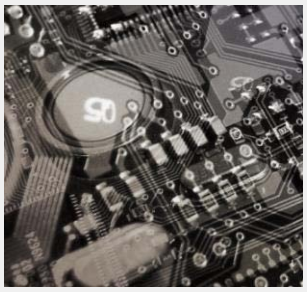

Research Report Abstract: Virtualization Trend in China Market

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April, 2013

Sino-Bridges Research and Consulting Ltd.

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List of Research Data

About the Survey

Virtualization has become the core technology of global businesses of all sizes to improve IT efficiency. In Europe and the United States, nearly 80% of companies have deployed virtualization. However, in the China market, it generally lags behind the U.S. and European markets both in virtualization penetration and virtualization levels. This not only hinders Chinese enterprises from improving IT efficiency through virtualization and their ability to innovate through IT breakthroughs, but also seriously limits the competitiveness of China enterprises in the conceptualization era of the global economic environment.

Virtualization evolution can be divided into three stages. What are the market potential of China virtualization market? What value can virtualization bring to China users? What are the challenges in the deployment of virtualization? In which stage are the Chinese users in the evolution of virtualization? How about the virtualization roadmap in China? What has restricted the Chinese market to improve the overall level of virtualization? How does virtualization change the traditional deployment and management of IT infrastructure? What is the virtualization market trend in the next two years? Is there any correlation between virtualization and cloud computing? In response to these questions, Sino-Bridges Research and Consulting Ltd. conducted a survey among 683 (753 people participated in the survey in total) IT managers and professionals of Chinese end users on 50 questions about the virtualization market and technology trends. And in-depth telephone interviews were made with typical users from different industries, different business sizes, and different virtualization and cloud computing deployment phases. Then Sino-Bridges integrated the data from the survey and in-depth interviews to form an in-depth analysis, in order to provide an interpretation of the Chinese virtualization market and technology trends.

Survey Methods

- Online Survey : With Sino-Bridges' in-house database of more than 20,000 of endusers, an online survey with 50 questions about the virtualization market and technology trends was made through Sino-Bridges' online survey platform.
- In-depth telephone interviews: In-depth interviews were conducted by telephone with 30 users selected from different industries, different business sizes, and different virtualization stages.

Survey Questions Coverage

- Your company's virtualization deployment status? Such as virtualization technology deployment time, ratio of server virtualization, current virtual machine density and that in the next 24 months? Virtualization status or plans for production applications? Virtualization status and plans for business-critical applications? How many different applications are running in a virtualized environment?
- Virtualization deployment and virtualization challenges faced by enterprises of different sizes and users in different industries
- Main value of server virtualization to the enterprise
- Important considerations incorporate assessment for virtualization technology (servers, storage, network, software)
- Influence of server virtualization on enterprise IT architecture and management
- What changes can server virtualization deployment bring to enterprise management?

- Enterprise choice of cloud computing types
- Correlation between virtualization and private cloud
- Private cloud market trends

In-depth Interviews Coverage

- Your main reason for deploying virtualization
- How to choose virtualization software
- Major determinants of virtualization from a testing development environment to a production environment
- Changing process and determinants of virtual machine density from deployment to in-depth interviews
- Influence of virtualization on servers, storage, network expenses/management
- Relationships between private cloud and application/virtualization, and the value to the enterprise
- Main factors which hinder virtualization for production applications and business-critical loads
- If layer 1 application virtualization is considered, what about a technology roadmap of virtualization?

Divided by Enterprise Sizes

- Large enterprises: Over 5,000 employees
- Enterprises: 1,000-5,000 employees
- Medium users: 500-1,000 employees
- SMEs: Fewer than 500 employees
- Small businesses: Fewer than 100employees

Main Industries Covered

Telecommunications &communications, energy & infrastructure, financial services, manufacturing, research institutes, government, broadcasting & media, education & public utilities, medical & pharmaceutical, and service industries.

