ORACLE DATA SHEET

Oracle Hospitality OPERA Property (vs 5.5+)

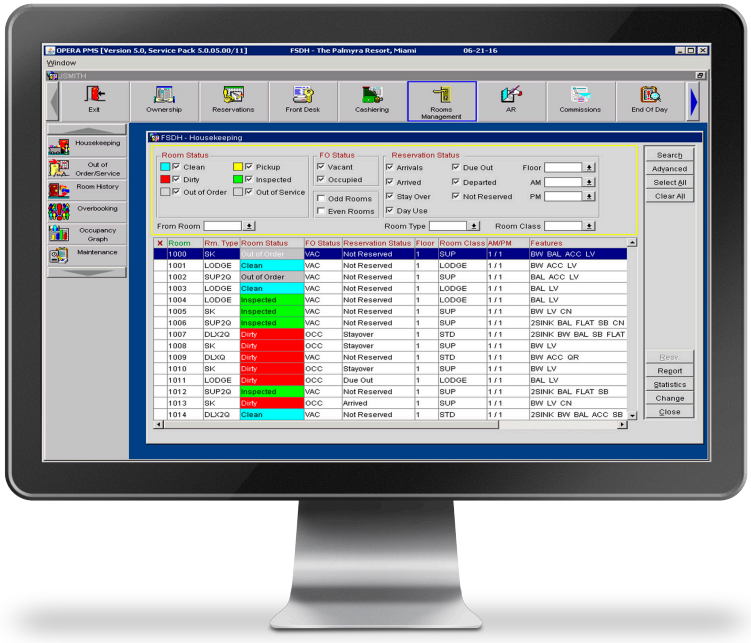
ORACLE HOSPITALITY

Network and Communications Guidelines

Oracle Hospitality's 'OPERA property' is an enterprise platform for hotel operations and distribution. It offers the comprehensive, next-generation capabilities hotels need to enhance guest experiences and improve operating efficiency. The core software can be self-hosted either at the customers location, within a 3rd party datacenter or it can be deployed within an Oracle Hospitality Cloud facility.

The product is designed around the legacy forms based architecture of OPERA but with upgraded weblogic middleware which has resulted in less stringent latency requirements for application use.

Whilst this document outlines the current application communications requirements, it does not however extend to the many third party interfaces which connect to the product. These use a variety of different protocols and architectures, all of which require a separate certification and design process.



Changes to Architecture

With the introduction of 11g forms server, the forms client has been ported to Java and now runs on the client tier using a Java plug-in. The Forms Listener Servlet the message broker that makes it possible for Forms to work through firewalls) and the Forms Servlet are both written in Java and use the Weblogic Java runtime in 11g.

This upgraded forms architecture allows OPERA Property to function over a variety of communication networks from low cost, best effort public internet services to expensive, redundant private switched wide area private networks.

Regardless of network type, there are a number of core fundamental requirements which much be satisfied to ensure application performance is as expected. The three main areas which need to be considered are:

