

**TABB**  
GROUP

The advantage of first-person knowledge

WHAT'S AHEAD FOR YOUR COMPANY?

# Financial Services Infrastructure

## Better, Faster, Cheaper

Presented by  
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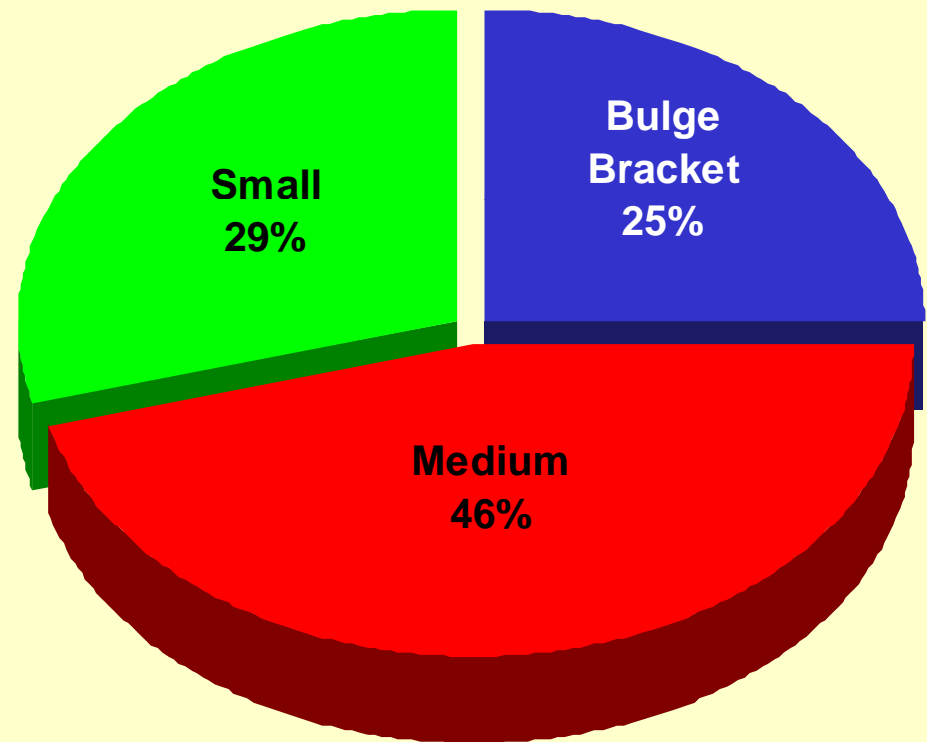
WSTA | March 2010

# Agenda

- ▲ **Market Drivers**
- ▲ **Data Centers**
- ▲ **Utilization**
- ▲ **Virtualization and Cloud**
- ▲ **Operating Systems**
- ▲ **What's next?**

# Some background...

- ▲ Where noted, charts from TABB Group's "US Equity Technology 2010: The Sell Side Perspective"
- ▲ Data based on outreach including two-thirds of bulge bracket firms
- ▲ Focus was on US equity businesses

