038 ms
 7  25.021 ms  28.885 ms *
 8  26.792 ms  24.774 ms  22.507 ms
 9  36.133 ms  33.953 ms  41.359 ms
10  35.051 ms  34.235 ms  35.969 ms
11  37.675 ms  34.282 ms  33.935 ms
12  39.912 ms  41.991 ms  42.245 ms
13  39.210 ms  40.492 ms  40.890 ms
14  39.844 ms  46.476 ms  45.520 ms
15  140.91.196.228 (140.91.196.228) 39.769 ms
    140.91.197.30 (140.91.197.30) 40.532 ms
    140.91.196.55 (140.91.196.55) 40.700 ms
16  * * *
  
```

Bandwidth Considerations Per Hotel

Network bandwidth refers to the data rate and is a measure of a network's ability to transfer data.

In most networks, it is usually limited by the capacity of the local network edge access link between the subscribing hotel and its core network backbone, as shown at right.

When designing the type of circuit required for OPERA Cloud, it is important the following requirements are adequately scoped:

- Total number of physical workstations within the property which will be required to access OPERA Cloud.
- If existing links are utilized, ensure sufficient free bandwidth is available during peaks.

Core
Network
Backbone

Network
Edge Access
Links

Hotel Network
Security

Subscribing
Hotel

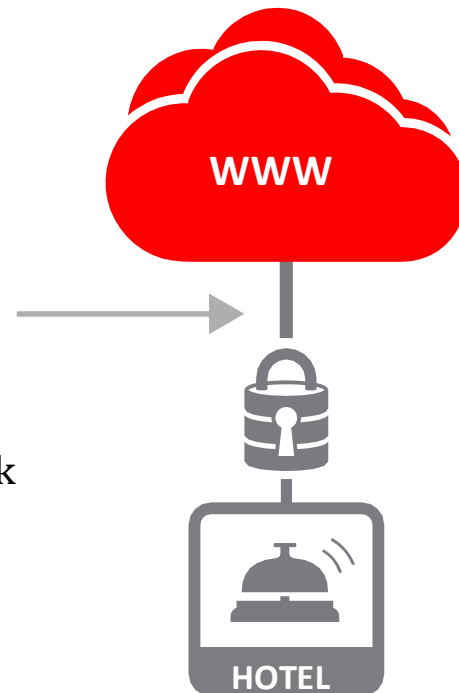


Figure 4. Showing network edge 'last mile' links which are typically limiting factors in corporate network designs.

Bandwidth Calculations

During the normal operation of OPERA Cloud, the bandwidth requirements are relatively small; however, these do peak when a user requests data to print or requires a download of exported data. To calculate this, the following formula can be used as a guide:

Recommended minimum bandwidth (Mbps) per hotel = $(W \times 0.3)$

Where: W = Total Physical Workstations

This formula results in the following bandwidth estimations. Depending on the available bandwidth tiers, the local access link should always be rounded up from the value calculated in table 3.

Workstations	Bandwidth (Mbps)
5	1.5
10	3
25	7.5
50	15
100	30
150	45

Table 3: Site bandwidth requirements by workstation count.

Capacity plan where existing links are used

Where existing circuits are planned to also carry OPERA Cloud traffic, it is important that a capacity plan is undertaken to ensure that sufficient spare bandwidth is available.

What type of backbone network can be used?

OPERA Cloud is designed to be operated securely from a browser over the public Internet.

What type of local access link technology can be used?

The type of the access technology used does not affect the ability to use OPERA Cloud as long as the network allows TCP/IP connectivity to the Oracle Hospitality data centers and latency and bandwidth requirements are met.

Security and Port Considerations

To connect to OPERA Cloud, customers must allow HTTP and HTTPS/TLS (TCP 443) outbound to the OPERA Cloud data center on their local hotel network security devices.

Jitter definition

Jitter is defined as a variation in the delay of received packets. The sending side transmits packets in a continuous stream and spaces them evenly apart. Jitter occurs where network congestion, improper queuing, or configuration errors results in an inconsistent delay in delivery at the receiver.

Ashburn	ASH																									
Bangalore	231	BANG																								
Beijing	295	162	BEI																							
Chicago	36	245	273	CHI																						
Wash, DC	2	230	296	35	DCA																					
Denver	55	257	250	27	56	DEN																				
Dallas	38	264	263	44	39	18	DFW																			
Frankfurt	101	166	301	116	100	140	135	FRA																		
Hong Kong	231	95	67	209	232	186	198	237	HKC																	
Hyderabad	222	12	152	235	221	248	254	164	85	HYDE																
Los Angeles	67	239	231	63	68	43	37	161	167	230	LAX															
London	84	158	287	98	83	122	118	20	223	149	151	LON														
Mexico	65	297	289	70	66	51	35	159	225	288	61	149	MEX													
Miami	31	257	293	41	32	53	36	129	229	248	65	111	63	MIA												
New York	11	223	295	26	9	53	48	92	231	213	76	75	74	41	NYC											
Paris	92	160	295	107	91	131	127	12	231	157	160	11	157	120	84	PAR										
Philadelphia	7	226	298	30	6	56	44	96	234	216	73	78	70	37	5	87	PHL									
Sao Paulo	156	374	416	165	157	168	161	239	352	364	185	223	183	129	158	231	162	SAO								
Seattle	81	249	242	56	83	36	53	164	177	239	33	154	90	79	79	155	83	198	SEA							
San Fran.	77	230	223	59	78	32	48	161	166	221	12	151	70	75	76	160	79	194	23	SFO						
Shanghai	268	133	32	246	269	223	235	274	43	123	204	259	261	266	268	268	271	389	214	195	SHA					
Singapore	248	58	103	225	249	202	215	203	41	54	184	188	242	246	247	196	250	369	193	174	75	SIN				
Sydney	236	165	201	232	237	209	204	305	143	155	172	290	230	234	245	298	242	357	201	182	172	107	SYD			
Tokyo	175	134	127	160	176	135	150	263	59	124	117	246	169	173	174	254	177	296	127	107	98	76	174	TOK		
Toronto	25	235	285	14	24	41	57	106	221	226	75	88	83	54	15	97	19	164	68	65	257	236	244	164	TOR	

Table 4. Typical city-to-city global network latencies from OPERA Cloud data center facilities (highlighted).



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