# Colo 2.0 Infrastructure as a Service (IAAS) Services Documentation

1 November 2023

# Contents

## 1. VERSION CONTROL

| Version | Name and Role | Date | Reason for Changes |
|---|---|---|---|
| 1.0 | Nasheen Sharma, [Technical Account Manager] | 1 November 2023 | Initial Draft |

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## 2. CONTACT DETAILS

| JSE Limited | JSE Colo 2.0 (IAAS) Services |
|---|---|
| One Exchange Square | Email: Colocation@jse.co.za |
| 2 Gwen Lane, Sandown | |
| South Africa | **Customer Support** |
| Tel:  +27 11 520 7000 | Email: CustomerSupport@jse.co.za |
| www.jse.co.za | Tel:  +27 11 520 7777 |

## 3. GLOSSARY OF TERMS

| # | Term | Definition |
|---|---|---|
| 1. | Access Network | A network that allows JSE customers to connect to various JSE services. |
| 2. | Business Days | Any day other than Non-Business Days. |
| 3. | Business Hours | 06:01 – 19:00 |
| 4. | Colocation | Aside from the Colo2.0 Solution, a facility located in the JSE Primary Data Centre that allows for Customers to place their Equipment in closer proximity to the trading systems of the various JSE Markets. |
| 5. | Cross Connect | The cabling between multiple Colocation Hosting Units across multiple Customers or the cabling between multiple Hosting Units nonadjacent or not in the same row to each other for the same Customer.<br><br>Also applicable to cabling from the JSE Meet Me Room to the top of the rack for JSE IaaS solution. |
| 6. | Customer | A party that holds a contract with the JSE to utilise the Services. |

| # | Term | Definition |
|---|------|-----------|
| 7. | Customer Test Services | These are the test services for Equity Market and Derivative Markets' trading and information systems aimed at assisting Customers in the development and testing of their applications. |
| 8. | IaaS | Infrastructure as a Service |
| 9. | Information Subscribers | A party which has entered into one or more market data agreements with the JSE to cover access to the market data for the relevant JSE Markets. |
| 10. | Inter-Connect | The cabling between multiple Hosting Units adjacent to each other in the same row, for the same Customer. |
| 11. | JSE Customer Support | The help desk capability established to facilitate the resolution of queries and service requests relating to the Services. |
| 12. | JSE Markets | For the purpose of the Services, being:<br>• Equity Market (including JSE and the NSX)<br>Derivative Markets (including Equity Derivatives Market, Commodity Derivatives Market; Currency Derivatives Market; Interest Rate Market; and Interest Rate Derivatives Market) |
| 13. | JSE Premises | One Exchange Square, 2 Gwen Lane, Sandown, South Africa. |
| 14. | JSE Primary Data Centre | The secure data centre space allocated in the JSE Premises. |
| 15. | JSE Services Agreement (JSA) | The agreement entered by a party and the JSE which governs the use for certain JSE services. |
| 16. | JSE Systems | The computer and/or communications systems and/or operated by or behalf of the JSE for the purposes of offering services. |
| 17. | Live Connectivity Test | A test that is performed when a customer requires a new production connection or changes to an existing production connection to the JSE. |
| 18. | Meet Me Room | A facility within the JSE Primary Data Centre where telecommunication service providers can provide telecommunication services to Customers. |
| 19. | Member | A party authorised in accordance with the JSE rules and directives to trade on the various JSE Markets. |
| 20. | Member Client | A party that holds a contract with a member to trade through such Member on the JSE Markets. A Member Client not sub-letting from a member will be required to Cross Connect to a Member located in Colocation to trade on the JSE Markets that the Member is authorised for. It will be the responsibility of the Member Client and applicable Member to legalise this relationship. |
| 21. | Network Service Providers (NSP) | A JSE accredited network service provider that provides telecommunications connectivity between the Colocation network and the Meet Me Room. It will be the responsibility of the Customer to legalise this relationship. |