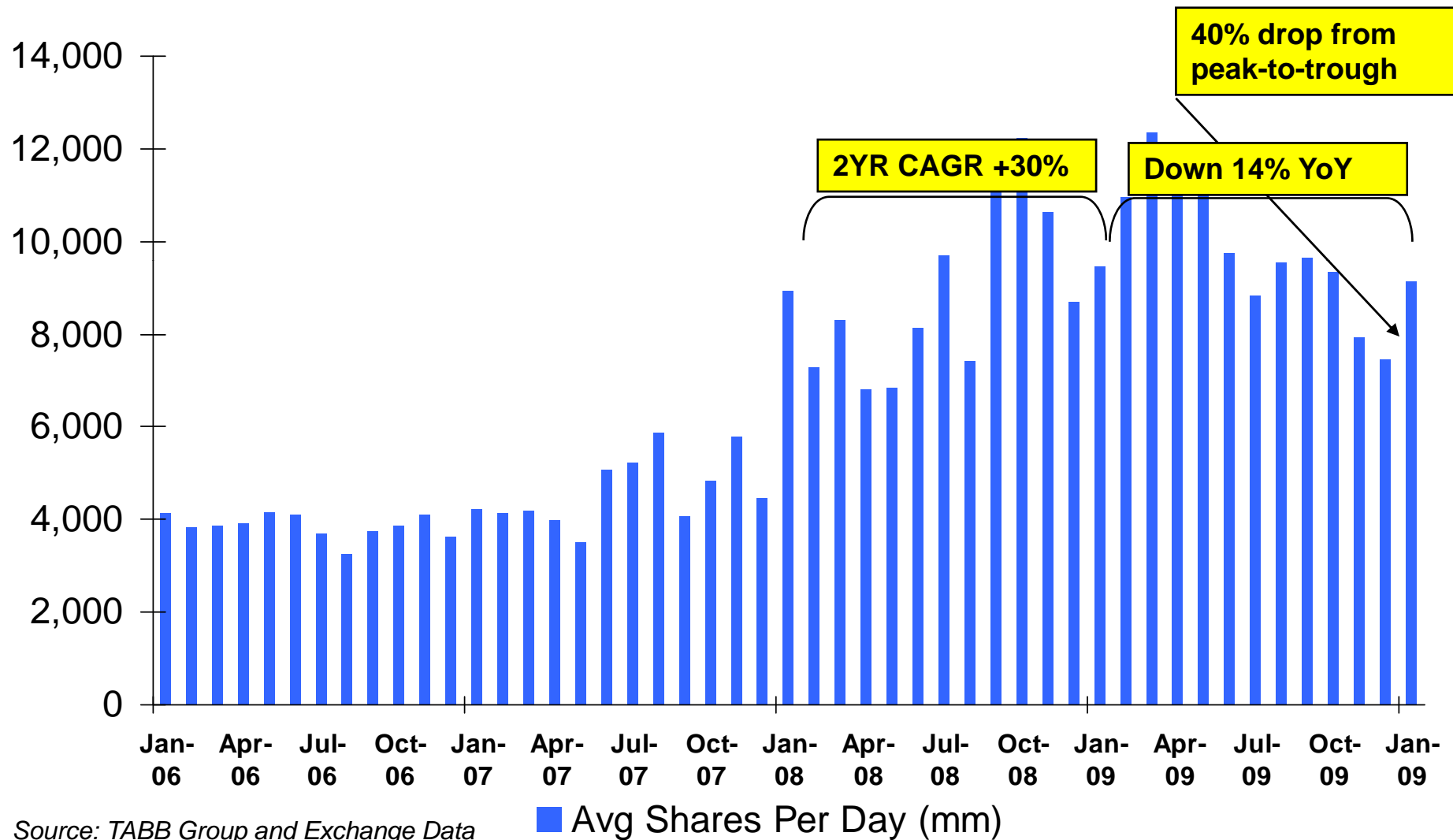


Source: TABB Group

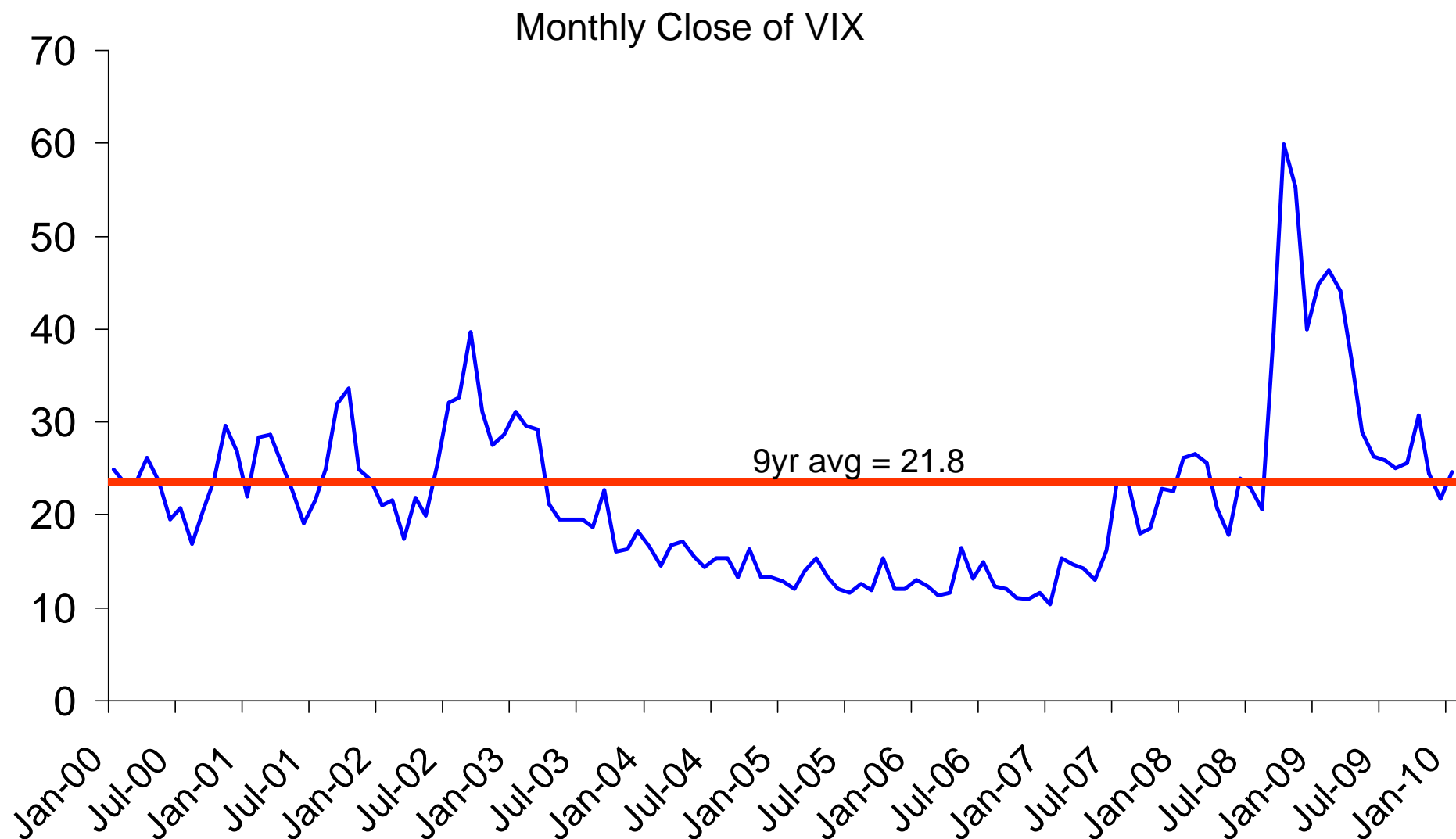
# Market Drivers



# US Equity volumes have been declining since April 2009; more than just a seasonal trend



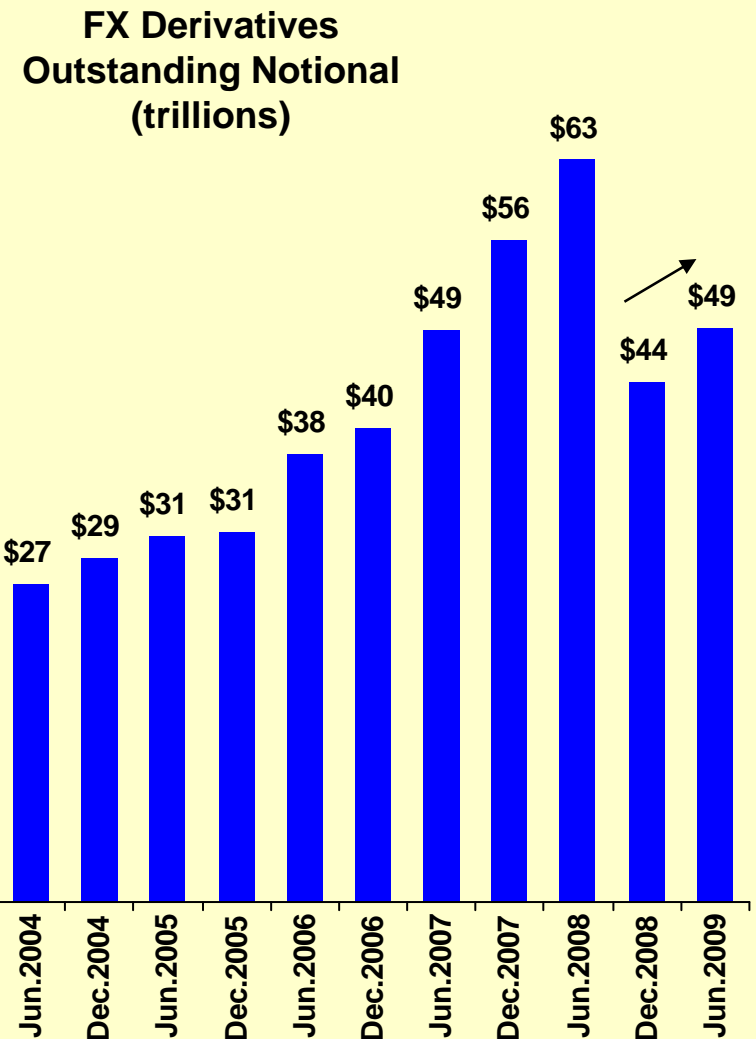
# VIX has come well off its highs and is hovering around its 9yr average – but...



Source: CBOE

# FX is moving towards an order driven market, where latency is more critical

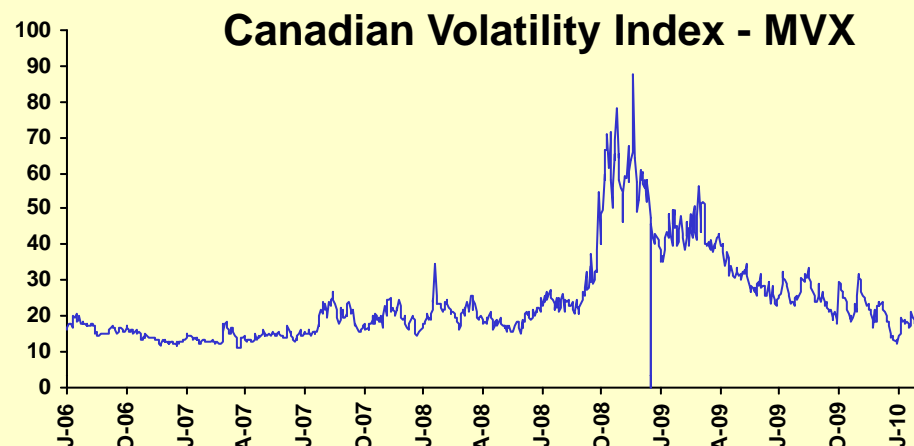
- ▲ Although the majority of FX trading is already electronic, the use of order driven markets for FX will grow driving low latency strategies
- ▲ Essentially anyone who trades internationally trades FX, and most trading firms are going global looking for new opportunities
- ▲ Hedge funds, traditional asset managers and prop shops are also moving further into FX
- ▲ TCA tools and demand for high execution quality is driving many of the largest asset managers (the top 100 by AUM) to self directed trading



Source: BIS

# High frequency trading in Canadian markets will increase, despite lower volatility

- ▲ Volatility in the Canadian markets has decreased dramatically from levels seen during the credit crisis.
- ▲ However, Canadian markets will continue to see growth in high frequency trading as liquidity begins to fragment
- ▲ US firms are looking north as opportunities in the US are harder to find
- ▲ TABB Group believes high frequency trading in Canada will account for 30-35% of volume by the end of 2010.



## Canadian Market Share

Exchange Volume Share		
Exchange	Total Volume	% of Volume
TSX	425,150,415	64.6%
Alpha	170,674,784	25.9%
Chi-X	41,090,178	6.2%
Match Now	11,338,200	1.7%
Pure	7,589,000	1.2%
Omega	1,264,700	0.2%
Liquidnet	1,085,300	0.2%
<b>Total</b>	<b>658,192,577</b>	<b>100.0%</b>