- Latency
- Available Bandwidth
- Jitter/Loss

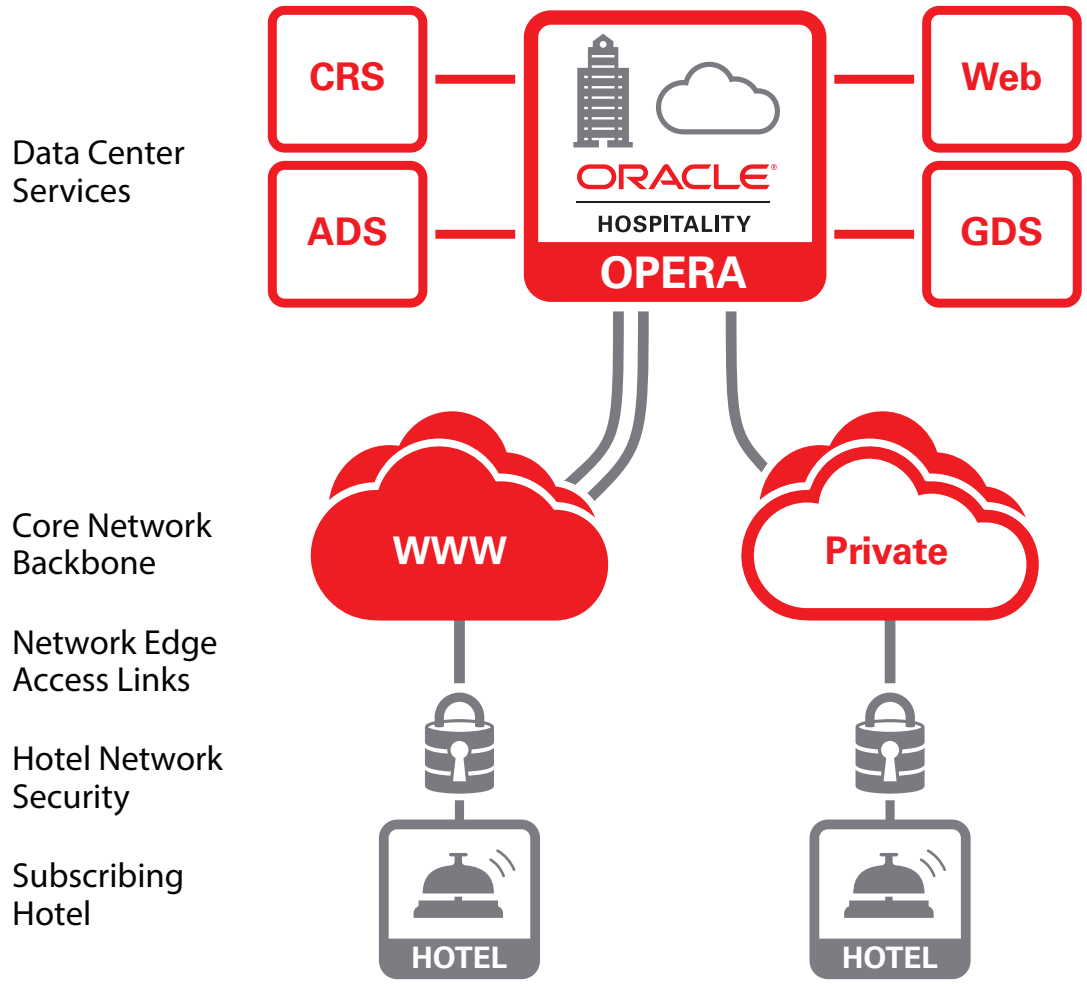


Figure 1. Showing the orientation of the data center, backbone networks and subscribing hotels.

Latency

Latency is the measurement of time taken for network packets to traverse a network and is a function of a number of factors but most notably **distance** from the Datacenter, **access technology**, **last-mile bandwidth** and **network contention**. It is the single biggest factor which will affect perceived application performance and can easily be tested by performing a network 'ping' test.

Table 1 below indicates recommended latency limitations when using OPERA Property, this should also take into account the type of hotel Operation considered.

For example, for high transactional Operations with a heavy peak check-in/out workload should have an average latency to the Data Center under 150ms, beyond this, whilst the application will continue to run, the User Experience will degrade progressively with additional latency.

Latency	Business Class hotel High Transactional Volume	Resort Style Medium Transactional Volume	Small and Boutique Style Low Transactional Volume
1–150 ms	✔	✔	✔
151–200 ms		✔	✔
201–300 ms			✔

Table 1. Recommended latency limitations for OPERA 5.

How should latency be measured?

Ping tests can measure latency from the datacenter edge to the client machine where the test is running as indicated in figure 2. Ideally these tests should be run over a period of 7 days at a sample rate of every 5 minutes to ensure that representative stats are captured. There are a number of good network testing utilities to assist with this if network monitoring is not in place.

If a utility such as wireshark, gping, or nping is used to measure the ping times, it will also allow for the accurate capture of the minimum baseline response times. Response times which are above this minimum baseline are often referred to as 'jitter', and are a good indicator of oversubscribed access-links. In general network jitter should not exceed 10% or 1 in 10 packets.

