Service Definition

The name of the Service is: **Big Data Analytics as a Service**

The Business Case for Big Data Analytics

In a recent study The Policy Exchange have estimated that achieving cutting-edge performance could in time save the public sector up to £16 billion to £33 billion a year – equivalent to £250 to £500 per head of the population. In another study The Centre for Economics and Business Research highlights than the UK Public sector could save £2 billion in fraud detection and generate £4 billion through better performance management. According to the latest figures from the National Fraud Authority, the public sector lost £20 billion through fraud in 2011/12. High-performance analytics can improve the scope and accuracy of fraud prevention, furnishing cost savings for the public sector of £2.0 billion by 2017. A further £5.6 billion in efficiencies could be gained through the effective analysis of performance data, with the healthcare system benefiting to the tune of £1.9 billion.

Some specific business areas identified by the Policy Exchange for such savings were:

- Real-time information management
- Countering noncompliance, fraud and error

Proposed solutions to realise these savings were:

- Routinely capture data created in the day-to-day business of government, monitor it to detect how departments are performing, and analyse it to identify opportunities to reduce waste or increase efficiency.
- Use cutting-edge data visualisation tools both as an aid to analysis and to provide senior officials, Ministers and their advisers with real-time, interactive facts and figures on public sector performance.

Accelerate the use of analytics and data fusion to make further inroads into tax compliance, welfare and benefits fraud and errors This could help: (a) Focus caseworkers on individuals most likely to be in breach/where the most money is at stake; (b) Identify and prioritise the channels and communications that are most effective at ensuring compliance; and (c) Eliminate errors by reducing avoidable data entry and flagging potential errors at the point they enter the system.
An overview of Big Data Analytics as a Service

The Big Data Analytics service is delivered as a managed service by Amtex Solutions Ltd. It is a managed deployment of 4 nodes on IL2 compliant G-Cloud platform (16 cores, 128 GB memory, 20TB database storage) with a complete big data analytics platform and big data storage platform.

The solution enables big data analytics at a fraction of cost of proprietary appliances from the major database/hardware companies. There are three stages in leveraging the solution:

Prepare & Model
- Visual designer for data integration, enrichment and modeling
- 15x productivity boost compared to scripting and coding
- Wizards for uploading and previewing data

Visualize & Explore
- Big data exploration
- Interactive visualizations
- Dashboards
- Reports
- Open API for publishing

Discover & Predict
- Time series forecasting
- Statistical learning, evaluation and visualization of predictive models
- Support of Predictive Modeling Markup Language (PMML)

The solution is based on Datastax Enterprise Edition, Pentaho Business Analytics and Pentaho Instaview version 4.8 (enterprise edition) commercial open source software and some additional open source components.

Pentaho Instaview, the first instant and interactive application for any big data, dramatically reduces the time and complexity required for data analysts to discover, visualize and explore large volumes of diverse data.

- Broadens big data access to data analysts
- Removes the need for separate big data visualization tools
- Simplifies big data delivery and access management for IT

Pentaho Instaview enables the following benefits for cost reduction and time to market:
Big Data Analytics as a Service for the G-Cloud

- Full continuity from data access to decisions – complete data integration and business analytics platform for any big data store
- Faster development, faster runtime – visual development and distributed execution
- Instant and interactive analysis – no coding and no ETL required

From preparing and modeling big data stores for analysis, to data visualization, exploration and predictive analysis, Pentaho Business Analytics allows you to harvest the meaningful patterns buried in large volumes of structured and unstructured data. Analyzing big data sets gives you the power to identify new revenue sources, develop loyal and profitable customer relationships, and run your overall organization more efficiently and cost effectively.

**Predictive Analytics** Beyond interactive visualization and exploration of data, Pentaho provides powerful, state-of-the-art machine learning algorithms and data processing tools. Data scientists and analysts can uncover meaningful patterns and correlations otherwise hidden with standard analysis and reporting. Sophisticated, advanced analytics such as time series forecasting help plan for future outcomes based on a better understanding of prior business performance.