Source: TMX Group, Chi-X Canada



# And plenty more...

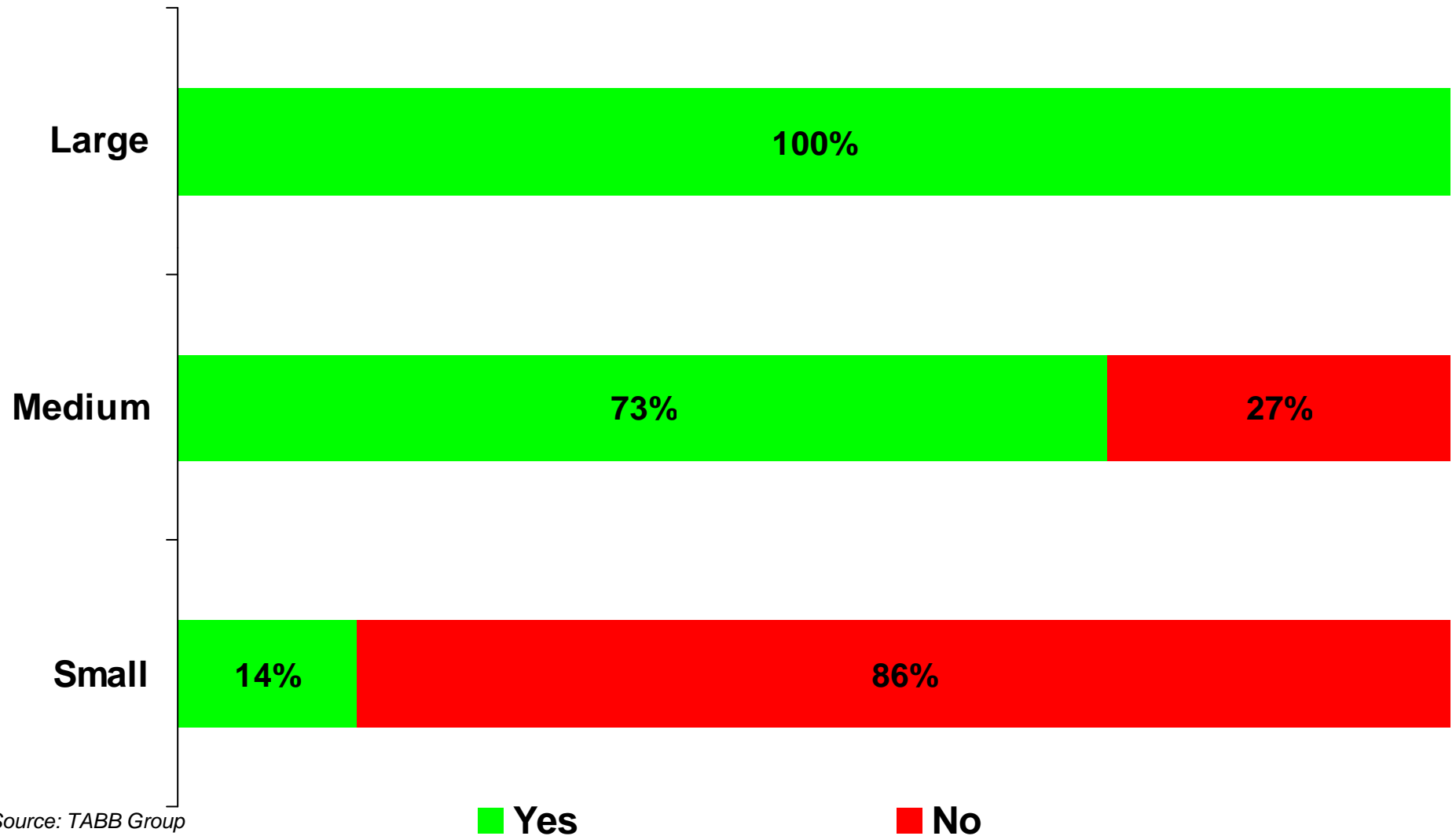
- ▲ **Europe**
- ▲ **Futures**
- ▲ **Options**
- ▲ **OTC derivatives**

# Data Centers



# Proximity hosting has taken hold of the major dealers

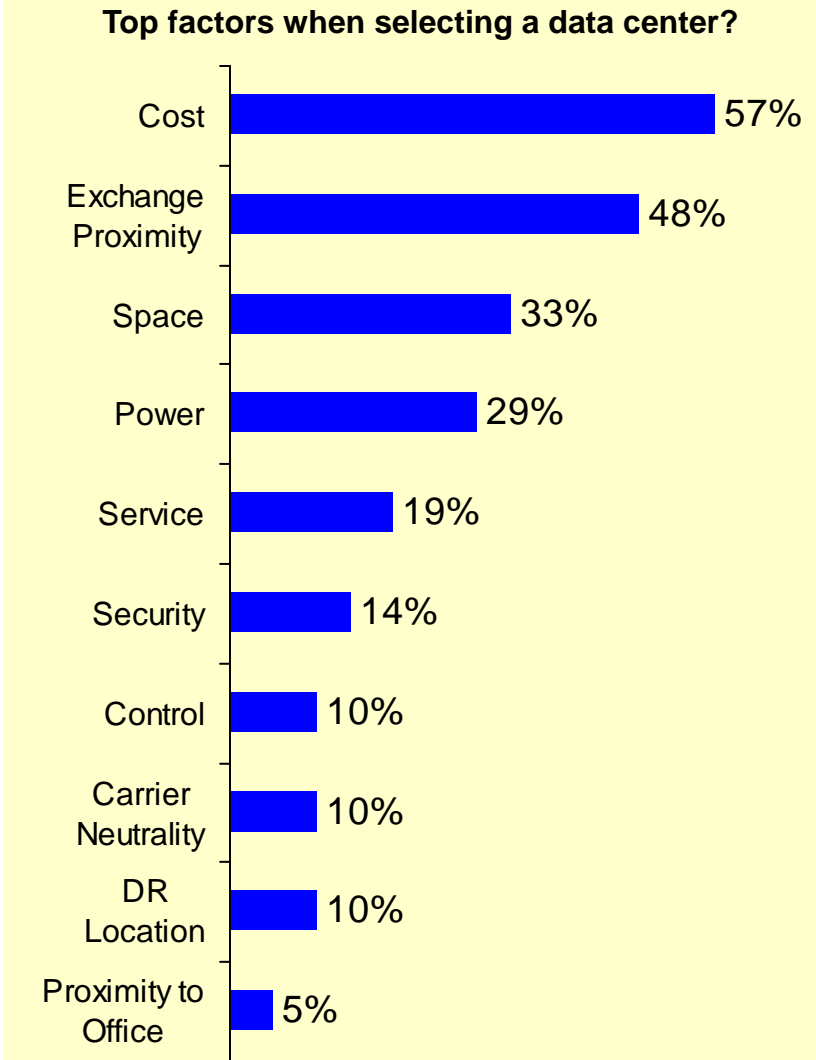
## Sell Side US Equities - Do you proximity host?



Source: TABB Group

# Latency is tops for some, but not most

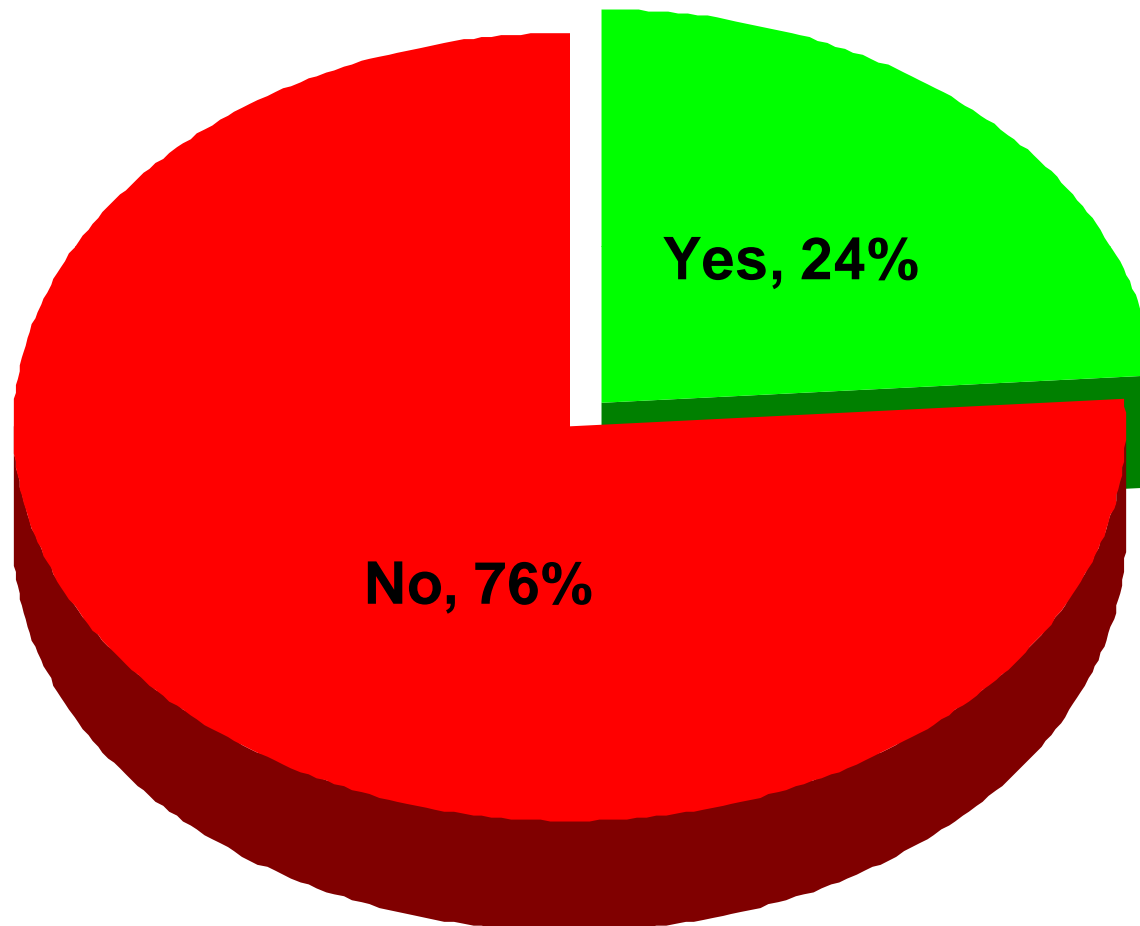
- ▲ Although “latency is the end game”, keeping costs down is important to all
- ▲ It is an ROI discussion. For HFT it is reduced latency vs. increased revenue. For less latency sensitive - control, transparency, security and TCO come into play
- ▲ Location does matter to firms that are not ultra-low latency
- ▲ Acceptable latency for ALL strategies continues to fall.
- ▲ Sitting in geographic proximity to matching engines is beneficial to smaller hedge funds who historically kept servers in-house



Source: TABB Group

# The majority of US hedge funds are not yet co-located

US Hedge Funds – Do you use co-location?



