The Finance Information Factory

Towards a Rational Information Management Architecture for the Finance Function in Banks

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Executive Summary

This paper considers the issues associated with the current general ledger-centric and incoherent information management architectures in the finance function in banks. It also considers alternative architectures that make greater use of banks' investments in data warehousing and the advantages and disadvantages of each approach.

Introduction

In William Thompson's *Dictionary of Banking*, published in 1919, he describes the principal function of a general ledger and emphasizes the variety of forms it may take:

> **"However many books may be in use or on whatever system they may be worked, they are all brought together in the general ledger. The accounts which are found in a general ledger vary according to the bank, the system, and the amount of sub-division which is considered necessary."**

Notwithstanding this variety, in 1919, the general ledger (G/L) had a relatively simple function, to facilitate reconciliation between different accounting ledgers and to present a consolidated view of the bank's financial accounts.

When banks first computerized their ledgers in the 1960s, they often included a G/L within their customer accounting systems by simply assigning the G/L a discrete range of account numbers. Over the past 20 years, most banks have moved to separate G/L systems that are increasingly part of broader Enterprise Resource Planning (ERP) systems covering a wide range of financial functions. In addition, as banking groups have expanded to include units operating different general ledgers, separate consolidation systems have been put in place to undertake group consolidations.

Computerization and growing demands for information have led to a considerable increase in the complexity of banks' general ledgers as they struggle to provide multi-dimensional views of financial data and to enable users to drill down to lower levels of detail. The ability of the G/L to meet these needs is, however, always constrained by the essentially summarized nature of the data that it holds. The introduction of additional dimensions

creates exponential increases in the data that need to be stored in the G/L and the processing they need to undertake. It also increases significantly the management effort required for developing and maintaining the system.

The growth of demands for multi-dimensional views of financial data and drill-down facilities was one of the reasons why many banks developed data warehouses starting in the late 1980s. By storing data at a granular account and transaction level, banks were able to get underneath the high-level summarized figures in their G/L to meet emerging internal and external reporting requirements and to explain variances in the high-level figures.

Two Worlds – General Ledger and Data Warehouse

While the development of data warehouses running alongside banks' general ledgers provided at least a partial solution to banks' immediate problems, this has also created a polarized situation that has troubled banks for a generation.

The fact that the G/L and the data warehouse are usually fed from different data feeds that were built at different times and where maintenance has not been synchronized has meant there are often serious discrepancies among the source data for each system.

The fact that the process for summarizing granular data up to G/L account level is often incorporated in complex interfaces between the G/L and the banks' operational systems that have themselves been subject to multiple changes over many years, leads to a lack of transparency that would make reconciliation between the G/L and the data warehouse very difficult; even if there were no discrepancies in the underlying data.

Finally, the fact that manual adjustment entries are often passed to the G/L, but are not reflected in the data warehouse, means that the two worlds, which start off apart, diverge still further over time.

An additional aspect of this polarization is the fact that the bank must maintain two separate skill sets for what is essentially the same data analysis and reporting function. The finance function naturally develops skills in using the specific data analysis tools that are provided with the G/L, whereas the users of the data warehouse develop expertise in the use of the bank's standard business intelligence tool. In some cases, staff members must develop skills in both tool sets.

Just When You Thought It Couldn't Get Any Worse...

The problem described so far would be bad enough on its own. However, banks' finance departments also have to undertake a number of additional tasks that further complicate the situation. There are a number of calculations that are required for financial accounting and regulatory reporting purposes that are not automatically included within the banks' operational systems as they are not reported to the customer. These analytical calculations include interest and commission accrual calculations, average balance calculations, amortization, funds transfer pricing calculations, embedded option valuations, fair value calculations, amortized cost calculations, and risk weighted asset (RWA) calculations. In addition to these financial accounting and regulatory calculations, there is also a range of analytical calculations required for internal management accounting purposes such as those associated with customer value and product and channel profitability.