- Supports the whole process of predictive analytics
  - Preparation of input data
  - Statistical evaluation of learning schemes
  - Visualization of input data and the result of learning
- Includes powerful algorithms such as classification, regression, clustering and association
- Allows import of third-party models using Predictive Modeling Markup Language (PMML)
- Allows storing and versioning of models using the Pentaho repository
- Uses Pentaho Data Integration to operationalize models inside or outside of a Hadoop cluster
- Incorporates algorithms into Pentaho’s visual interface

**Pentaho Business Analytics** is a tightly coupled data integration and business analytics platform that brings together IT and business users for easy access, integration, visualization and exploration of any data. Pentaho includes data discovery, data integration and predictive analytics. With Pentaho, business users are empowered to make information-driven decisions that positively impact their organization’s performance. IT can rapidly deliver a secure, scalable, flexible, and easy to manage business analytics platform for the broadest set of users.

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Pentaho provides a web-based interface for business users to access any data for dashboards, interactive reporting, visualization, analysis and predictive analytics. With an easy to use wizard-based approach, business users can turn their data into insight and make information-driven decisions in minutes. Access to diverse data sources support from Excel to Oracle. Powerful data integration is supported in the embedded solution.

Pentaho reporting capabilities span the entire continuum from self-service interactive reporting, to high-volume, highly-formatted enterprise reporting. Output in popular formats include HTML, Excel, CSV, PDF and RDF. In-memory caching of data and reports is provided for fast results. By delivering key performance indicators in a highly graphical, interactive visual interface, Pentaho dashboards give business users the critical information they need to understand and improve organizational performance. Some key features include:

- Rich graphical visualizations with navigation, drilling and a rich library of filter controls.
- Web-based drag and drop dashboard designer for business users.
- Portal and mash-up integration to seamlessly integrate business analytics with other applications, including Google Maps
Pentaho Mobile brings interactive analysis, rich visualization, dashboards and operational and enterprise reports to the iPad. (Android support in roadmap) Touch-enabled with support for native gestures, business users have a true mobile experience. Business users can instantly create ad hoc analysis and reports on the go using their BYOD mobile devices. Instant secure access is provided to live data from anywhere so that reports only need to be created once. Some key features include:

- True iPad-optimized mobile experience with native gestures, such as touch filtering, drill-through and touch-enabled drag and drop functionality
- Creation of analytic reports from the iPad with access to all interactive dashboards, analysis and reports
- Personalization capabilities like favorites and customizing start-up location
Pentaho Business Analytics puts powerful analytics in the hands of business users. With an intuitive, interactive web user interface, users can freely explore and visualize their business data by multiple dimensions such as product, geography and customer. Some key features include:

- Interactive visual analysis allows decision makers to drill into data for greater insight
- Visual lasso filtering and zooming narrows down the context of data to understand or exclude outliers
- Attribute highlighting provides better visualization contrast among data displays
Big Data Analytics as a Service for the G-Cloud

- A rich library of interactive visualizations to find patterns and anomalies, including geo-mapping, heat grids and scatter/bubble charts
- Drill-down functionality into supporting reports and dashboards provides deeper analysis
- Extreme scale in-memory data caching for speed-of-thought analysis with large data volumes
Big Data Analytics as a Service for the G-Cloud

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Predictive Analytics

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- Incorporates algorithms into Pentaho’s visual interface
The Big Data Analytics Service data storage is based on **Datastax Enterprise Platform** deployed on IL-2 compliant UK secure private cloud with 99.995% uptime guarantee. DataStax powers the big data applications that transform business and profoundly improve customer experiences through Apache Cassandra™, the massively scalable NoSQL database. Simple to operate and built with architectural flexibility in mind, DataStax Enterprise delivers extreme speed and unmatched reliability in a single platform designed for today’s most complex and demanding enterprise big data requirements. Some capabilities of the Datastax platform are:

**Certified Cassandra for Real Time Production Applications.** DataStax Enterprise contains certified, production-ready versions of Apache Cassandra that have been chosen from the community by the expert staff and committers at DataStax. Each selected release is put through a rigorous certification process designed by DataStax engineers and QA staff to ensure that it is stable and ready for enterprise production systems.
Big Data Analytics as a Service for the G-Cloud

Continuously Available Hadoop for Analytic Workloads Built into DataStax Enterprise is an enhanced Hadoop distribution that utilizes Cassandra for many of its core services. DataStax Enterprise provides integrated Hadoop MapReduce, Hive, Pig, and job/task tracking capabilities, replacing Hadoop’s HDFS storage layer with Cassandra (CassandraFS). The end product is a single integrated solution that provides increased reliability, no single points of failure, simpler deployment, and lower TCO than a traditional Hadoop solution. DataStax Enterprise also is fully compatible with existing HDFS, Hadoop, and Hive tools and utilities.

Scalable Enterprise Search with Solr DataStax Enterprise includes strong enterprise search support via Lucene and Apache Solr. Capabilities include robust full-text search, hit highlighting, faceted search, rich document (e.g., PDF, Microsoft Word, etc.) handling, and geospatial search. Using Cassandra as its foundation for Solr/search, DataStax Enterprise provides a number of key benefits over traditional Solr deployments such as full data durability, scalable write operations, blazingly fast reads, simplified replication, multi-data center support, powerful search for application log data, and more.

Workload Management DataStax Enterprise solves the mixed workload problem enterprises have struggled with for years. DataStax Enterprise provides full workload management so that real-time, analytic, and search workloads do not compete with each other for either compute or data resources. Further, DataStax Enterprise puts an end to complex and time-consuming ETL operations as data is transparently replicated between all Cassandra, Hadoop, and Solr nodes in a DataStax Enterprise cluster.

Visual Management and Monitoring DataStax Enterprise includes a visual, browser-based management solution called OpsCenter Enterprise. OpsCenter Enterprise allows a developer or administrator to manage and monitor the health of one or many DataStax Enterprise clusters from a centralized web console. All key aspects of Cassandra, Hadoop, and Solr operations can be monitored and managed with point-and-click ease with DataStax OpsCenter, either on a desktop, laptop, or iPad.
Big Data Analytics as a Service for the G-Cloud

Pentaho Data Integration (PDI) is used for graphically building data integration scenarios including Map Reduce jobs for the Hadoop and Cassandra data sets.

PDI makes it easier and faster to integrate with Hadoop, NoSQL and high performance analytic databases. PDI’s intuitive graphical design provides:

- Native connectivity to leading Hadoop, NoSQL and analytic databases
- Visual designer for MapReduce jobs to reduce development cycles by as much as 15x
- Data preparation, modeling and exploration of unstructured data sets

PDI’s powerful data integration engine provides:

- Multi-threaded engine for fast execution
- Cluster support, enabling distributed processing of jobs across multiple nodes
- Unique in-Hadoop execution for extremely fast performance

PDI offers broad connectivity to a variety of diverse data including all popular structured, unstructured and semi-structured data sources. Some examples include:

- Standard relational databases (e.g. Oracle, DB2, MySQL, SQL Server)
- Hadoop (e.g. Apache Hadoop, Cloudera, HortonWorks, MapR)
- NoSQL databases (e.g. MongoDB, Cassandra, HBase)
- Analytic databases (e.g. Vertica, Greenplum, Teradata)
- Packages enterprise applications (e.g. SAP)
- Cloud-based and SaaS applications (e.g. Salesforce, Amazon Web Services)
- Files (e.g. XML, Excel, flat file) and web service APIs

PDI has a simple visual designer for the fastest path to big data value.