Source: TABB Group

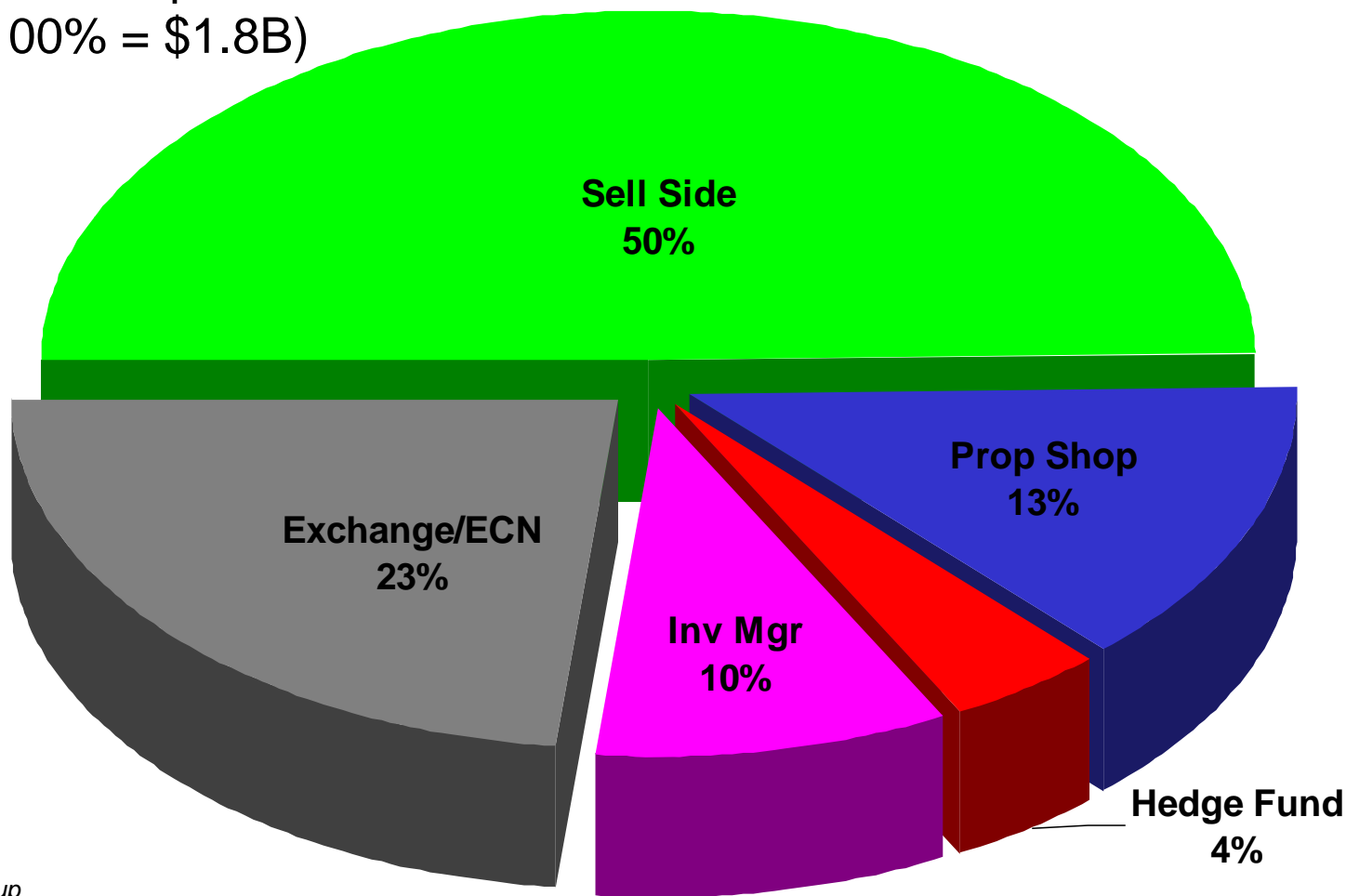
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# Despite cost consciousness, spending is still high

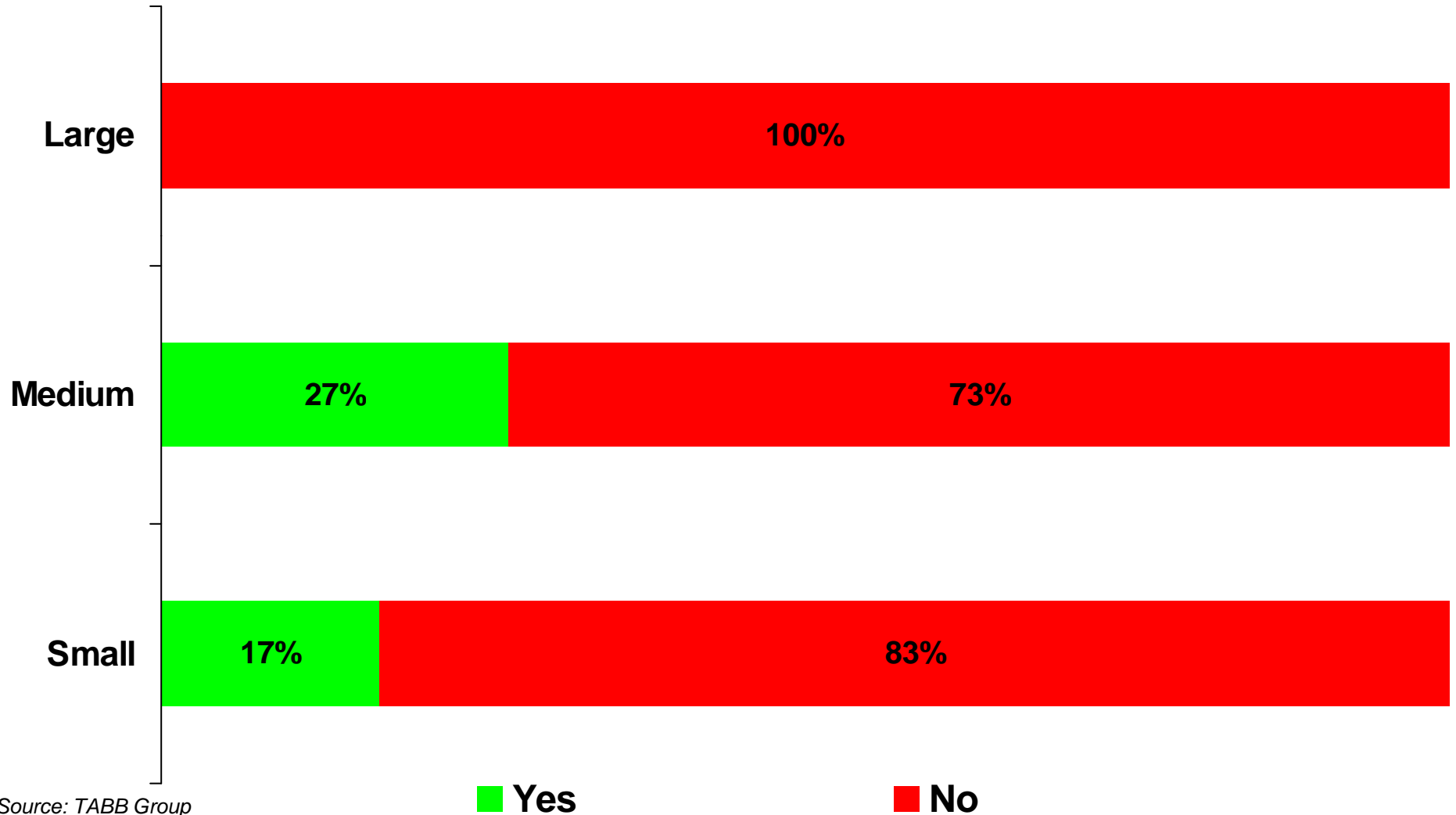
2009 Data Center Spending  
N. American Capital Markets  
(100% = \$1.8B)



Source: TABB Group

# Rationalizing data center space will be the focus in 2010, not expanding

Do you plan to add more data center space in the next year?



