

# FINsights

Technology Insights for the Financial Services Industry

Governance, Risk and Compliance »



Infosys®

POWERED BY INTELLECT  
DRIVEN BY VALUES.

# Contents

## From the Editors Desk

Strategic themes in Risk and Compliance .....	02
<i>Ashok Vemuri</i>	
Red light, green light – playing the risk game .....	06
<i>Adam D. Honore</i>	
Sub-prime crisis and credit risk measurement: lessons learnt.....	11
<i>Thadi Murali, Srividhya Muralikrishnan and Balaji Yellavalli</i>	
Credit risk management: back to basics .....	17
<i>Godwin George, Arup Sinha and Thadi Murali</i>	
Risk Measurement: It's all about data, data and master data.....	24
<i>Anita Stephen, Sabitha Vuppula and Abhijit Ghosh</i>	
Raising the bar: Executive risk reporting using fractal maps.....	29
<i>Raghu Anantharam and Shriram Subramanian</i>	
Navigating through the compliance maze in a post-merger world.....	33
<i>Debashis Pradhan and Naveen Balawat</i>	
Managing the problem within - Employee Surveillance.....	39
<i>Anand Bhushan, Debodeb Datta and Rajesh Menon</i>	
Addressing the partial compliance trap in the wealth management industry.....	45
<i>Bob Skea and Vikesh Gupta</i>	
Demystifying financial compliance through an integrated IT framework .....	50
<i>Ravishankar N and Ramachandran Sundaresan</i>	
Integrated Controls Management– a cost effective approach to implementing GRC..	55
<i>Uttam Purushottam, Satnam Gill and Ashwin Roongta</i>	
Conversations with Tim Leech – Perspectives from an industry expert.....	61
<i>Q &amp; A session conducted by Satnam Gill</i>	
Leveraging SaaS to manage GRC.....	66
<i>Ravi U. and Vishakha C.</i>	
Case study – Information Risk Management: A mandatory need .....	71
<i>Amar Bawagi and Viswananath Shenoy</i>	

## From the Editors Desk

We are delighted to present the second issue of the Infosys Banking and Capital Markets journal FINsights. The spotlight in this issue is on Governance, Risk and Compliance and the compilation of articles reflect perspectives on risk and its measurement, governance, the compliance conundrum and our take on the priorities in risk and compliance and their technology implications in the coming years.

The increased incidence of failures in the financial services marketplace over the past decade has given visibility to the science (and art) of understanding and measuring risk in running a business, making strategic and tactical decisions and participating in markets and economies that are increasingly linked in a flattening world. A recent such event, covered in one of the articles, has been the sub-prime crisis and the unforeseen ripple effects in markets in distant parts of the world.

As always we have tried to reflect in these articles the unique value that Infosys brings to its clients through a combination of deep domain understanding, technology best practices and global sourcing expertise. The article on sub-prime crisis reflects the current challenges in credit risk measurement and brings a perspective that combines credit risk measurement approaches with a global knowledge process outsourcing (KPO) option.

Risk and compliance is a multi faceted animal and the focus in the past few years has been on giving it a holistic view through a unified Governance, Risk and Compliance (GRC) program. The articles featured on GRC explore integrated controls to implement GRC, use of SaaS in GRC and industry perspectives on GRC and the road ahead. In the area of compliance, the articles look at addressing compliance challenges, an aspect of internal compliance namely employee surveillance and the partial compliance challenge in the wealth management industry. Our articles on risk address credit risk management, the role of master data in risk measurement and risk reporting. Included in this issue is also a case study highlighting the importance of Information Risk Management (IRM).

We would like to thank all the authors from Infosys as well as external contributors - Adam D. Honoré from Aite Group, Tim Leech from Navigant Consulting and Bob Skea of Northstar Systems. As always, we look forward to your queries or comments on Governance, Risk and Compliance or any feedback and suggestions in making FINsights a more relevant and topical journal.

Happy reading and all the best for the new year 2008!