PDI intuitive and rich graphical designer allows you to do exactly what the most skilled developers can accomplish, in a fraction of the time, and without requiring you to manually code.
PDI graphical designer includes:

- Intuitive, drag and drop designer
- Rich library of pre-built components
- Powerful data transformation mappings
- Dynamic transformations, using variables to determine field mappings, validation and enrichment rules
- Integrated debugger for testing and tuning job execution

PDI provides basic big data profiling and data quality capabilities such as row counts, mathematical functions and identification of null values. PDI also provides data quality operators such as string manipulators, mapping functions, filtering and sorting. For name and address verification capabilities, PDI integrates with leading data quality vendors, such as Ataccama Software and Human Inference. PDI data profiling and data quality capabilities help data stewards:

- Identify data that fails to comply with business rules and standards
- De-duplicate and cleanse inconsistent and redundant data
- Validate, standardize and correct name, address, email and telephone data
**Cloud Data Storage based on OpenStack**

The cloud data storage service is based on OpenStack (http://www.openstack.org/), which is a collection of open source software developed and supported by a wide range of cloud experts. This gives complete peace of mind as the cloud data storage solution is founded on tried, tested and compatible Object Storage software.

The cloud data storage solution has built upon OpenStack to provide a range of additional features too, including:

- Encrypted on the disk
- Secure by default (https)
- SFTP interface
- FTP interface
- Serve any public container via HTTP using own domain

**Resilient.** Memset have built triple redundancy into their cloud data storage system so there are always three replicas of the data. In the unlikely event of a disk failure the system will automatically fill in the gaps from the other disks. As there will be no disturbance to either the data or the access this means an organisation will never even know this has happened. No data storage system can be 100% guaranteed, however. There is a remote chance that in the narrow time window during which it takes the data that was on a faulty disk to be replicated elsewhere the two other disks holding that piece of data could also fail. The architecture of the system means that if this were to happen its effects would be distributed among several project deployments, ie. no one project's data would be wholly lost, but some files might be. Memset have performed statistical analysis on the probability of data loss and we believe the object durability to be 99.999999%. This means that any individual object (file) stored in the cloud data storage service has a 0.000001%, or 1 in 100,000,000 chance per year of being lost. By comparison, 6 x 2TB disks in a RAID6 array with a hot spare (generally considered by most IT professionals to be "bullet proof") has a 1 in 75,000 chance per year of significant or total data loss.

**Secure.** We understand that the government’s data is important which is why we selected Memset IaaS platform with security in mind, in line with the ISO27001 security accreditation and IL2 compliance (IL3 later in year). First, all data is encrypted on the disk. Second, access to files in cloud data storage is based on a token system which verifies authorisation and access level, providing a high level of security for your data without compromising download speed.

For added security we can assign different permission levels to the various people with access to your storage They can either have account level access and be able to access all containers (essentially folders), write to them and delete them. Or they can have Container Level access whereby you can set their permissions for each individual container. This flexibility allows organizations to share information easily with other public sector organisations and associates/staff without making any security concessions.
Real-Time Integration of External Events

The service supports a real-time event integration layer for loading data into Cassandra and Hadoop for analysis. This allows the real-time integration with systems such as SAP and Oracle to feed the databases for purposes of big data analytics and visualization.

Collect & Store any Type of Business Events

- Events are named, versioned and typed by event source
- Event structure consists of (name, value) tuples of business data, metadata and correlation data

High Performance Data Capture Framework

- High performance, low latency API for receiving large volumes of business events over various transports including Apache Thrift, REST, HTTP and Web services
- Scalable event storage into Apache Cassandra using columns families per event type
- Non-blocking, multi-threaded, low impact Java Agent SDK for publishing events from any Java based system
- Use of Thrift, HTTP and Web services allows event publishing from any language or platform
- Horizontally scalable with load balancing and high available deployment

Scalable Data Analysis Powered by Apache Hadoop (Datastax Enterprise)