| # | Term | Definition |
|---|------|------------|
| 22. | Non-Business Days | Saturdays, Sundays, and any public holiday as gazetted by the government of the Republic of South Africa from time to time. |
| 23. | Non-Business Hours | 19h00 – 06h00 on Business Days. |
| 24. | Personnel | Employees, agents, consultants, contractors, subcontractors of a party and their employees, agents, consultants, contractors, and subcontractors. |
| 25. | Planned Changes | Changes that follow the change management procedure and are approved and scheduled for implementation by the JSE. This includes, without limitation, JSE planned changes, new installations, new connects, setup or maintenance of equipment. |
| 26. | Portal | The JSE's service provider's cloud portal accessible at colo-jse.co.za. |
| 27. | Precision Time Protocol (PTP) | It is a protocol used to synchronise systems clocks in compatible equipment utilising a reliable time source i.e. GPS. |
| 28. | Price List | The list of fees payable for the Services as published by the JSE from time to time. |
| 29. | Services | The access to and usage of the computing IaaS, or analytics service, within the JSE Primary Data Centre, also referred to herein as 'Colo 2.0 Solution', as set out in the Colo 2.0 Client Onboarding Form |
| 30. | Services Documentation | The business and technical documents in relation to the services provided to the Customer by the JSE, from time to time. |
| 31. | Service Fees | The fees and charges payable for the Services, as identified in the Price List. |
| 32. | Shared Infrastructure Providers (SIP) | A JSE accredited entity that provides shared infrastructure services to more than one Member for trading or for the provision of market data to more than one Customer or Member Client in Colocation. This includes, without limitation:<br>• Application or application service hosting.<br>• Platform hosting (e.g. virtual machines).<br>• Shared network.<br>• Physical infrastructure hosting services.<br>Colo 2.0 sub-letting. |

4. **DOCUMENT PURPOSE**

The purpose of this document is to provide Customers with detailed information relating to the Services related to the Colo 2.0 -Infrastructure as a Service (IAAS) solution.  Additional documentation can be found on the JSE website: https://www.jse.co.za/services/jse-colocation-connectivity.

5. **SERVICE OVERVIEW**

The Colo 2.0 IaaS solution provides Customers with the ability of leasing equipment in respect of pre-built hardware rack, including Dedicated Servers and Virtual Machines. Each solution is scalable, secure, managed solution optimised through a deep understanding of Customers' technical requirements. Each solution offers a predictable cost model with resources focusing on delivering and supporting infrastructure and network capabilities optimised for exceptional service performance.

Customers could either lease a single physical or virtual machine or multiple. There is also the option of choosing an analytics service if required.
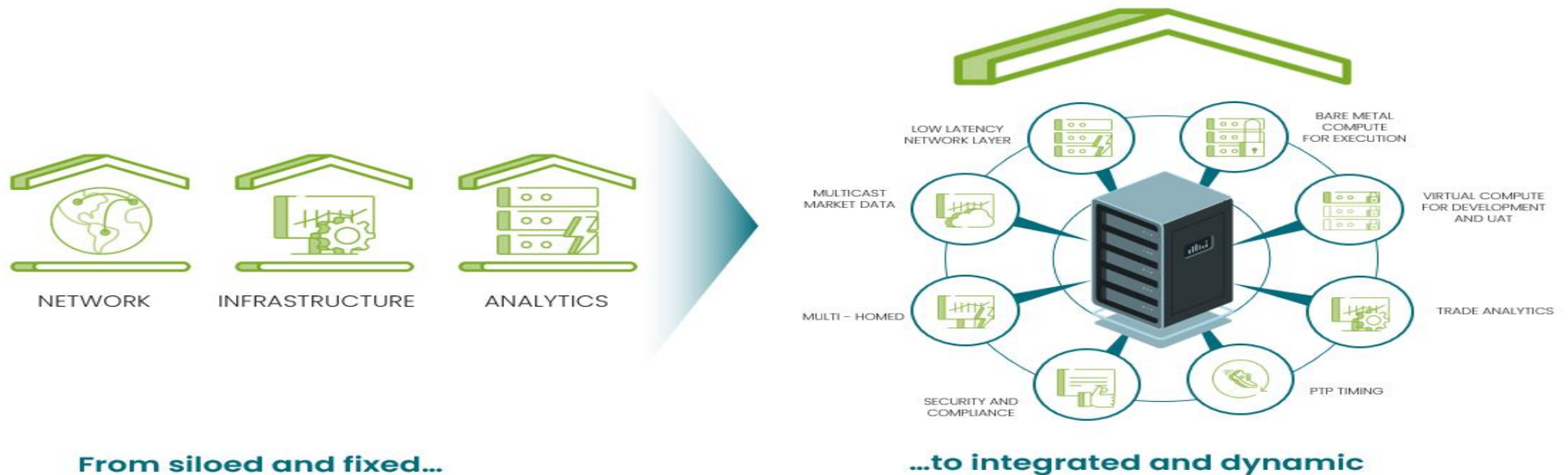
## 6. CUSTOMER ELIGIBILITY

