



# Hybrid Multicloud Data Center Services from Kyndryl

Transform your data center  
to respond with agility to  
dynamic business demands



# Contents

- 2 The bold new IT imperative
- 3 Hybrid Multicloud Data Center Services from Kyndryl
- 9 Why Kyndryl Data Center Services

## The bold new IT imperative

Organizations today face an increasing need to innovate and adapt to meet rapidly changing business needs and market demands. Digital transformation is no longer a choice; it is a fundamental business strategy to leverage the changes and opportunities in the marketplace.

Digital transformation increases IT complexities due to hyperconvergence of environments (including on-prem legacy, private cloud, public cloud, and colocation) and heterogeneity of platforms and interfaces. Dynamic business requirements and the increasing complexity can put tremendous strain on data centers and challenge IT leaders to re-evaluate their data center (DC) strategy realign it to their business goals.

But organizations struggle to create data center resources that drive—rather than act as barriers to—innovation. Many lose business due to lack of skilled staff. Building an adaptive data center strategy that can respond to future capacity and availability needs as well as technology changes requires specialized skills, experience, and enabling tools. Any missteps and incorrect decisions along the way can lead to unplanned downtime, increased risk of cyberattacks, and subpar implementation of your digital transformation initiatives.

# Hybrid Multicloud Data Center Services from Kyndryl

## Data Center Consulting Services

This service provides strategic advice and insights through the assessment of IT facility environment to facilitate decision making for achieving highly resilient, energy efficient, optimized data center. It provides advisory service through three catalogues of services.

## Data Center Strategy

- Strategic benchmarking against DC industry standards and Uptime Institute certification
- Financial options and analysis (CapEx, OpEx, ROI, chargeback, showback)
- Analysis of all options, including on-premises and colocation DC
- Review of business continuity and resiliency
- Innovation and technology transformation

## Data Center Assessment

- DC facilities resiliency and capacity gap analysis
- DC infrastructure comprehensive audit—power, cooling, fire and safety
- DC energy optimization and power usage effectiveness (PUE) improvement (CO2 reduction)
- DC facilities resiliency and capacity gap analysis
- DC infrastructure comprehensive audit—power, cooling, fire and safety

Kyndryl™ will perform a detailed study of your data center's drawings, data sheet, and requirements to assess the facility support systems and to provide recommendations for achieving a high level of facilities systems reliability and with consideration for future growth. At the end of the process, we provide cost estimates including the cost of remediation or enhancements to existing data centers up to a desired level of reliability consistent with the mission of the IT organization.

## Data Center Design and Site Engineering Services

Having designed over 30 million square feet of data center footprint, Kyndryl has the deep knowledge and expertise to design data centers for any cabinet power density. Our designs consider both long-term business benefits and ecological footprint. We are committed to building facilities that are both cost-effective and commercially competitive, while also ensuring that our designs comply with industry standards and regulations and meet the green norms.

## Relocation, Consolidation and IT Discovery Services

Data Center Consolidation and Relocation Services helps you discover your IT environment and develop alternatives, methods, risk profiles and expense estimates for relocating applications, data and IT equipment within data centers and/or from one data center to another. We define logical groupings of applications, data, and IT equipment to be relocated simultaneously, and create a project plan and timeline to accomplish the relocation.

## Modular Data Center Services

Modular Data Center Services helps achieve a leaner, more resilient and flexible infrastructure. This can bolster growth, deliver business value, and address risks and opportunities while allowing you to stay “always on” based on customer IT hardware requirements to meet the private cloud. Our portfolio encompasses planning, design, building, and connectivity for more cost effective, optimized data centers. We help you handle workloads from hybrid enterprises, improve your resiliency posture, and align with your business and operating objectives. We design and build data centers that are well protected from any physical intrusion through better management and support services.



### Features and Functionality

- Planning efficient capacity to ensure adequate space and power to balance supply and demand
- Deploying faster built-to-suits for data centers
- Designing efficient architecture to handle data movement, capture, and processing from IoTs and connected applications, and compute-intensive architecture to support big data and analytics
- Finding skilled resources to ensure that experienced personnel are leading the design and build
- Maintaining regulatory compliance to meet new norms for energy efficiency and IT management

### Scalable Modular Data Center

A modular data center complete with power, cooling modules, racks, and network devices. They are instrumented to facilitate rapid deployment that is cost effective, resilient, scalable and “always on.”