- SQL-like flexibility for writing analysis algorithms via Apache Hive
- Extensibility via analysis algorithms implemented in Java
- Schedulable analysis tasks
- Results from analysis can be stored flexibly, including in Apache Cassandra, a relational database or a file system

Powerful Dashboards and Reports

- Tools for creating customized dashboards with zero code
- Ability to write arbitrary dashboards powered by Google Gadgets, D3JS and JaggeryJS

Integrated Lightweight, Developer Friendly and Easy to Deploy

- Scales from a single JVM download to highly scalable deployment involving 10s of servers
- Choice of deployment to on-premise servers, private cloud or public cloud without configuration changes
Big Data Analytics as a Service for the G-Cloud

- Integrated user store and management of all components, including Apache Cassandra and Apache Hadoop
- Integrated to Eclipse-based IDE

Manage & Monitor

- Comprehensive management & monitoring Web console with enterprise-level security
- Built-in collection and monitoring of standard access and performance statistics
- JMX MBeans for key metrics monitoring and management
- Flexible logging support with integration to enterprise logging systems

A rich set of visualizations have been integrated with the event processing.
Big Data Analytics as a Service for the G-Cloud
Deployment Models

*How can the service be deployed?*

The Big Data Analytics service can be deployed on private cloud.

By partnering with Memset Ltd we offer the service on a secure private cloud IL2 accredited for G-Cloud (IL3 later in the year). On the secure private cloud deployment each client (organisation) will have a dedicated VM and a dedicated database per organisation. We can also support a dedicated secure private container with multi-tenant service for within a single organization.

*Networks to which the service is connected (directly)?*

The Big Data Analytics service is accessible from a browser with an internet SSL connection.

Other networks (PSN, JANET, GSI, N3) can be enabled by working with our partner Memset Ltd.

*API access available, documented and supported?*

SOAP and REST APIs are available using Data Services.

*Open standards documented and supported?*

Data interchange is supported through XML and JSON formats. Data Services can be published as REST and SOAP services.

*Open source used and documented?*

<table>
<thead>
<tr>
<th>Function/Purpose</th>
<th>Open Source Components</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating System</td>
<td>Ubuntu Linux</td>
</tr>
<tr>
<td>Web Server</td>
<td>Apache HTTP server</td>
</tr>
<tr>
<td>Application Server</td>
<td>Apache Web Server</td>
</tr>
<tr>
<td>Database</td>
<td>Datastax Enterprise Edition</td>
</tr>
<tr>
<td>Java Libraries</td>
<td>ExtJS, KendoUI, JQuery, POS</td>
</tr>
<tr>
<td>BI Platform</td>
<td>Pentaho Enterprise Edition</td>
</tr>
<tr>
<td>Optional Data Service</td>
<td>WSO2 Data Services Server</td>
</tr>
<tr>
<td>Ordnance Survey</td>
<td>OS OpenData Public Viewing License</td>
</tr>
<tr>
<td>D3JS/Michael Bostock</td>
<td>D3JS data driven document visualization library</td>
</tr>
</tbody>
</table>
Service Management

Technical boundaries/interfaces of the service documented?

The Big Data Analytics service interfaces are fully documented for both the role of administrators and end-users.

Services available to other suppliers so they can use them to provide services to government?

The Big Data Analytics service is available to any other suppliers who wish to leverage the G-Cloud framework.

On-boarding process e.g moving to the service?

An administrator account is created for the organization. The administrator can then create end user accounts. Additionally the on-boarding is provided as a managed service.

The SLA for on-boarding is 24 hours. Once an administrator account is created the on-boarding of end-users takes less than a minute via email notification inside organisation.

Off-boarding process e.g moving off the service?

The administrator can remove the end user accounts and the data. Additionally the off-boarding is provided as a managed service.

The SLA for off-boarding is 72 hours.

Data extraction/removal criteria met?

The criteria are met in accordance with the G-Cloud ITT glossary definition.

Data processing and storage locations defined?

For the G-Cloud the IaaS option available is Memset (twin data centres located in Reading, UK).