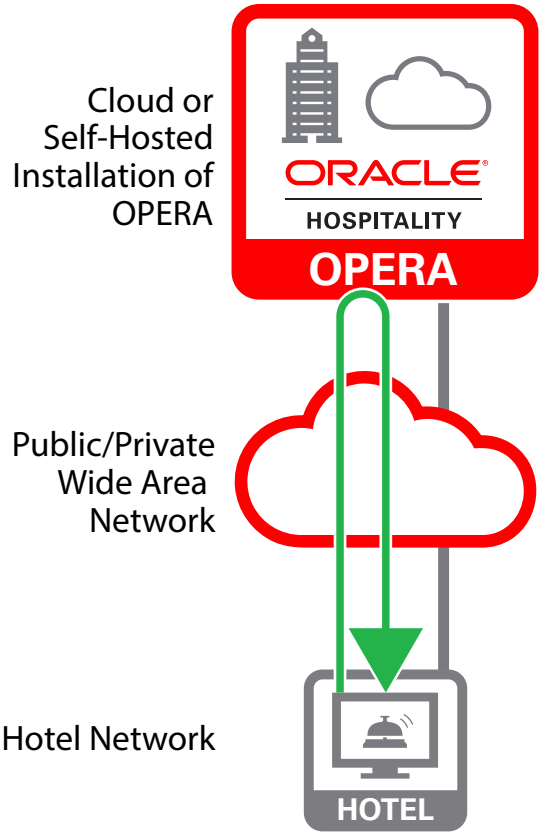


Figure 2. Showing ping packet location originating from subscribing hotel to facility edge. Green arrow shows ping test from front desk to addresses given in table 2 and figure 3.

Where should OPERA Property be located?

OPERA Property can be located at the customers' preferred hosting facility or datacenter, or from an Oracle Cloud services facility which have multiple geographically redundant locations in each of the four major global regions. (US, EMEA, LATAM & AP).

When deciding on which regional datacenter facilities to use, you should take 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 datacenter facility.

If a chain decides to leverage Oracle Hospitality Cloud services then it should undertake network latency checks in the form of ping times from the subscribing hotel to the preferred Regional facility.

Regional Facility		Test Live IP Address
AMER	Chicago, Illinois, US	66.77.117.5
JAPAC	Singapore	160.34.47.148
EMEA	Frankfurt, Germany	62.209.56.10
LAD	São Paulo, Brazil	200.186.94.194

Table 2: Publicly available IP addresses for ping tests.

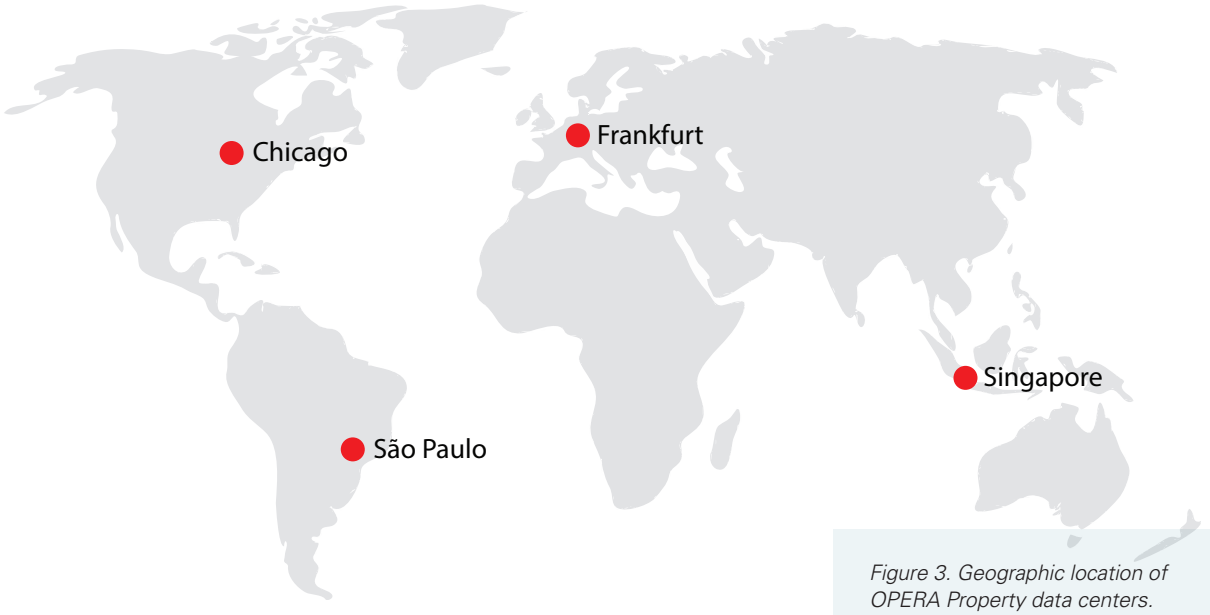


Figure 3. Geographic location of OPERA Property data centers.