### Prefabricated Modular Data Center (PMDC)

PMDC is a fully-functional, factory-prefabricated and preassembled data center that provides high density and private cloud solutions. It is an open architecture solution (supports any manufacturers IT hardware), and can provide large, open raised floor environments as well as multiple rooms for infrastructure equipment, work rooms, staging areas, and more.

### Enterprise Modular Data Center (EMDC)

EMDC is a customized turnkey design and build data center solution on single-story or multi-story buildings.

Supports new technology

- 3x growth in density within each module
- Supports rack, mainframe and storage without separation
- Provides overhead or under-floor power and cooling options

Designed for flexibility

- Single- or multi-story designs adaptive to real estate
- Module size selection based on customer requirements
- Expands easily from one to multiple modules
- Installs in existing facilities

Promotes energy efficiency

- PUE starting at 1.2
- Right-size physical infrastructure to IT needs

Lowers lifecycle total cost of ownership

- May reduce capital costs
- May reduce operational costs

Provides available, predictable operations

- Designed to Kyndryl, UI or TIA reliability standards
- Target reliability by module
- Undisrupted operations during upgrades

### Benefits

- Flexible racking and power density options based upon your requirements
- Cloud-ready, and enables hybrid IT infrastructure
- Rapid deployment comes with plug and play models
- State-of-the-art DC health monitoring controls
- Enhanced data security with access controls and fire suppression systems
- Designs that can be placed anywhere, regardless of room, and which enable judicious use of real estate

## Cloud Resiliency IT and Application Discovery

Many organizations don't have a complete and accurate understanding of the business applications that reside on the server infrastructure or the dependencies between those applications. Traditional IT discovery methods employ outdated or manual processes that increase the cost and risk of migration, and fail to provide an accurate picture of the IT environment.

Kyndryl Cloud Resiliency IT and Application Discovery uses Analytics for Logical Dependency Mapping (ALDM)—a patented tool developed by IBM Research—as well as additional intellectual properties and methods to discover and map business applications to the IT environment. This helps us plan data center migrations from a business application perspective, and helps ensure that the DR environment is properly configured to support the required applications.

Deployment in the client's environment is inconspicuous—one of several factors that sets the technology apart. Other differentiators include obtaining fast and affordable results as well as quickly and easily deriving business value from complex and comprehensive workloads. Additionally, you can conduct standard queries for common migration requirements like, "All servers with a dependency on other servers" and handle user-defined queries for project-specific needs.

### Features

Application and IT Discovery Services can quickly discover your IT environment and produce the data and analysis required for many IT projects.

- Discovers server configurations and dependencies
- Discovers server and middleware clusters using powerful queries
- Helps gain business insight and value from increasingly complex and voluminous data
- Ingests client and third-party provided data
- Enables IBM Cloud and client premises deployment using Docker Container technology

The ADML portal is accessible by customers and provides secure file uploads and output downloads.

### Benefits

- Risk mitigation and cost control for consolidations and migrations
- Encrypted, security-rich communications
- User-created accounts with "challenge" and "response" passwords
- Bulk upload for tape archive (tar) files
- Downloads the most current scripts
- Downloads Kyndryl Resiliency IT and Application Discovery toolset outputs



## Why ALDM?

Current tools must be continually active to capture server dependencies, potentially increasing labor costs and degrading performance in the environment. These tools do not capture all the necessary information regarding applications running in the data center. Enterprise-level IT discovery tools require significant time to install, maintain and operate.

ALDM is unobtrusive in the IT infrastructure. It runs periodically with minimal overhead on servers and the network. It also delivers fast time to results, usually in four weeks or less.