For an IL2 compliant (IL3 later in year) and UK sovereign G-Cloud solution the preferred approach is to use Memset IaaS.

Data location option can be defined by user?

This is not possible. The organization purchasing through G-Cloud would only have the option of the Memset IaaS which is managed in a UK sovereign Tier-3 data centre.

Data centre tier?
Big Data Analytics as a Service for the G-Cloud

Tier-3 UK data centre through our partner Memset Ltd.

*Support boundaries/interfaces documented?*

This is defined in the support guide.

*Service roadmap provided?*

The next release of the Big Data Analytics service is scheduled for Q3 2013 and will include:

- Pentaho 5.0
- Datastax Enterprise roadmap
- Apache Cassandra roadmap
- Apache Hadoop roadmap
- Apache Solr roadmap
- Advanced visualizations enhancements for end-users based on the D3.JS data driven documents. These are presently supported through data services.
- The service should be upgraded to optional IL3 assurance certified, working with IaaS partner Memset, providing information assurance to store data to the PROTECT level
- PSN network connectivity
- Virtual server nodes for analytics will be upgraded to 32 cores and 256GB memory

*Performance attributes defined and documented?*

Performance uptime and response time are documented in the support guide. Databases and VM Linux servers are constantly monitored.

*Backup & Disaster Recovery?*

The instance is backed up with nightly snapshots. Databases are constantly monitored.

*Is a support service provided and documented?*

The support service is documented in the support guide.

*Real-Time management information available?*

Management information is provided in a monthly report.

*Self service provisioning/de-provisioning?*

This is partially supported. The Big Data Analytics service itself is provisioned by Amtex Solutions Ltd. But the end users can be added and removed by the client’s administrator.
Big Data Analytics as a Service for the G-Cloud

**Time for provisioning/de-provisioning documented?**

24 hours for on-boarding and 72 hours for off-boarding. Administrators can add end-users in less than a minute.

**Service desk can be used by 3rd party suppliers?**

The Big Data Analytics service can be used by any 3rd party suppliers in the G-Cloud framework.

**Commercial**

*Unit based pricing model?*

The service pricing is £17,500 per month. Excludes VAT.

The service supported unlimited number of licensed users to access the analytics and data. The service is based on 4 nodes and 20 TB database storage.

Additional nodes can be added for £5,000 per month and big data storage can be added in blocks of 10TB (£10,000 per year per 10TB). Excludes VAT.

**Aggregated billing?**

Billing options can be provided for organizations with multiple departments.

*Minimum Contract/Billing Period?*

12 months for a total £210,000 contract value. Excludes VAT.

**Free Option?**

A free option is not standard offering on the G-Cloud.

**Trial Option?**

A trial option can be provided on virtual private cloud for a fee supporting 1 node and 5TB data. The fee would be £5000/month. Minimum term for a trial service subscription is 3 months £15,000. Excludes VAT. An additional Big Data Solution Assessment and Pilot Programme is available through Lot 4 services for £35,000 making a total for 3-month pilot of £50,000.

**Termination Costs?**

If terminated within the 12 month term then the remainder of the annual fees (£210,000) will be billed. If terminated at the end of the term then there is no cost. Trial subscriptions can’t be terminated.
Big Data Analytics as a Service for the G-Cloud

Supplier contract terms/jurisdiction?

Amtex Solutions Ltd is located in the UK under the jurisdiction of English law. The IaaS provider (Memset) is also located in England.

Payment Options?

Purchase Order and BACS are supported

Data Visualization

Authorized users may store datasets?

This is core functionality. End users can upload their datasets to the cloud database service

Authorised users may make datasets public?

This functionality can be enabled using Data Services publishing data as an API (SOAP/XML or REST/JSON)

Part of an integrated collaborative tool set?

The service is not part of a collaboration tool although Data Services API can be integrated into other collaborative tools or workflow processes.

Publish datasets as visualizations?