In most banks, these calculations are undertaken in an incoherent way in a variety of places. Sometimes they are embedded in customer accounting systems, sometimes in separate finance operational systems, sometimes in the interfaces between the operational systems and the G/L, sometimes in the data warehouse, and sometimes in the G/L itself. Sometimes these calculations are undertaken at a granular account or customer level and sometimes at a summarized level. In most cases, the approach taken does not meet the key requirements for this type of calculation, namely flexibility, transparency, auditability, granularity, and performance.

Where some of these calculations have been incorporated into the G/L, it has often resulted in a significant increase in complexity. In some cases, such as Basel II calculations and IFRS, additional data stores have had to be built onto the G/L in recognition of the fact that the G/L does not traditionally hold the range of data required for these calculations.

Polarization between the G/L and the data warehouse and the incoherence of banks' approach to analytical calculations have had a seriously detrimental effect on the efficiency of banks' finance processes and a knock-on effect on many other areas in the bank:

Data Warehousing Comes of Age

One of the main reasons for banks' continuing reliance on general ledgers has been the overriding requirement for financial accounting and reporting to be undertaken in an environment that reflects its importance to the bank. This business criticality has demanded a level of robustness that can, it has generally been assumed, only be delivered in an operational environment such as a G/L. The data warehouse however, with its origins in ad-hoc decision support and with its known issues regarding data comparability with the G/L, has not been regarded as sufficiently operational to take on this role.

While this argument was undoubtedly true in the past and remains true for some data warehouses even today, it is rapidly being overturned by developments in data warehouse technology and by data warehousing governance practices in banks themselves. Over the past decade, data warehouses have increasingly moved into the operational domain as they provide support for operational functions that need the range of data and analysis that only a data warehouse can provide.

To support these new operational requirements, data warehouse vendors have developed advanced business continuity capabilities and comprehensive system management solutions that together ensure that data warehouse services are always available at the time they are needed.

The banks themselves, now with many years' experience of developing and running data warehouses behind them, have achieved advanced levels of data warehouse governance that cover a broad range of areas including data quality, master data management, metadata, user access, and development priorities. The deployment of application neutral 3NF data models has also become more widespread and has helped to produce data warehouses that are both more integrated and more stable over time.

Perhaps most importantly, the finance function in many banks have themselves had practical experience of using the data warehouse over many years and have demonstrated its ability to support their needs. In many banks, the analysis required to support many of the notes to their accounts, which become more voluminous by the year, is supported by the data warehouse. Increasingly internal management accounting analytical calculations, such as customer and product profitability, are being run on the data warehouse.

It is not surprising, therefore, that the CFOs in many banks around the world are now considering how to extend the data warehouse even further into the area currently occupied by the G/L and other financial systems.

Moving Towards the Finance Information Factory

There can be many drivers that lead a bank to review its information management architecture in the finance area. Often the continuing pressure to reduce costs or to meet new requirements cost effectively is sufficient. In many banks, however, change is driven by a major change in operational systems often caused by a recent takeover by a larger institution or by the need to reduce reliance on legacy systems – such changes usually highlight the cost and inflexibility of the current approach. The need to review G/L provisions for reasons of cost or where older systems are no longer supported can also drive change.

The roadmap adopted by CFOs looking to migrate from a polarized, fragmented architecture to a more rational and efficient *Finance Information Factory* is often influenced by where they are coming from and how quickly they wish to achieve their vision.

The Finance Information Factory

In developing a plan for moving towards the Finance Information Factory, we need to consider the processes that are most amenable to change. There are three main areas:

G/L account attribution

> This is usually undertaken outside the G/L and suffers from inflexibility and lack of transparency and is highly amenable to rationalization and consolidation.

Analytical calculations

> These are usually undertaken in multiple locations on an inconsistent and suboptimal basis.

Reporting

> This is a function that is common across business areas and is, therefore, amenable to a standard approach across the bank.

The first step in establishing a vision for the finance function is to identify where these elements are currently undertaken. Figure 1 indicates the current situation typically found in banks that operate a *fat G/L*.