Source: TABB Group

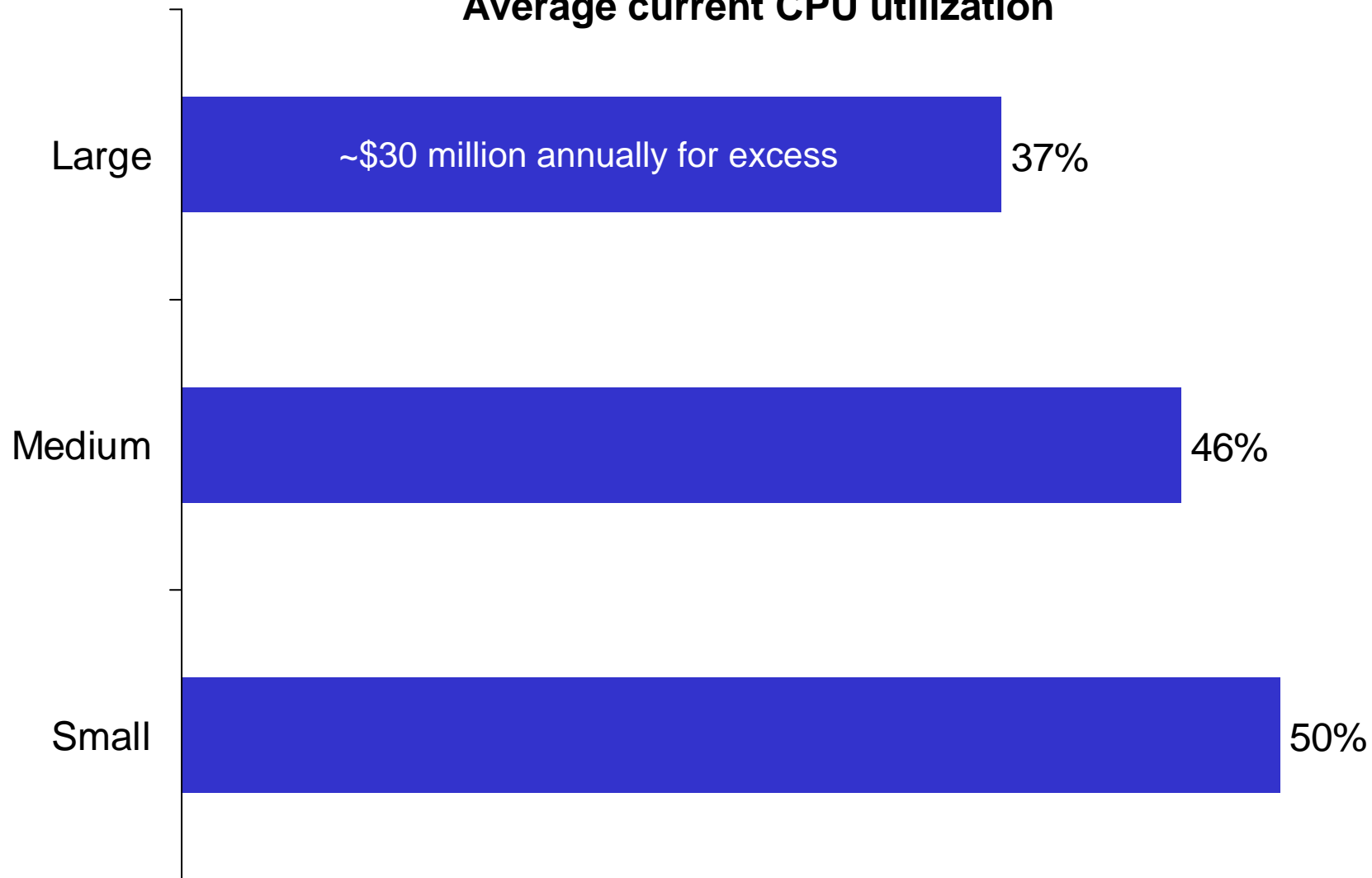
# Utilization, Virtualization and Cloud





# Utilization is low and costs are high

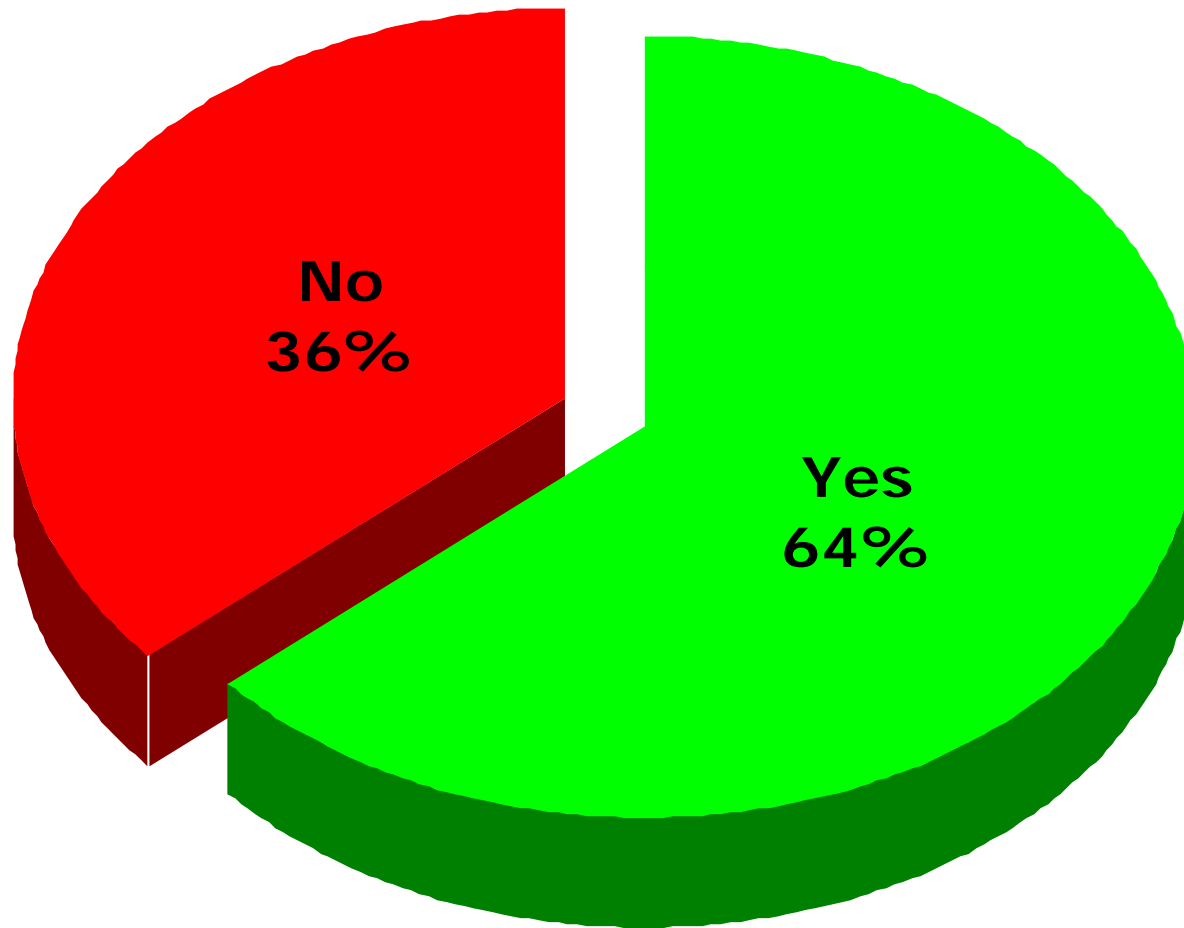
Average current CPU utilization



Source: TABB Group

# Yet utilization monitoring is not ubiquitous

Do you measure CPU utilization in your data center?