This is core functionality. Very rich data visualizations.

End users may search for datasets?

Search is not part of the current functionality

Types of display?

Pixel perfect reports and various visualizations are provided including Area Charts, Bar Charts, Bubble Charts, Column Charts, Pie Charts, Scatter Charts and Series Charts. Some advanced visualization
Big Data Analytics as a Service for the G-Cloud

documents include box plots, bubble charts, bullet charts, calendar view, cartogram, chord diagram, dendrogram, force directed graph, circle packing, population pyramid, stacked bars, steamgraph, sunburst, node-link tree, treemap, voronoi diagram and tag clouds.

Maps are supported using Ordnance Survey OpenSpace API which provides a much richer UK mapping services compared to Google Map, Bing Maps or Open Street Maps.

A comparison example is shown below:

![Comparison Example](image)

**Maximum dataset size?**

The standard data storage for the service is 20TB. Additional storage can be purchased in increments of 10TB.
Specialist Cloud Services - Generic

*Do you provide vendor specific services?*

Services are provided for the implementation of the Big Data Analytics service and data services.

*If the vendor(s) have accreditation are you accredited?*

UK G-Cloud IaaS partner provider Memset Ltd has a number of accreditations and certifications e.g ISO 9001, ISO 14001, ISO 27001. Amtex Systems has ISO 9001 certificate for IT enabled services, business process outsourcing, software testing, data integration and reporting.

*Vendor accreditation?*

We will submit the Big Data Analytics service for IL3 accreditation in the near future working with IaaS partner Memset.
Service Levels

Platform IaaS provider partner Memset Ltd has a 99.995% uptime guarantee for networks, servers and storage. 24x7 support is provided for the IaaS and this support is wrapped into the Big Data Analytics service support levels.

For the Big Data Analytics service production support is provided 24x7x365. Incidents are submitted via e-mail and/or telephone. The target response and resolution times for incidents are:

<table>
<thead>
<tr>
<th>Severity Level</th>
<th>Response Time</th>
<th>Resolution Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1 hour</td>
<td>24 hours</td>
</tr>
<tr>
<td>2</td>
<td>4 hours</td>
<td>48 hours</td>
</tr>
<tr>
<td>3</td>
<td>8 hours</td>
<td>72 hours</td>
</tr>
<tr>
<td>4</td>
<td>24 hours</td>
<td>None</td>
</tr>
</tbody>
</table>

The severity levels are defined based on impact on a production usage of the Big Data Analytics service in the table below. “Production” is defined as usage of one by end users where a failure of the Big Data Analytics service in production will have immediate economic impact on the client’s business operations.

<table>
<thead>
<tr>
<th>Severity Level</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Client’s business operations have been disrupted either through a loss of data or a loss of service.</td>
</tr>
<tr>
<td>2</td>
<td>Client’s business operations can continue in a restricted fashion. Client’s business operations are at risk.</td>
</tr>
<tr>
<td>3</td>
<td>Some aspects of the service are impaired but client can continue to use the service. Client’s business operations are at minimal risk.</td>
</tr>
<tr>
<td>4</td>
<td>General usage questions, requests for new features or documentation issues.</td>
</tr>
</tbody>
</table>
Termination Options

Clients may terminate the production Big Data Analytics service with 30 days notice for any reason, subject to full payment of remaining SaaS fees for the 12 month subscription period (£210,000).

Trial service cannot be terminated. Client will be invoiced the full amount for the 3 month trial in advance.

Vendor can terminate the production Big Data Analytics service for any reason at the end of the initial 12 month subscription period, with 90 days notice.

Data Restoration/Service Migration

Data restoration is provided by vendor for recovering from backups.

Service migration can be provided as a service through an export of the database environment or a migration of the complete VM onto another cloud instance.

Customer Responsibilities

The client responsibilities are set out in the support guide.

More Information

More information can be found at the cloudstore or by email uksales@amtexsystems.com

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