## Eligible Users

**Trading Members**   **Clearing Members**   **Information Subscribers**   **SIP's**   **Software Providers**

As well as all other JSE Accredited Services viz Network Service Providers (NSPs), Extranet Service Providers (ESPs) ,CSDP's , CSP's and any other client type providing services to JSE clients

## 7. COLO 2.0 PRINCIPLES

The following key principles are applicable to the Colo 2.0 (IAAS) Solution:

**Markets:** Colo 2.0 (IAAS) will be available for all JSE Markets.

**Services:** Colo 2.0 (IAAS) will be available for all JSE Services

**Fees:** In increasing or varying any Colo 2.0 (IAAS) Service Fees, the JSE undertakes to treat the Customer equitably in relation to other Customers of the same Service. Customers will require independent subscriptions to all other JSE services such as (not an inclusive list):

- Market data - The access to market data will be governed by the various market data agreements, as well as data fees which are separate to Colo 2.0 Service Fees.
- Trading - The access to trading will be governed by various agreements with the JSE.

Separate fees are applicable to other JSE services e.g. enablement / COMP ID fees, JSE International Access point fees, etc.

**Billing:** Customers will be billed monthly for all Services. Prorated billing is applicable for Customers enabled during a billing month.

**Limited Capacity:** Server/s will be allocated on a first come first served basis within a limited capacity constraint in Colo 2.0 (IAAS) Solution.

**Redundancy:** Colo 2.0 (IAAS) has been designed to offer redundancy. The level of redundancy will be launched in Phase 2 of this project.

**Disaster Recovery:** Colo 2.0 (IAAS) will not be offered at the JSE remote disaster recovery site until further notice to Customers. Customers must therefore ensure that they can still connect and trade if the JSE operates out of the JSE remote disaster recovery site.

**Customer Test Service:** Access to the Customer Test Services will be facilitated via the Colo 2.0 (IAAS) solution to the JSE Client Access Network.

## 8. BENEFITS OF COLO 2.0 (IAAS) SOLUTION

Colo 2.0 (IAAS) offers private cloud services within the JSE Primary Data Centre. The aim is to ensure Members, technology/software or data providers and all market participants can take advantage of the following benefits:
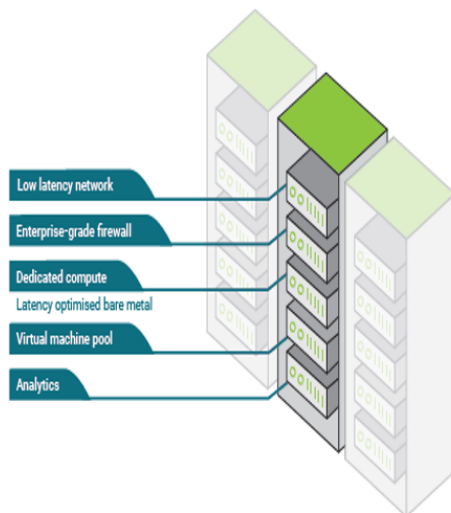


**Multi-tenant solution that reduces:**
- Time to market
- Total Cost of Ownership (CTO)

**The solution offers:**
- PTP time stamping
- Internet break-out (over VPN)
- Improved flexibility and scalability
- Built-in 1Gbps Analytics Server (optional)
- Single point of contact for support and invoicing
- Removes complexity in support, billing and hardware refresh costs

**Cloud on-demand compute**
- Connect to the JSE matching engines
- Industry-leading private self-manage portal
- Ease of configuration and infrastructure monitoring

**World Class Analytics**
- Real-time, uncompromised operational oversight and detailed analysis
- Delivers powerful actionable insights via latency monitoring and analytics.