Source: TABB Group

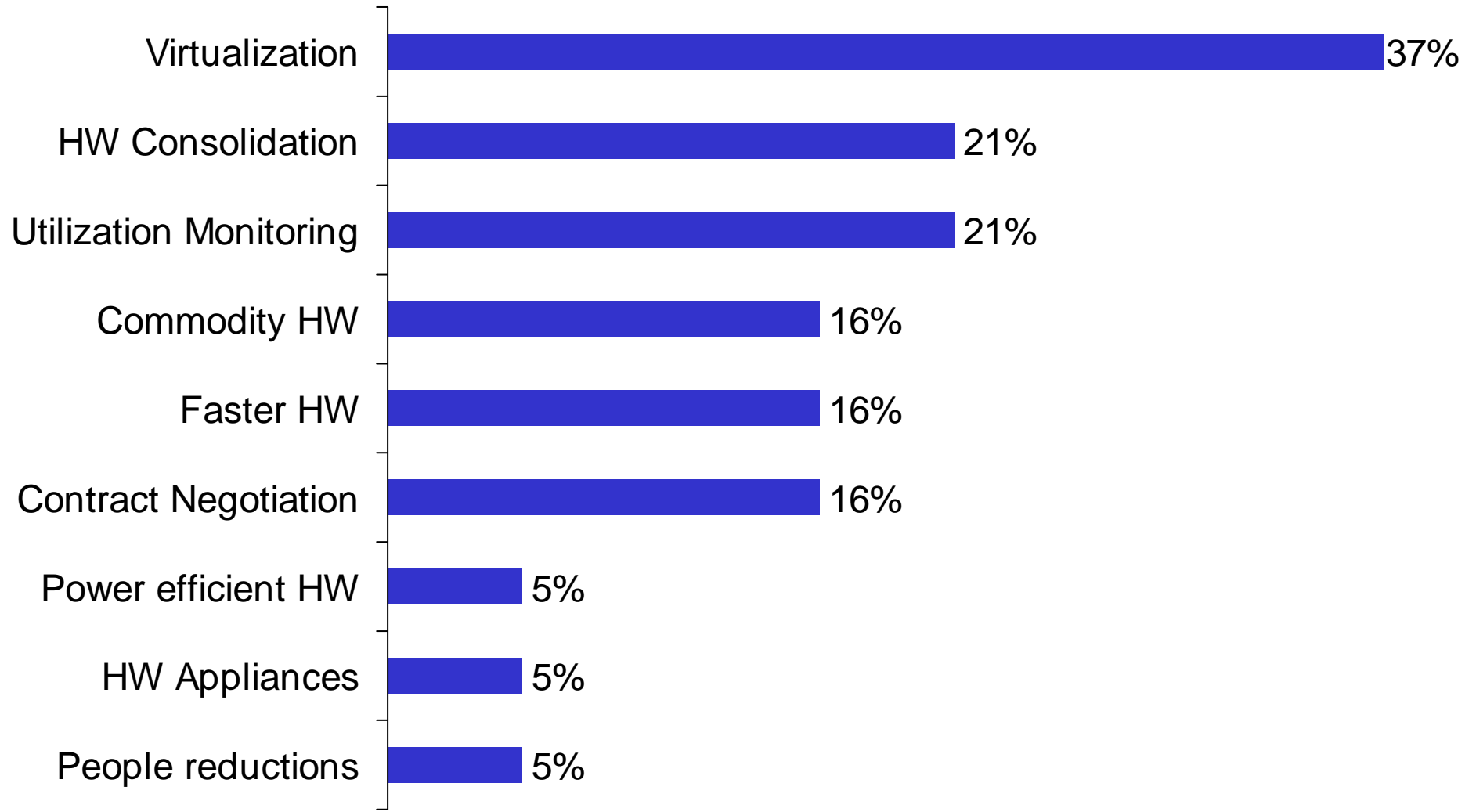
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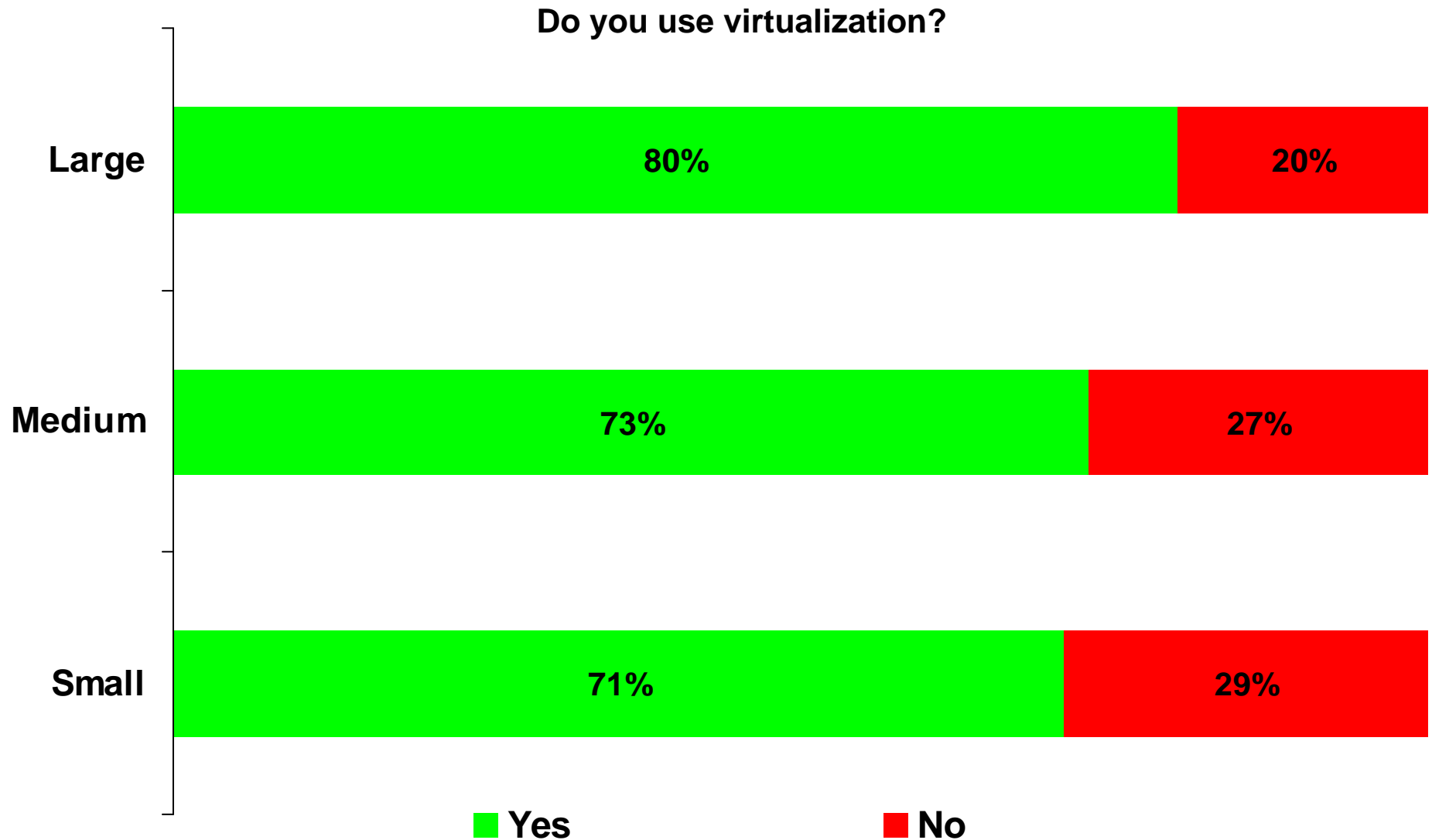
# The credit crisis opened up eyes and now things are changing

What are your primary methods of increasing DC cost efficiency?