There are three main approaches to moving away from this fat G/L approach

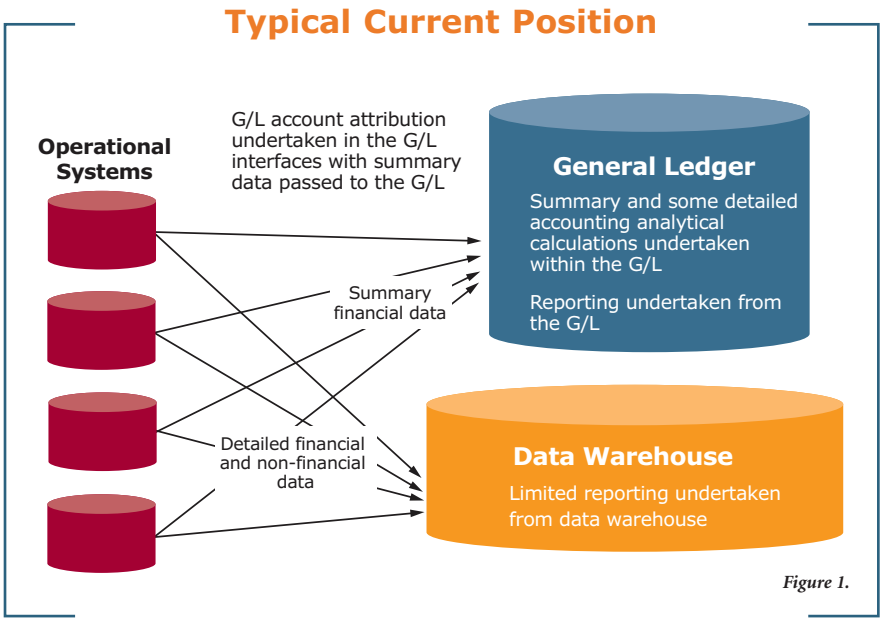

Figure 1.

with its associated problems that have been discussed earlier, each with its advantages and disadvantages:

> The Extract, Transform, Load approach

> The accounting hub approach

> The data warehouse approach

The Extract, Transform, Load Approach

The Extract, Transform, and Load (ETL) approach involves developing an Extract, Transform, and Load process that uses an ETL tool to create synchronized data feeds for both the data warehouse and the G/L.

This layer applies the same logic for attributing G/L account codes to account balances and transactions at both the granular level for the data warehouse and at a summary level for the G/L.

The ETL layer can also be used for some analytical calculations.

Now that the base data in both the data warehouse and the G/L are comparable and can be reconciled, and providing that the manual entries issue is addressed, the bulk of reporting can be transferred to the data warehouse.

The Finance Information Factory

Assessment of ETL Approach

Pros

> Granular financial data in the data warehouse will reconcile to summary data in the G/L.

> Provides drill-down into the data warehouse from summary level G/L to detailed data.

> Creates a *thin G/L* that is easy to manage.

> Meets the bulk of reporting needs from the data warehouse which is intrinsically highly flexible.

> Can reuse existing ETL environment.

Cons

> Requires complex ETL (particularly for analytical calculations such as accruals) that may be difficult to manage.

The Accounting Hub Approach

The accounting hub approach involves the creation of a separate platform for undertaking G/L account attribution to granular data, some analytical calculations, and the summarization of data to feed the G/L.

The platform for the accounting hub may either be an extension of the bank's operational system environment or a third-party packaged application on an appropriate platform.

As with the ETL approach, now that the base data in both the data warehouse and the G/L are comparable and can be reconciled, and providing that the manual entries issue is addressed, the bulk of reporting can be transferred to the data warehouse.