## 9. SERVICE SUMMARY

The Colo 2.0 Services comprise of the following options available to Customers, as may be selected in the Colo 2.0 Client Onboarding Form:

| No. | Product | Type | CPU | RAM | Storage | Network Interface Card | OS Options |
|-----|---------|------|-----|-----|---------|------------------------|------------|
| 1 | Gold Virtual Server | Virtual | 4 vCPU | 6.66GB | 75GB | N/A | Windows 2012 Windows 2016 Linux Servers |
| 2 | Dedicated Server Diamond | Physical | Single 6-Core 2.1GHZ CPU | 32GB | 480GB SSD | Dual 10G Network Cards | Windows 2012 Windows 2016 Linux Centos Servers |
| 3 | Dedicated Server Platinum | Physical | Single 18-Core 3.5GHZ CPU | 64-128GB | 480GB SSD | Dual 10G Network Cards | Windows 2012 Windows 2016 Linux Centos Servers |
| 4 | Analytics Server | Physical | 1 Gbps throughput with 2 weeks of data stored on a rolling 2-week basis | | | | |

Multi-tenancy solution package:
- Contract term ranges from 1 year to 4 years
- Customers signing for an initial 4-year term and renewing their contract will incur zero equipment refresh costs.

Full solution package:
- 2x Colo Racks
- Customers signing for an initial period of 4-years and renewing their contract will incur zero equipment refresh costs.

All packages include:
- Power
- Remote Hands support, subject to the terms set out below.
- Information Delivery Portal (IDP) connectivity
- JSE Test & End-to-End Environment Connectivity (All Markets)
- Access to all JSE Markets: Trading; Market Data and Post Trade,
- Colo 2.0 Service Fees set out in the Price List excludes pricing and fees payable for access to JSE markets.
- Server prices are charged monthly, with zero upfront capital outlay.

**N.B – Please note that we are flexible on the Operating System requirements and please discuss this further with your account manager.**

## 10. CROSS CONNECTS

| Cross Connect Process | ❖ Cross connect (s) will be installed and managed by the JSE. |
|---|---|
| | ❖ If a customer requires a Cross Connect to another Customer's Hosting Unit, permission will be required from both parties before a Cross Connect will be installed between the two Hosting Units. |
| | ❖ All Cross Connect cables will be 10 X Giga bits fibre connectivity (Single mode or multimode applicable). |
| | ❖ Cross Connect redundancy can be facilitated through the procurement of an additional Cross Connect. |
| | ❖ Cross Connects will be implemented in the production environment within 10 Business Days of a confirmed CSOF and the requisite network tests, Live Connectivity Tests and data centre tests have been passed subject to the availability of cables. |

## 11. CUSTOMER SETUP PROCEDURE

| | |
|---|---|
| **Initial setup** | ❖ Customers interested in the Services will need to:<br>    • Enter in a Colo 2.0 (IAAS) Services Order Form under the JSA, and any other associated agreements.<br>❖ Complete a Colo 2.0 Client Onboarding Form.<br>❖ Once the respective Customer users are enabled on the Portal, the Customer to login to the Portal and select their desired number of server/s and analytics suite.<br>❖ Once the server/s are allocated, the IP addresses for the respective services will be provided.<br>❖ Customer to submit their comp-id enablement requests to customersupport@jse.co.za and follow the standard application enablement process. |
| **Request for Additional Services** | ❖ Customers, post their initial implementation, can request any additional servers or analytics suite via the Portal.<br>❖ Customers will deploy their applications and operating system/s and test once the server is allocated on the Portal.<br>❖ The Customer shall ensure that its applications have been properly tested prior to installing it on the server and that it conforms to any requirements as set out in the API specifications for the respective service being used.<br>❖ Customers must pass the relevant data centre tests, the network connectivity test, and Live Connectivity Test before the server/s can interact with any of the JSE Systems.<br>❖ Only conformed software may be used to connect to the JSE trading and/or market data gateways/proxies. |

## 12. SUPPORT MODEL

Support will be provided by telephone and service tickets (**Service Ticket**) through the Portal 24 hours a day, 7 days a week, 363 days a year. (Christmas Day and New Year's Day have reduced levels of cover.)

i.  Service Tickets for support requests or incidents in relation to Colo 2.0 Services are to be raised via the Portal.