Source: TABB Group

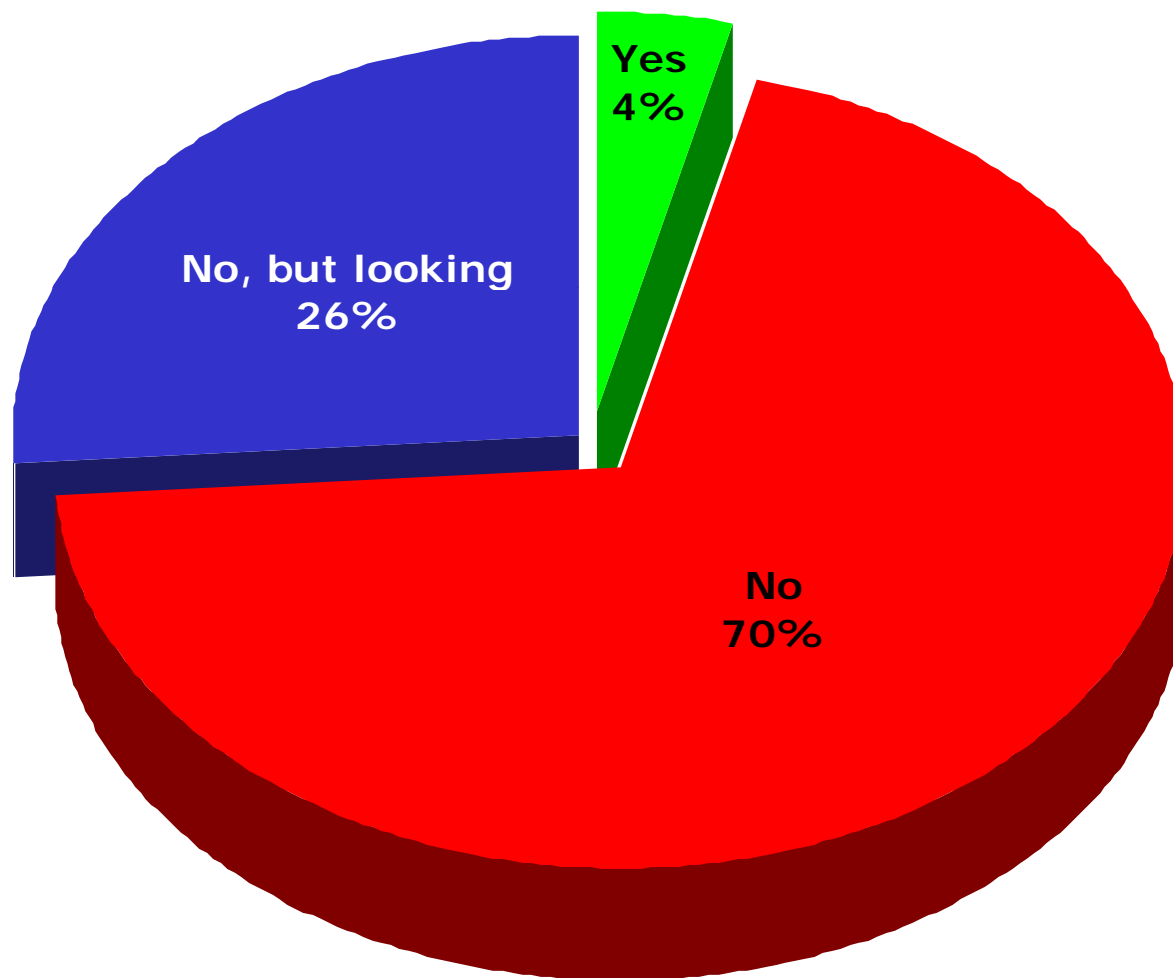
# Use of virtualization is growing



Source: TABB Group

# Cloud computing isn't there yet, especially for trading applications

Is cloud computing part of your strategy?



Source: TABB Group

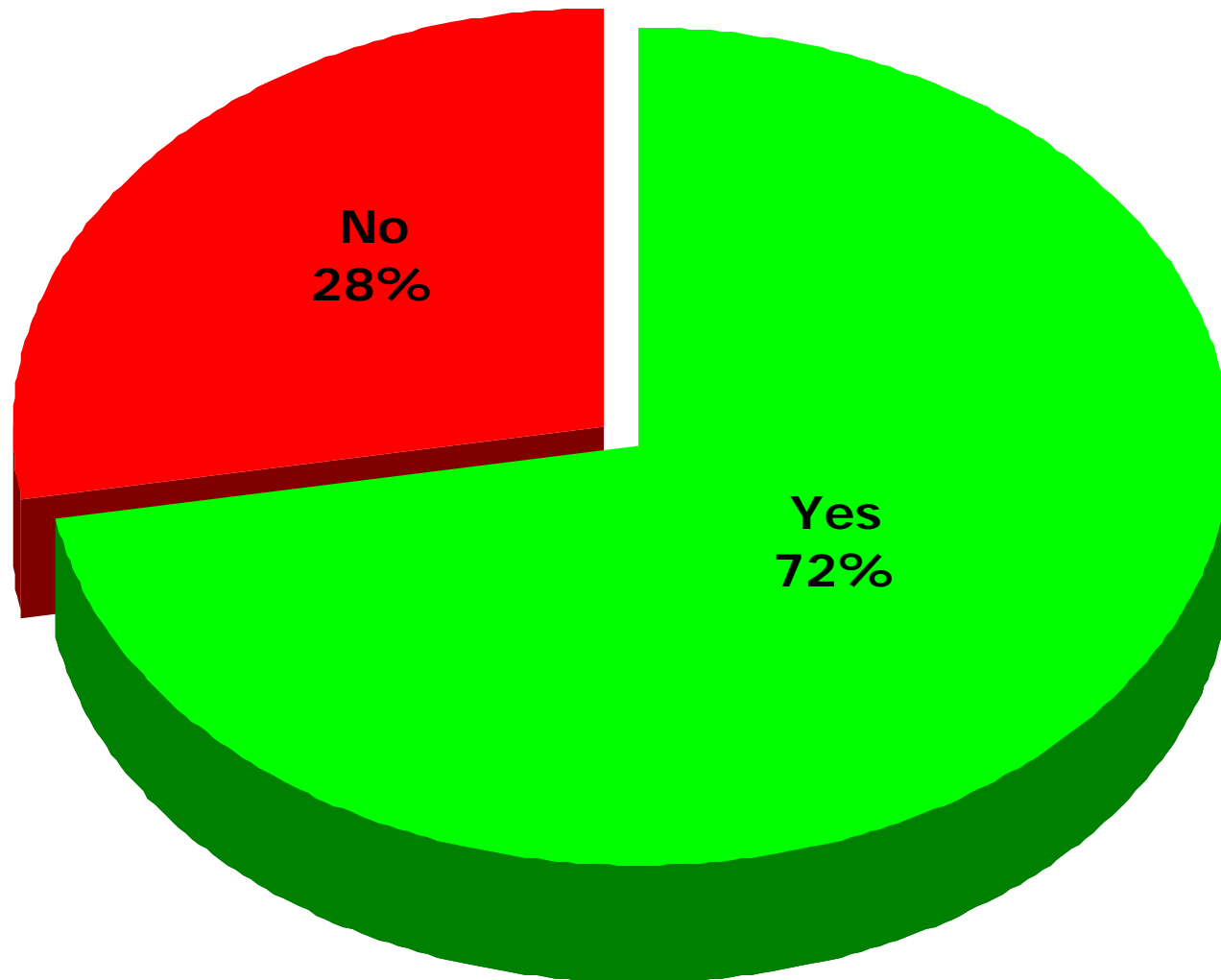
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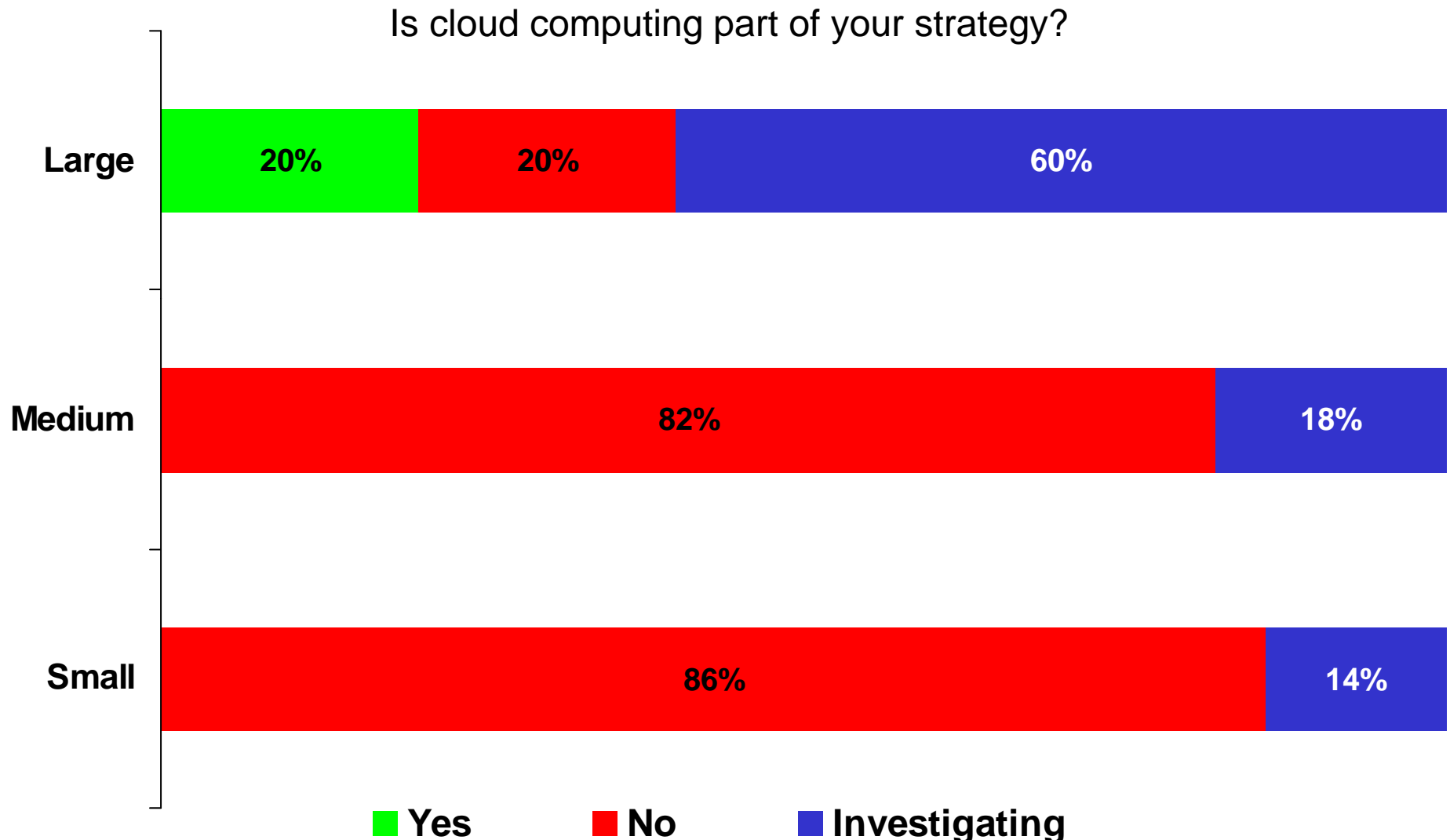
# Security and regulatory concerns are huge impediments to adoption