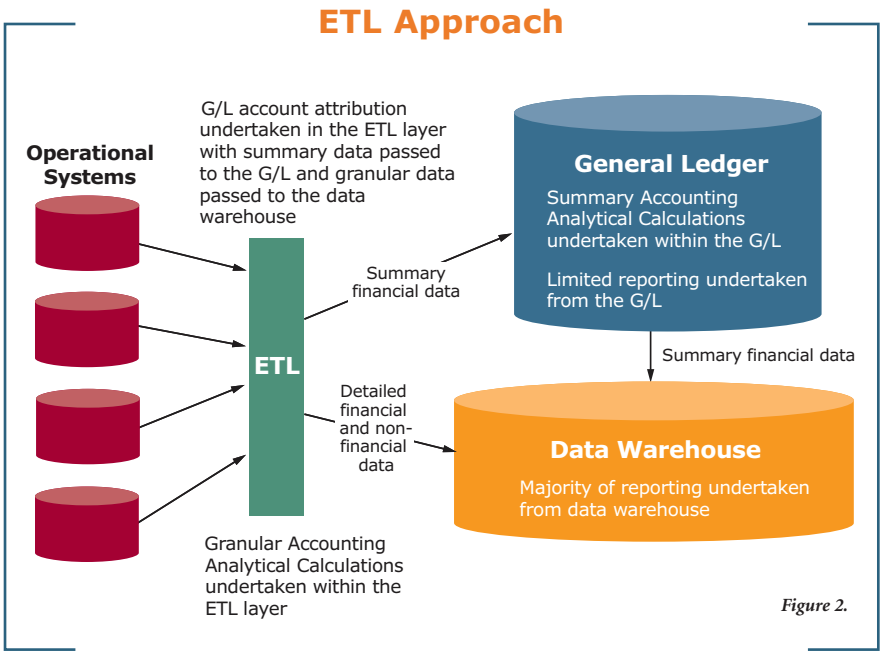

Figure 2.

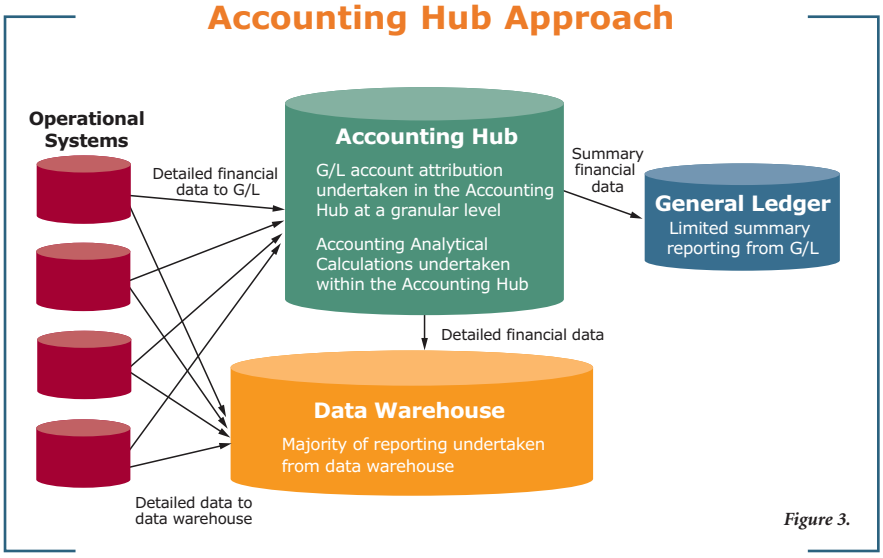

Figure 3.

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Assessment of Accounting Hub Approach

Pros

> Granular financial data in the data warehouse will reconcile to summary data in the G/L.

> Provides drill-down in data warehouse from summary level G/L to detailed data.

> Creates a *thin G/L* that is easy to manage.

> Meets the bulk of reporting needs from the data warehouse which is intrinsically highly flexible.

Cons

> Requires multiple feeds – from Systems of Record (SORs) to Accounting Hub (AH), SORs to data warehouse (DW), AH to G/L, and AH to data warehouse.

> Requires a separate platform and application for the accounting hub.

The Data Warehouse Approach

The data warehouse approach involves a single feed of granular data from each operational system into the data warehouse. Once loaded, the G/L account attribution process, any analytical calculation processes, and the G/L summarization process can be undertaken in situ. This avoids further data movement and allows these processes to be undertaken in a consistent fashion that provides the necessary flexibility, user control, transparency, auditability, and speed of processing.