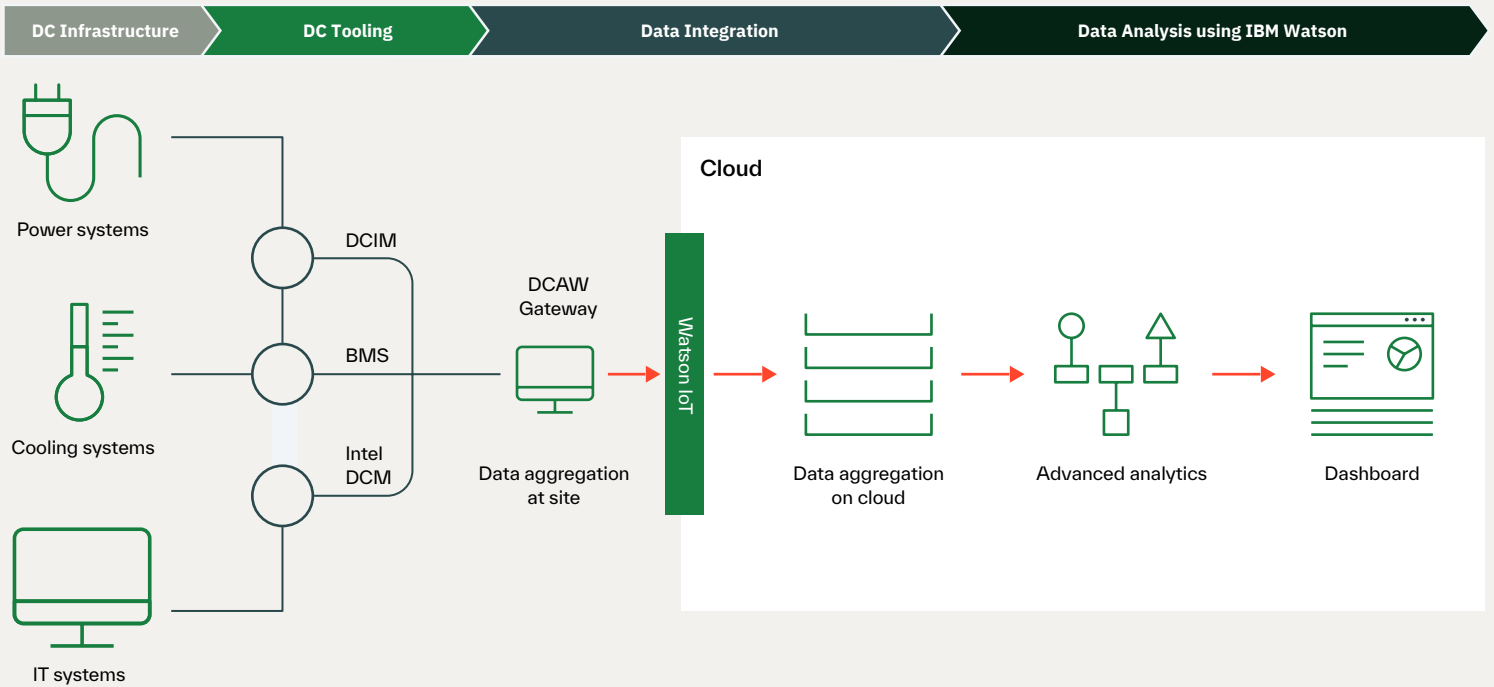


Figure 1: Data Center Advisor with Watson

**Data Center Advisor with Watson (DCAW)**

In this era of cloud, IoT, digital and social media, data centers have transformed from being cost centers to being nerve centers for today’s enterprise. As a result, managing data center operations is one of the key functions for enterprises worldwide. As data centers become more and more sophisticated, operations management complexity increases exponentially. A lack of skilled resources results in the inability to optimize equipment performance and manage capacities. This leads to bottlenecks in meeting availability, efficiency, and compliance goals. Conventional data center management tools are no longer sufficient.

To be operationally and economically viable, data centers must implement artificial intelligence (AI) and machine learning (ML). This is where **DCAW** can be a game changer.

**Data centers of the future—smarter with AI**

DCAW is an advanced analytics platform that uses AI and ML to optimize data center operations by:

- Aggregating the operational data of infrastructure endpoints from existing monitoring tools
- Analyzing the data using ML models
- Providing predictive operational insights

The solution can help organizations with data driven and AI enabled insights to make proactive choices for improving their data center infrastructure reliability, efficiency and drive down cost of operation. It also empowers data center operators with operational insights to reduce turnaround time.

**Features**

- Predictive analytics on failure and degraded performance
- Operational anomaly detection
- Prescriptive equipment maintenance
- Descriptive analytics on historical data

**Use case**

*Failure prediction and prescriptive maintenance*

DCAW includes deep learning models to predict blackout and brownout conditions. It predicts equipment failure or degraded performance, detects anomaly in equipment health and performance, and provides operational insights on condition-based equipment maintenance.