**Balaji Yellavalli and Sudhir Singh**  
*Editors*

## FINsights Editorial Board

### **Balaji Yellavalli**

*Associate Vice President  
Banking & Capital Markets Group*

### **Edward L Smith**

*Associate Vice President  
Banking & Capital Markets Group*

### **Jonathan Stauber**

*Vice President  
Banking & Capital Markets Group*

### **Lars Skari**

*Practice Leader  
Infosys Consulting*

### **Thadi Murali**

*Senior Principal  
Banking & Capital Markets Group*

### **Mohit Joshi**

*Global Head of Sales  
Banking & Capital Markets Group*

### **Pankaj Kulkarni**

*Senior Engagement Manager  
Banking & Capital Markets Group*

### **Roopa Bhandarkar**

*Senior Engagement Manager  
Banking & Capital Markets Group*

### **Sudhir Singh**

*Associate Vice President  
Banking & Capital Markets Group*

# FINsights

Technology Insights for the Financial Services Industry



## Raising the bar: Executive risk reporting using fractal maps

The business models of trading firms depend on effective market risk management which, in turn, is based on timeliness and accuracy of market risk numbers. Very often companies either don't know exactly what risks they face or they are not able to zero-in on the risks to be addressed on priority. Typically, risk numbers are calculated on an end-of-day basis and reported in a fairly static format. For an executive dealing with thousands of positions and portfolio going through these reports could be laborious and time consuming. However, there are some emerging trends in visually enhancing risk reporting technology to easily slice and dice risk numbers on a real time basis. This paper highlights the usage of fractal maps for analyzing and disaggregating risk numbers.

Raghu Anantharam  
Principal  
Infosys Technologies Limited

Shriram Subramanian  
Senior Principal  
Infosys Technologies Limited

## Issues with conventional risk reporting

Risk metrics need to be monitored and managed properly; else reports would be of little value. Time and again companies have had to write off large losses due to ineffective monitoring of risk. The timeliness of risk reporting depends on whether it is done at a desk level of positions by a trader or at an enterprise-wide level by the risk management group. Enterprise-wide risk management is typically done on an end-of-day basis, while traders monitor risk of their positions on a real-time basis. A typical end-of-day report may look like the one in Fig 1, where it shows the long and short positions and the Monte Carlo Value-at-Risk (VaRs) disaggregated by the Security Type, the Sector and the Country.

## How fractal maps can save time and effort

A good risk reporting system should have the capability to highlight the relevant risk metrics like limits, utilization and canned stress testing scenario indicators to various stakeholders like senior management, front office, risk managers, finance, back office and regulators. The risk metrics should be presented with high-impact visualization at multiple aggregation levels - group, business units, trading units and books or by product lines, geographies with sufficient drill down capabilities. Such systems must also be flexible to interact with disparate systems and file types for importing and exporting risk metrics, providing sufficient leeway for

**Example showing disaggregating of risk metrics**

Monte Carlo Value-at-Risk, 1-Day, 95% Confidence Interval, 3-year history

VaR by Security Type	MV Total	Expected Shortfall	VaR	Marginal	Incremental	Equity	Rates	Volatility	Commodity	FX
Equities	13.44	0.69	0.40	0.10	0.54	0.55				0.33
ADR	4.15	0.06	0.05	-0.02	0.00	0.05				
CMN	-1.27	0.69	0.55	0.37	0.50	0.55				0.03
Fund	10.56	0.19	0.15	0.00	0.04	0.15				
Others	0.00	0.00	0.00							
Options	-0.20	0.03	0.08	0.01	-0.03	0.08	0.02	0.15		
Futures	-0.07	0.08	0.06	-0.04	0.02	0.06				

VaR by Security Type	MV Total	Expected Shortfall	VaR	Marginal	Incremental	Equity	Rates	Volatility	Commodity	FX
Communications	-0.03	0.24	0.19	0.02	0.06	0.20				0.01
Industrial	10.56	0.19	0.15	0.00	0.04	0.15				
Technology	2.56	0.00	0.06	0.01	0.02	0.06				
Media	-2.96	0.10	0.16	-0.04	-0.03	0.16				0.01
Healthcare	6.76	0.59	0.49	0.25	0.42	0.49				

VaR by Security Type	MV Total	Expected Shortfall	VaR	Marginal	Incremental	Equity	Rates	Volatility	Commodity	FX
US	15.00	0.13	0.10	0.01	0.05	0.10				
UK	3.96	0.11	0.09	-0.02	0.00	0.01				
KR	-1.56	0.05	0.05	0.02	0.01	0.04				0.02
IN	2.50	0.66	0.52	0.39	0.47	0.50				0.05