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.

It is important therefore, that when designing the type of circuit required for OPERA Property that the following requirements are adequately scoped:

- Total number of physical workstations within the property which will be required to access OPERA Property.
- If existing links are to be utilized, that a capacity plan of available bandwidth during peaks is undertaken.

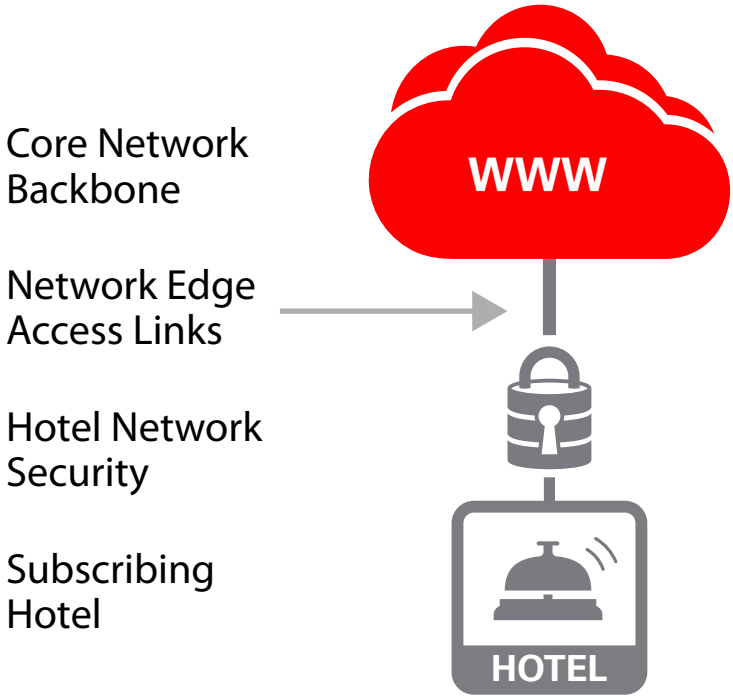


Figure 4. Showing network edge 'last mile' links which are typically limiting factors in corporate network designs.

Bandwidth Calculations

During the normal operation of OPERA Property the bandwidth requirements are relatively small, however these do peak when a user requests data to print, or requires a download of exported data. Modelling this data usage during normal operations can be challenging however the following formula can be used as a guide:

Recommended minimum bandwidth (Mbps) per hotel =

Bandwidth (Mbps) = W x 0.1

Where: W=Total Physical Workstations

This formula will result in the following bandwidth estimations which take into consideration printing and interfaces.

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

Workstations	Min. Bandwidth (Mbps) (Rounded)
10	1
50	5
100	10

Table 3: Site bandwidth requirements by workstation count.

Capacity plan where existing links are used

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

Primary & Redundant Network Considerations

A good reliable network is a fundamental requirement for any cloud based or remotely hosted application. An increased use of cloud applications which leverages the internet as the core backbone has resulted in a migration away from more expensive private switched networks to internet based ones to reduce costs. Hotel Group IT Operations should still review the need for access link redundancy to determine if there is a sufficient business case to provide dual access circuits and mitigate the risk of single telco based network outage. Core to this process should be the risk involved, the type of local vendors available, the access technology available and how to quickly detect and fail over links.

What type of backbone network can be used?

OPERA Property is designed to be operated securely from a browser over a shared public or private network. The Oracle hospitality cloud facilities have redundant internet circuits in place and depending on the type of application service used, can also accommodate the deployment of private network CPE devices allowing customers to connect their private core network if required.

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 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 Property deployed from an Oracle Cloud facility, customers will be asked to ensure they allow TLS (TCP 443) outbound to the OPERA 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	BEIJ																						
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 Oracle Hospitality data center facilities (highlighted).

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