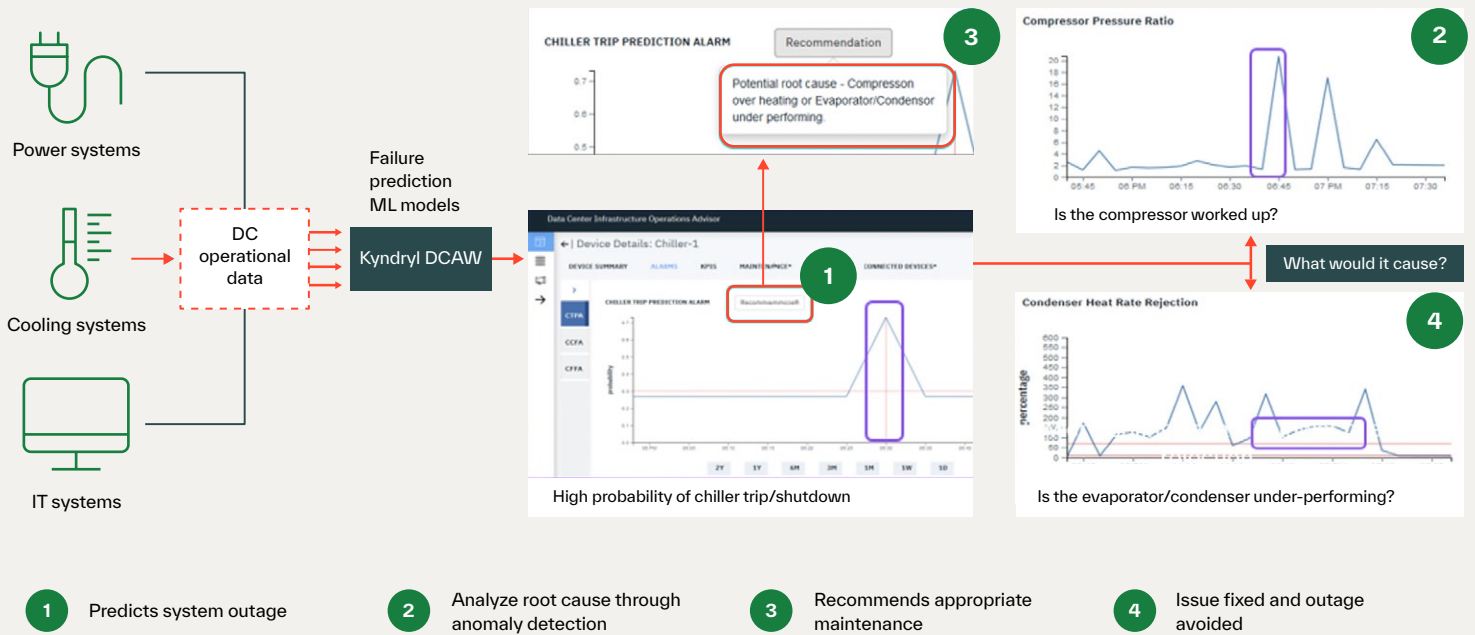


Figure 2: Data center energy optimization<sup>1</sup>

### Data center energy optimization

DCAW includes models to dynamically manage equipment set points to optimize energy consumption and reduce data center energy footprint. Models are available for HVAC components, line chillers, pumps, cooling towers, and computer room air handlers (CRAH).

### Improve reliability

- Prediction of blackout or brownout using AI improves data center reliability
- Root cause analysis through anomaly detection improves time to restore from outages

### Improve efficiency

- ML models on energy optimization reduce data center energy footprint
- Prescriptive maintenance for equipment improves operational efficiency

### Cost optimization

- Energy optimization reduces operating cost on power
- Prescriptive maintenance optimizes equipment maintenance cost
- Failure prediction minimizes cost of downtime

Figure 3: Typical energy usage in a data center<sup>1</sup>

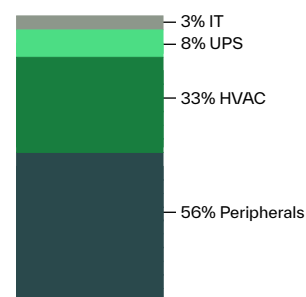


Figure 4: HVAC energy consumption break-down<sup>1</sup>

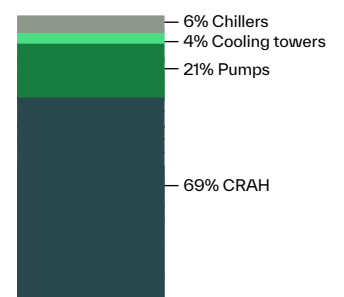
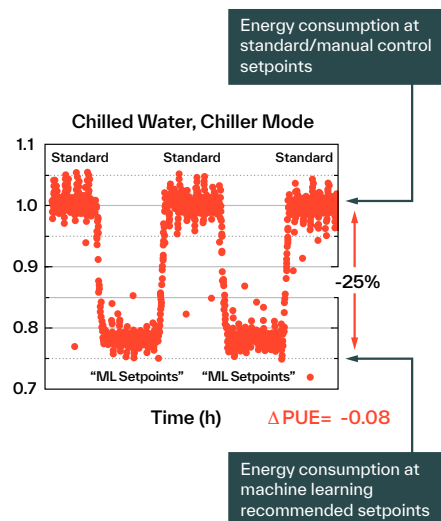