ii.  All Service Tickets or queries submitted on the Portal will be delivered to the JSE Business Operations Team via email alert, for oversight purposes. The JSE's service provider will attend to Service Tickets and queries, and shall escalate to the respective JSE teams those Service Tickets and queries that are still not resolved. Refer to below workflow for a high-level process.

iii.  For major/critical issues the JSE's service provider's Major Incident Hotline is available. This line is available 24x7x365 and is an immediate escalation. The Major Incident Hotline should only be used for severity P1 Services outages:

> **P1 Incident line UK: 00 44 (0)1505 800770**
>
> **P1 Incident line US: 00 1 312 945 7554**
>
> **P1 Incident Line SA: +27 11 520 7777 / +27 11 520 7900/ +27 83 278 6451**
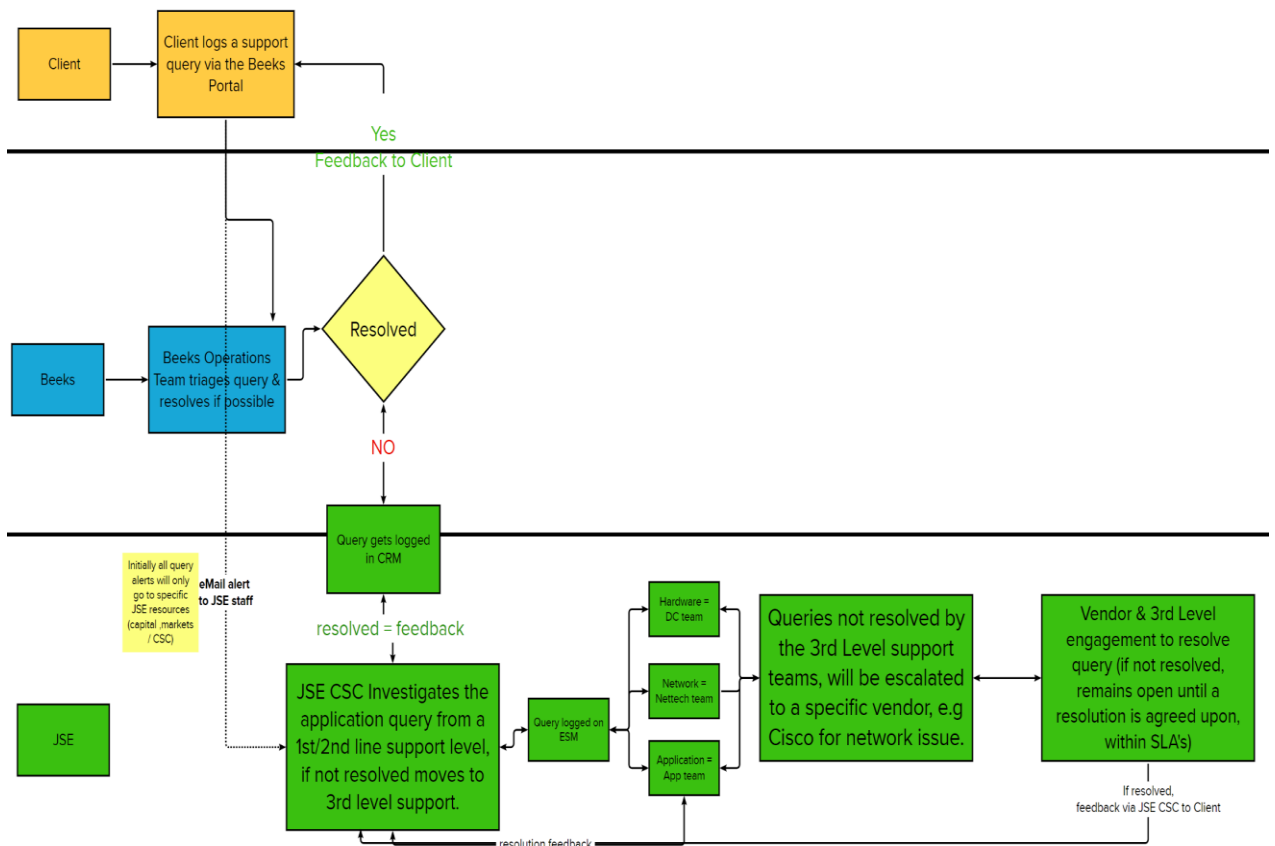