Fig 1: Example showing disaggregating of risk metrics

The issues with such reports are:

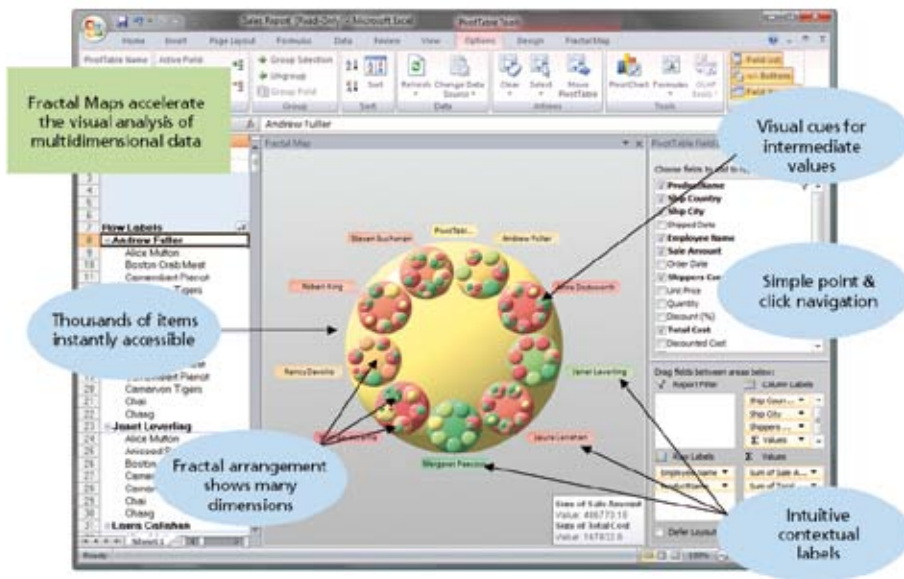
- Laborious and complex to prepare - Preparation of these reports can be time consuming, involving multiple departments and multiple people.
- Time consuming and difficult to understand - These reports require senior management to spend considerable time and effort to understand and decipher them effectively.
- Difficult to drill down or consolidate - These reports are fairly static in nature making further consolidation or drilling down on any specific area or number difficult.

user interactivity and ensuring user level security and audit trails.

Senior management, desk heads and risk management groups would be keen to have dynamic, up-to-the minute risk figures which is graphical in nature and where it is easy to slice-and-dice the risk numbers. Fractal map is one such tool in analyzing risk reports. Fractal Maps are versatile tools for visibility enhancement in risk reporting that help in combining recent advances in interactive information visualization research with business intelligence functionality. They are particularly useful in contexts of very large datasets and real-time data feeds. These tools can help in spotting hidden patterns and identifying potential problems and opportunities that would otherwise go unnoticed. They also support effective and timely decision making and make it easy to

synthesize, present and share results with stakeholders. Unlike common spreadsheets and pivot tables these technologies instantly appeal to human curiosity and perceptive ability. The size and color of objects is easier

arrangement also means that placing the cursor over the centre of a circle, multiple labels can be shown at any instant and hence the items within can be read very quickly.



to understand than simple representation in numbers. Important values can be spotted instantly.

Fractal Maps are a big leap in terms of visualization capability compared to other risk reporting formats like Heat Maps and Tree Maps. While Heat Maps and Tree Maps display one or two structural dimensions, Fractal Maps can be modeled to show all relevant dimensions. Also, Heat Maps and Tree Maps often fall short when visualizing the structure of the tree while Fractal Maps present a very intuitive navigation through the hierarchies. Fractal Maps are useful for large data sets which are not necessarily hierarchical in nature. They are layouts combined with color-coding and other visual cues providing an instant view of data, both overview and detail. Reactive labels and click-and-drill interaction make investigation and navigation through the data effortless and effective.

Fractal Maps provide a unique degree of dimensional information. One can drill through several levels of the data structure, understanding how sub-sectors nest within sectors, within indices and within regions. This sort of understanding is relevant in market risk and other financial markets applications because of the various ways in which risk exposure needs to be understood.