Figure 5: Normalized power-dissipation<sup>1</sup>



<sup>1</sup> For figures 2, 3, 4, and 5 the performance data and client examples cited are presented for illustrative purposes only. Actual performance results may vary depending on specific configurations and operating conditions.

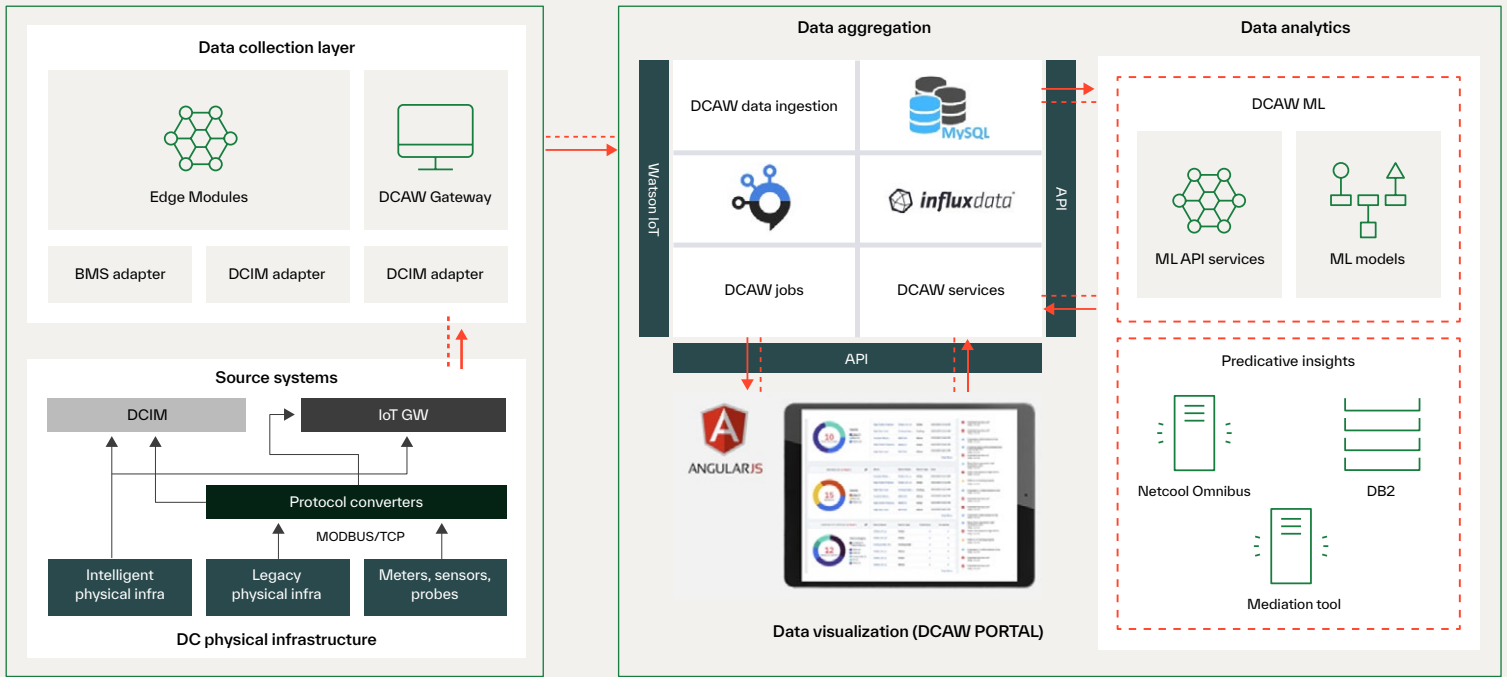


Figure 6: Solution architecture

### Solution architecture

The architecture for both the cloud and on-premises versions are composed of core platform services and application-level components to facilitate the processing needs across four major layers:

- The **Data Collection Layer** integrates with source systems and devices for data collection. It comprises a pluggable adapter-based framework that can connect with incumbent monitoring tools like Data Center Infrastructure Management (DCIM) and Building Management System (BMS).
- The **Data Aggregation Layer** uses IBM Watson IoT services to collect data on IBM Cloud. It securely stores raw data, events, and processed data in both relational and time series databases. Data from this layer is streamed into the analytics layer for real-time analytics.
- The **Analytics Layer** is the core of DCAW, where the data collected in the aggregation layer is used as input for various ML models to detect anomalies and to generate predictions. This layer provides data processing, analytics, anomaly detection and operational insights.
- The **Visualization Layer** consists of the DCAW portal where all the events (anomalies, predictions, and alerts) raised by the analytics layer can be visualized on dashboards and using various charts.

### Dashboard and reporting

DCAW includes a comprehensive dashboard that provides real-time information on all events (predictions, anomalies, early warnings, and operational insights) from both IT and the data center's facility infrastructure. The dashboard provides a 'single pane of glass' view of all data center sites within the organization from one console. The dashboard can be personalized based on job roles, and can be viewed on both computers and handheld devices.



Figure 7: Example of DCAW dashboard



## Why Kyndryl Data Center Services

Kyndryl Business Resiliency Services has decades of experience helping clients worldwide with their backup and recovery needs. Today, over 9,000 customers are protected by our disaster recovery and data management services, and we back up more than 3.5 exabytes of data annually and under our management. More than 300 Kyndryl Resiliency Centers in 60 countries around the globe provide managed disaster recovery and data protection, and over 6,000 global professionals are dedicated to resiliency.

Kyndryl has deep data center operations and maintenance expertise, and owns over 6.3 million square feet of data center space on 400 data centers worldwide. Our highly experienced site and facilities teams have strong design, engineering and project management capabilities, and we have global reach, with local partners in all geographies.

## Why Kyndryl?

Kyndryl has deep expertise in designing, running and managing the most modern, efficient and reliable technology infrastructure that the world depends on every day. We are deeply committed to advancing the critical infrastructure that powers human progress. We're building on our foundation of excellence by creating systems in new ways: bringing in the right partners, investing in our business, and working side-by-side with our customers to unlock potential.

## Ready to learn more?

To learn more about Kyndryl Data Center Services contact your Kyndryl representative or visit us at [kyndryl.com](https://www.kyndryl.com)



© Copyright IBM Corporation 2021

IBM Corporation  
New Orchard Road  
Armonk, NY 10504

Produced in the United States of America  
July 2021

IBM, the IBM logo, ibm.com, Kyndryl, the Kyndryl logo, kyndryl.com, IBM Cloud, IBM Research, IBM Watson, and Watson are trademarks of International Business Machines Corp., registered in many jurisdictions worldwide. Other product and service names might be trademarks of IBM or other companies. A current list of IBM trademarks is available on the web "Copyright and trademark information" at [ibm.com/legal/copytrade.shtml](https://www.ibm.com/legal/copytrade.shtml).

This document is current as of the initial date of publication and may be changed by IBM at any time. Not all offerings are available in every country in which IBM operates.

THE INFORMATION IN THIS DOCUMENT IS PROVIDED "AS IS" WITHOUT ANY WARRANTY, EXPRESS OR IMPLIED, INCLUDING WITHOUT ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND ANY WARRANTY OR CONDITION OF NON-INFRINGEMENT. IBM products are warranted according to the terms and conditions of the agreements under which they are provided.

The client is responsible for ensuring compliance with laws and regulations applicable to it. IBM does not provide legal advice or represent or warrant that its services or products will ensure that the client is in compliance with any law or regulation.

Statement of Good Security Practices: IT system security involves protecting systems and information through prevention, detection and response to improper access from within and outside your enterprise. Improper access can result in information being altered, destroyed, misappropriated or misused or can result in damage to or misuse of your systems, including for use in attacks on others. No IT system or product should be considered completely secure and no single product, service or security measure can be completely effective in preventing improper use or access. IBM systems, products and services are designed to be part of a lawful, comprehensive security approach, which will necessarily involve additional operational procedures, and may require other systems, products or services to be most effective. IBM DOES NOT WARRANT THAT ANY SYSTEMS, PRODUCTS OR SERVICES ARE IMMUNE FROM, OR WILL MAKE YOUR ENTERPRISE IMMUNE FROM, THE MALICIOUS OR ILLEGAL CONDUCT OF ANY PARTY.