## 13. ESCALATION CONTACTS

The Beeks Network Operations Centre (**NOC**) will escalate support requests internally to Level 2 NOC and Level 3 Technical Team as required, failing which this will be escalated to the JSE Application and networks teams. However, in the event Customer has concerns over the handling of a particular incident the following escalations are available:

| Level 1 | Level 2 NOC | Level 3 NOC | Level 4 |
|---|---|---|---|
| NOC | Service Escalation, NOC | Senior Tech, Technical Dir | Senior Management |
| EMEA: +44 1505 800973 | EMEA: +44 1505800770 | Russell Cassidy +441505800773 | COO Paul Donohoe +447747695475 |
| | | | |
| JSE CSC | CSC Manager | Technical Account Manager | Senior Management |
| +27 11 520 777 After hours - +27 83 611 9315/+27 11 520 7777 | Sixolisile Mahlasela | Nasheen Sharma +27 83 278 6451 | Head: Equity & Equity Derivatives/Colocation – Vuyo Mashiqa + 27 73 257 5044 Head: CSC - Grace Brown - +27 72 306 4725 |

## 14. APPENDIX A

### 14.1 Service Components

Standard Service Installations. Colo 2.0 (IAAS) installations may consist of one or more of the following elements in accordance with the design criteria mutually agreed upon during the pre-ordering process:

- Managed Server – Dedicated and/or Virtual. The Managed Dedicated Servers or Virtual Servers for the Alpha Stack offering may be housed within a cabinet within the chosen data centre location as agreed with Customer.
- Managed Firewall – Dedicated and/or Shared. The Managed Firewalls for the Colo 2.0 (IAAS) offering are housed within a cabinet within the JSE Primary Data Centre location as agreed with Customer.
- Managed Storage – Shared NAS and/or Dedicated NAS. The Managed Storage solution for the Colo 2.0 (IAAS) may consist of a shared or dedicated environment based on Customer's requirements.

### 14.2 Standard Implementation Configurations

The following standard implementation configurations are detailed below:

- Managed Server – Virtual or Dedicated
- Managed Firewall – Shared or Dedicated
- Managed Storage – Shared or Dedicated
- Managed Infrastructure – Shared or Dedicated

### 14.3 Server Hardware Replacement.

Server hardware (DS and VM host) replacements will be available on-site within two business days of the location where the replacement hardware is required.
Business days are 06:30-19:00 Monday-Friday (excluding public holidays based on time zone and holidays of the location specified).
Replacement will be scheduled at the first available window agreed upon with Customer and in adherence to the JSE Change Management Procedure.

### 14.4 Network Hardware Replacement.

Network vendor hardware replacements will be available on-site within three business days.
Replacement will be scheduled at the first available window agreed upon with the Customer and in adherence to the JSE Change Management Procedure

### 14.5 Virtualisation Software.

JSE will support virtualisation software and patching. Required updates will be scheduled with the Customer in line with the Beeks/JSE Change Management Procedure.

**14.6Network Device Operating System.**

JSE will support network vendor operating system upgrades and patching, and required updates will be scheduled with the Customer in line with the JSE Change Management Procedure.

**14.7 Customer DS and VM OS**

Customer DS and VM operating systems (OS) are the Customer's responsibility alone. This includes any patching requirements or updates due to vulnerabilities.

**14.8Customer DS and VM OS licensing**

Customer DS and VM OS licensing (e.g., Microsoft server OS licensing) is the Customer's responsibility alone.

**14.9Automation and Management Server Access.**

Support of the DS and VPS build automation is solely the responsibility of JSE and its service provider. The Customer is not expected to have any access to the management server, which facilitates the automation functionality.

**14.10      Analytics**

JSE will be responsible for configuring the Analytics servers, data collection and dashboards but are not responsible for ongoing monitoring of the performance of the Customer's applications.
For hardware replacement for the Analytics Server, see 'Server Hardware Replacement' above in this section.

**14.11      Firmware Upgrades of Colo 2.0 (IAAS)**

It is solely the responsibility of JSE and its service provider to upgrade the firmware on Colo 2.0 (IAAS) network devices, the virtualisation layer and any other physical component that requires the upgrade. This does not include Customer DS or VPS operating systems.