Is security a concern when looking at cloud computing?



Source: TABB Group

# The big guys are taking the lead; saving money is a big driver



Source: TABB Group

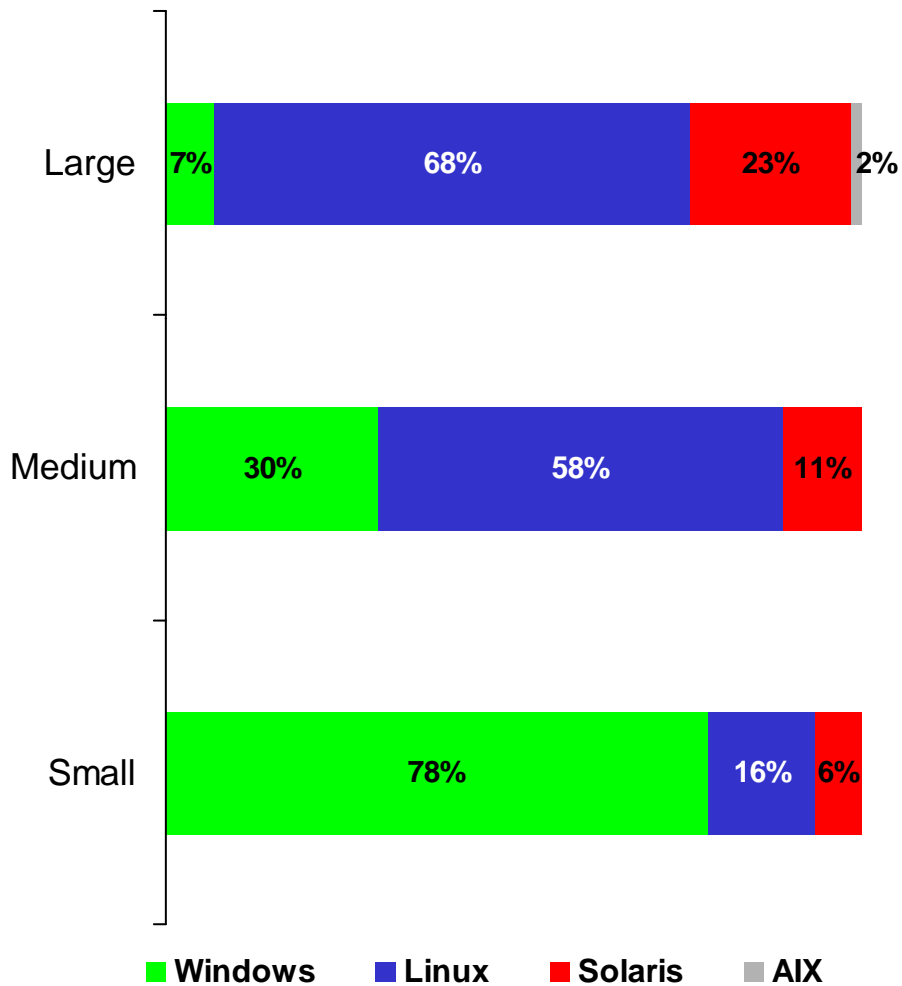
OS



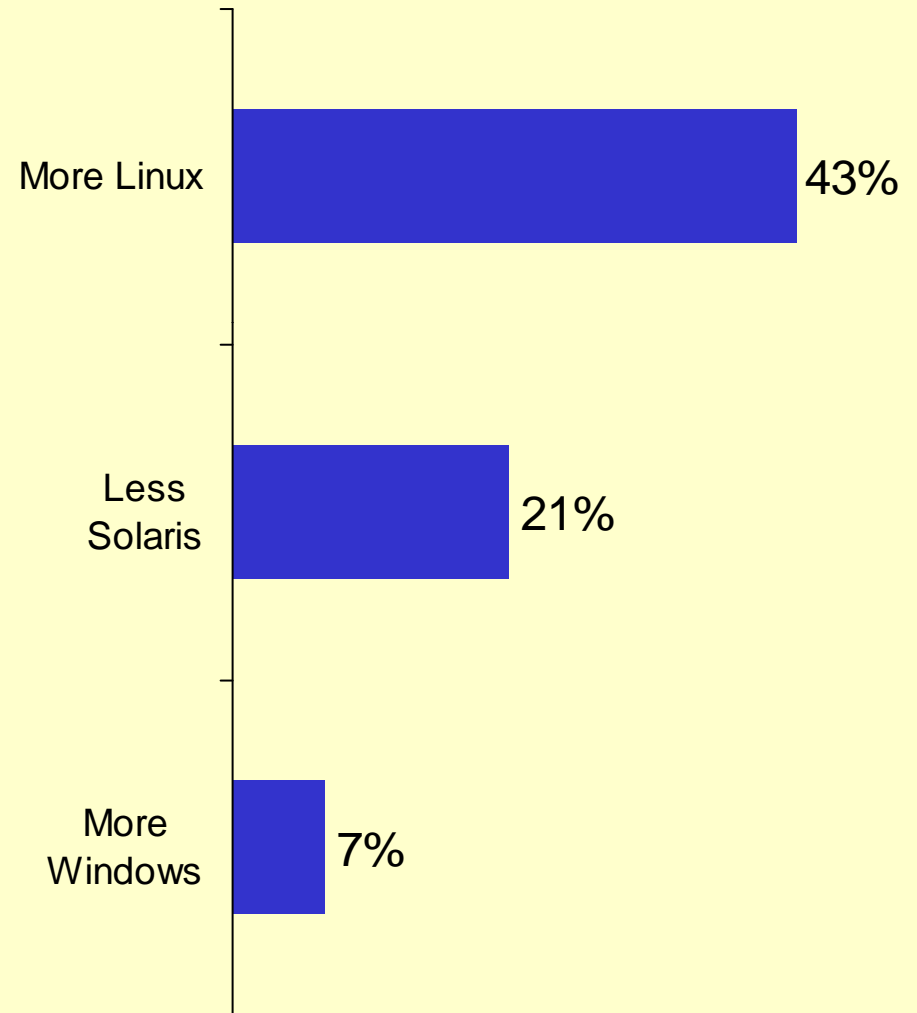


# Cost and stability are driving Linux usage

OS Usage by size



How is your OS strategy changing?



Source: TABB Group

# What's next?



# Globalization, electronification and cost constraints will drive demand for efficient infrastructures

- ▲ Demands for compute power and bandwidth will come from growth beyond US equities
  - ▲ FX
  - ▲ OTC Derivatives
  - ▲ Europe
  - ▲ Canada
- ▲ Throwing hardware at the problem must be thrown out the window
  - ▲ Virtualization is big on Wall Street and getting bigger
  - ▲ Cloud computing has hurdles to get over, especially in the trading environment
- ▲ The cliché is now the reality: Better, faster, cheaper

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