



# BIFM Award Submission

## Innovation in the Use of Technology and Systems

### Requirement and Business Case

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Today, corporate real estate and facilities management organizations have at their fingertips an abundance of transactional information from which to make decisions. These decisions affect every aspect of business, from human resources to information technology, and facilities management is no exception. Typically this information is asset and infrastructure-based and sits in disparate systems.

In order to increase productivity and reduce computing efforts and costs, the International Monetary Fund (IMF or the Fund) must prepare itself with upgraded technology to transform the method of managing information. Significant progress must be made to centralize, integrate and aggregate this data through data warehousing, thereby allowing faster decision making, the creation of new ideas and strategies, and access to vast amounts of data about a building's energy use and efficiency.

As a background to the search for a solution of isolated data, there are several internal drivers, including the facilities management contract, a management directive to reduce energy consumption, IMF Headquarters 1 (HQ1) renewal program, as well as an FMD reorganization and the resulting quest to process streamlining and the elimination of manual processes. To differing degrees, these

issues address key operational considerations related to complexity, cost, criticality and comfort.

The IMF facilities management goals are to:

- Ensure that the buildings (HQ1 and 2) meet organizational requirements
- Ensure that the building's assets allow the facility to operating according to specifications
- Ensure that the building's assets are operating properly, using the appropriate energy sources, which alternate between electric and gas
- Monitor the environmental conditions and gauge the impact within which the building assets are performing
- Monitor the productivity and comfort of the building's occupants
- Monitor the operational and capital budgets that are impacted by the aforementioned performance
- *Identify and gain insight, and therefore control, over these multiple variables that are most influential in managing a facility and, therefore, facilitate the mission of the IMF*

These objectives can be met using Data\$mart FM, which align with all of FMD's mission elements.

# Data Warehousing: Is it innovative?

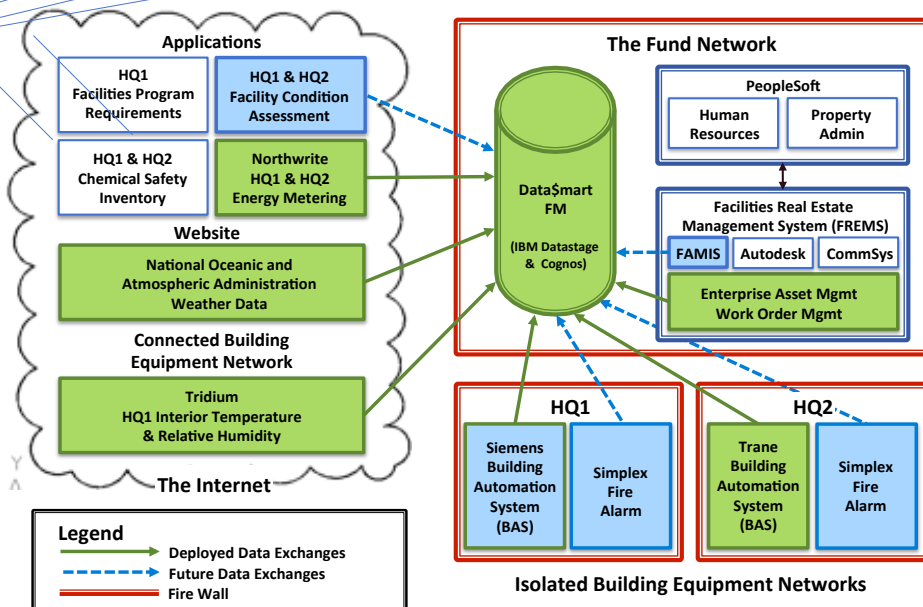
Traditionally, data warehousing focuses on data storage, in which the main source is cleaned, transformed, catalogued and made available for use by facility managers and other members of the FMD for data mining, analytical processing and market research. Data\$mart FM's creation was a multi-step process involving a great amount of analysis. First, we identified the systems and data sources; then defined which assets were worth tracking. With over 100,000 potential assets, it was a daunting task, but we identified approximately 1,500 assets in HQ1/HQ2 that met the criteria of having a relatively high asset value, a significant operational and/or maintenance cost; or the potential for greatest impact on staff.

We then defined which operational parameters would be tracked, including chiller water temp, energy consumption, etc. We determined the frequency at which the data would be measured, with the exception of degree days (monthly), base MBTU (annual). Then, we determined the way to reassemble the data for engineers to use, using IBM Datastage and Cognos through which we use Analysis Studio to assemble the data into analytical cubes. The graphic below displays the sheer complexity of this effort and the aggregation of so many types of data into Data\$mart FM.