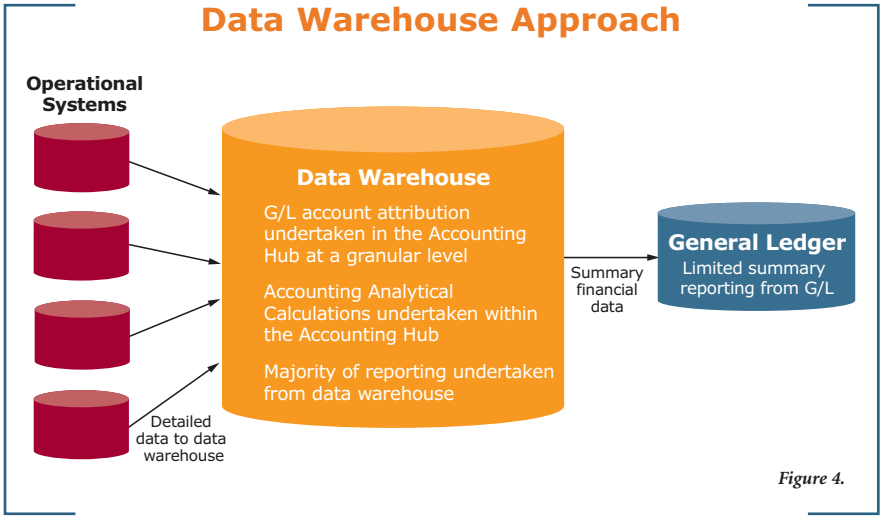

Figure 4.

Assuming the manual entries issue has been addressed, maximum use can be made of the standard data warehouse reporting capabilities if both detailed and summary data are available on the data warehouse.

Assessment of Data Warehouse Approach

Pros

> Granular financial data in the data warehouse will reconcile to summary data in the G/L.

> Provides drill-down into the data warehouse from summary level G/L to detailed data.

> Creates a *thin G/L* that is easy to manage.

> Meets the bulk of reporting needs from the data warehouse which is intrinsically highly flexible.

> Analytical calculations can be consolidated and brought into user space for maximum flexibility.

> Exploits investment in data warehouse infrastructure, and creates true single source of data thereby minimizing data movement, latency, and redundancy.

Cons

> Requires a robust and operational data warehouse environment.

> Examples of this approach are relatively rare and generally not comprehensive at the present time.

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Summary

As the analysis in this white paper indicates, examples of the ultimate vision of the Finance Information Factory where the three main finance processes – G/L account attribution, analytical calculations, and reporting – are undertaken entirely within the bank's data warehouse environment are few. Examples of banks that are currently investigating the feasibility of such an approach are relatively common.

There are two main inhibitors to developments in this area:

First, the absence of examples is itself a major inhibitor in an industry that is not noted for its willingness to adopt new and untried approaches. It is likely that this conservatism will lead to a tidal wave of similar developments once a few adventurous banks take the plunge. It may be that the first examples appear outside the banking industry – a major telecommunications company has already announced that it is feeding its G/L from its data warehouse.

The second inhibitor is the *Catch 22* situation that exists whereby the banks most familiar with the capabilities of data warehousing, and, therefore best placed to apply this technology to the finance area, are also those that have legacy-type data warehouse environments. These banks typically need more development in both technology and governance terms to create an operationally robust environment that can meet the needs of finance than those in green-field sites.

For these reasons, it may be that the ETL approach and the accounting hub approach will be adopted more frequently in the short term as stepping stones on the path to the full Finance Information Factory based on a data warehouse.

About the Author

Simon Doherty leads Teradata Corporation's Europe/Middle East/Africa area's Finance Industry Centre of Expertise. He joined Teradata in 1997, having worked for NatWest Bank in the U.K. for 18 years where he had a range of operational, planning, and financial roles. His last role was as CFO and Chief Operating Officer for the Bank's International Trade and Banking Services Division.

Since joining Teradata Corporation, Simon has worked as a business consultant specializing in the finance and risk areas and has undertaken engagements at a large number of banks across Europe and the Middle East. He has also been involved in the design and deployment of Teradata Value Analyzer, Teradata's customer value solution, and has been closely involved in the development and roll-out of Teradata's risk management and Basel II solution offerings.

Simon is a member of the Chartered Institute of Bankers and a Fellow of the Chartered Association of Certified Accountants.

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