The fractal arrangement of circles around the periphery of other circles enables multiple structural dimensional views and also leaves space at each level to convey exact summary information about that level. Peripheral

Fig 2: Fractal maps help in easy analysis

In the above map shown in Fig 2, the desk level access, the color coding, the layout of the reports, the size of the circles etc. can be changed. Each of the smaller circles within the large circle can be configured to denote a desk and each of the smaller circles within the desk can be a portfolio or position. The size of the circles indicates the portfolio or position size, while the coloring indicates the profit or loss on that position. One can zoom in and out of any of the circles to find out the constitution of a desk or portfolio.

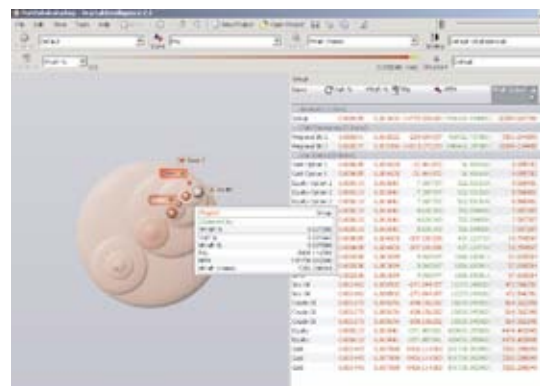


Fig 3: A typical portfolio using Fractal maps (Source: Fractal: Edge®, a popular tool for Fractal maps)

In Fig 3, the metrics in value terms are listed in numbers across various classifications. The left hand pane shows the visual impact of the numbers listed on the right hand pane. One can spot the circles or sub-portfolios and the

relative sizes of circles with respect to that of the overall circle or portfolio. One can easily zoom into any circle that is of interest.

## Conclusion

A good market risk reporting tool must not only report all the relevant metrics as laid out in the risk policy of the organization but also highlight critical numbers and aid in quick decision making. Fractal maps can foster objective

decisions on real-time basis by senior management and business-unit leaders. Risk management dashboards built on fractal maps provide visibility into risks disaggregating them by impact and probability. The value of such visualization techniques is an increase in intuitive analytical power to the user - reducing the time to pinpoint risk areas and take action. Fractal maps may well define the future of risk reporting.



### Raghu Anantharam

*Senior Principal*

*Infosys Technologies Limited*

Raghu is a Principal Consultant with the Banking and Capital Markets group at Infosys Consulting. He has over 12 years of experience spanning 13 countries. His expertise is in the areas of derivatives and risk management, structured finance and price forecasting.




### Shriram Subramanian

*Senior Principal*

*Infosys Technologies Limited*

Shriram is a Senior Principal with the Banking and Capital Markets group at Infosys Consulting. He has over 13 years of experience consulting for global investment banks and asset management firms. His expertise is in derivatives consulting, risk management, training and pricing models for the treasury desks of banks. He also holds a Financial Risk Manager certification from GARP.

For information on obtaining additional copies, reprinting or translating articles, and all other correspondence, please e-mail: [bcm@infosys.com](mailto:bcm@infosys.com).

Global Presence	About Infosys
<p><b>North America</b> Atlanta, Bellevue, Bridgewater, Charlotte, Detroit, Fremont, Houston, Lake Forest, Lisle, Mexico, New York, Phoenix, Plano, Quincy, Reston, Toronto</p> <p><b>Europe</b> Brussels, Copenhagen, Frankfurt, Geneva, Helsinki, London, Milano, Oslo, Paris, Stockholm, Stuttgart, Utrecht, Zurich</p> <p>For more information, contact <a href="mailto:bcm@infosys.com">bcm@infosys.com</a></p>	<p>Infosys Technologies Ltd. (NASDAQ: INFY) defines, designs and delivers IT-enabled business solutions that help Global 2000 companies win in a flat world. These solutions focus on providing strategic differentiation and operational superiority to clients. Infosys creates these solutions for its clients by leveraging its domain and business expertise along with a complete range of services. With Infosys, clients are assured of a transparent business partner, world-class processes, speed of execution and the power to stretch their IT budget by leveraging the Global Delivery Model that Infosys pioneered.</p> <p> POWERED BY INTELLECT DRIVEN BY VALUES</p> <p><a href="http://www.infosys.com">www.infosys.com</a></p>