Through this method, the IMF is not only able to view and evaluate data in one location, but facilities managers become efficient stewards of the Fund's assets, able to streamline processes,

enhance the customer experience and facilitate the Fund's mission. In addition to mining and cataloguing data, the IMF FMD now has the ability to rent and tune building equipment, achieve reductions in energy consumption; achieve a lower cost of scheduled maintenance; improve indoor climate monitoring to improve workplace comfort and proactively avert system failures that could disrupt staff.

Facilities data was collected from several sources and aggregated into one Data\$mart FM data repository





# Implementation of Data Warehousing at IMF

The IMF has been implementing DataSmart warehousing since September 2012, allowing facilities managers to gather, correlate and interpret data more efficiently than ever before.

Engineers and facilities management personnel are responsible for a plethora of equipment maintenance at the IMF. Work Order data, collected via data warehousing, provides performance data (data warehouse data), predictive analysis (eddy current, vibration analysis, oil analysis, MCE testing), maintenance history (INFOR and data warehouse) and observations made in the field to adjust the maintenance program for each major piece of equipment to achieve the best value for the actual condition.

Other types of performance data include:

- HQ1 building space temperature and humidity analysis
- HQ2 energy demand correlated with indoor temperature at morning start-up
- Data center power monitoring
- HQ2 lighting schedule adjustments study
- Chiller demand correlated with water consumption (cooling tower efficiency)
- Year-over-year comparison of energy consumption

## *Cost Savings*

Equipment Performance: Correlating energy consumption data with operational performance

data identifies performance anomalies and enables engineers to take corrective action.

## *Energy Consumption*

Correlating energy consumption data with equipment operational specifications identifies inefficiencies and enables engineers to take corrective action.

## *Staff Satisfaction*

Interior Comfort: Correlating equipment operational setting changes with building interior temperature, humidity and environmental conditions enables engineers to monitor such changes and ensure staff comfort.

## **HQ1 Renewal**

### *Asset Management*

Importing new HQ1 equipment into DataSmart FM enables building engineers to monitor equipment performance as soon as it is installed, test and tune equipment more effectively, and identify equipment warranty issues.

Automated aggregation has led to increased fine tuning to reduce energy consumption.

Reliability has improved through the use of near real-time monitoring with a more user-friendly interface.

# Measurement of Data Warehousing Success and Application in General Facilities Management

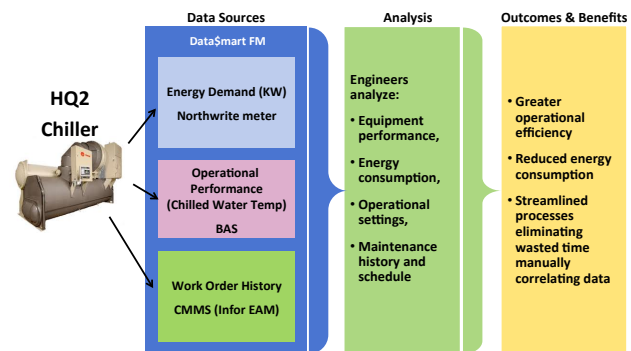
## Data Warehousing and Chiller Performance

Since the implementation of data warehousing at IMF, engineering and facilities management personnel have been able to collect data and collaborate with one another dramatically faster than before, making decisions regarding, for instance, chiller performance. Chillers are the single largest energy-using components in most buildings, and can typically consume over 50% of the electrical usage. An inefficient chiller may not only negatively impact the temperature of a building and its occupants, but also cost the IMF hundreds of thousands of dollars in energy annually.

It is the responsibility of engineers and facilities management personnel to ensure that the HQ2 chiller maintains a certain temperature in order to regulate the temperature of the building and its occupants. The first step in maximizing chiller efficiency is to establish a method for recording and reviewing chiller operational data, best served through the use of data warehousing. The chiller temperature must be checked at least once daily to evaluate the chiller’s performance. Through DataSmart, FM

personnel can do more than simply check the chiller temperature; they are able to analyze equipment performance, energy consumption, the chiller’s operational settings, maintenance history and schedule. (See the figure below.)

Chiller Performance Analysis and Tuning



Engineers and facilities management personnel are easily able to draw conclusions as a result of their findings, determining the performance of an asset compared to its work history. Through this simple use of data warehousing, FM becomes more efficient, is able to identify the root cause of a problem, perform fault detection and correction, and optimize a critical facility resource.