Executive Summary

The survey results of Sino-Bridges indicated that the Chinese virtualization market was in a rapid evolution from "accepting" to "popularizing." 40.8% of the 683 end users who participated in the survey as interviewees said they had implemented virtualization, which still showed a large gap as compared with the enterprises in U.S. and European markets, nearly 80% of which have deployed virtualization. However, the Chinese virtualization market will show a strong growth in the next 24 months. In terms of the maturity of virtualization, Chinese enterprise users are making preparations in resources and processes for the integration and transition between virtualization and cloud computing. And its production applications are progressively implementing virtualization to boost IT response speed and IT resource utilization rate, and enhance the level of IT automation. Most of the medium-sized and small enterprises are still under the primary stage, conducting centralized remote management and reducing the costs of testing development through virtualization. But the majority of the enterprises participating in the Sino-Bridges' survey are no longer satisfied with the deployment of virtualization for test and development environments, an increasing number of which have deployed them in office management software, IT services, production applications, and even business-critical loads. Meanwhile, the ratio of virtualized servers to total servers and virtual machine density will increase year by year.

Viewing from virtualization penetration and virtualization levels in enterprises of different sizes, enterprise users are greater in number than medium users as well as medium-sized and small enterprises. More than half of the enterprise users participating in the survey have deployed virtualization; 40% of the interviewed enterprise users have applied virtualization to production environments, while 30% of them are considering using it in production applications including business-critical loads. And in terms of the total amount of virtual machines and virtual machine density, the ratio of enterprise virtualized servers to total servers and average virtual machine density is higher than medium users as well as medium-sized and small enterprises. For enterprise users, the key to the improvement of the return on virtualization investment is to meet the growing requirements of virtual machine density to application performance and to facilitate the efficiency of automatic management of virtual machines. During the improvement process of the virtual levels, enterprise users will pay more attention to mass deployment, automatic management and monitoring of virtual machines, as well as bulk allocation of virtual machine resources and automatic management capability of virtual machine life cycles, to boost virtualization deployment and management efficiency of enterprises.

The maturity of virtualization in China greatly varies according to different industries. Two latitudes, the virtualization penetration and virtual levels, a total of six indicators are used by Sino-Bridges to comprehensively assess the maturity of virtualization in China. The results show that industries like telecommunications &communications, financial services, and energy &infrastructure are leading the maturity of virtualization in China (regardless of the fact that their virtualization penetration and virtual levels are all higher than that in other industries), followed by government, and service industries. The industries with relatively lower virtual levels include manufacturing, broadcasting &media, research institutes, education &public utilities and medical & pharmaceutical industries.

The multiple-option survey on the challenge of virtualization deployment shows that during the virtualization process, Chinese users consider the management complexity of virtualization as the greatest challenge, and second, the performance and business stability of virtualization, and the new expenses for deploying virtualization. This is closely correlated with Chinese users' virtualization stage and the deployment duration. At present, most Chinese users are in the process of refinement of Virtualization 1.0 and gradually evolving to Virtualization 2.0 and 3.0, and the interviewees with more than 3 years of virtualization deployment account for less than 20%. The Chinese market acutely lacks experience in using and managing virtualization in the production environment, leading to the current situation where the management complexity of virtualization is regarded as the greatest challenge. In addition, the existing stratified management structure

(server, network, storage and application) of IT in China is an important obstacle to the virtualization of users' production applications and business-critical loads. The virtualization of production applications (including business-critical loads) requires the stable performance of applications and loads to ensure the safe operation. However, the stratified management structure of IT cannot satisfy the requirements of applications and loads of virtualization to dynamic resources allocation, transparent real-time monitoring and rapid troubleshooting, regardless of the scheme selection, procurement process, configuration management, troubleshooting or the operation and maintenance management. Another challenge of virtualization is that some enterprises possess a large number of applications running on built-in systems or dedicated hardware which does not support virtualization. To avoid the rise of management complexity due to the virtualization deployment, users employ a management platform which is able to uniformly manage both physical and virtual environments.

The survey on IT virtualization structure management shows that more and more users treat highly integrated IT structure (converged structure) as the preferred IT virtualization structure to implement the rapid deployment of IT virtualization structure, the centralization and automatic control of physical and virtual resources as well as the simplification of allocation process of IT resources, in order to ensure the performance, stability and security of the virtualization of production applications and business-critical loads. Approximately 70% of the interviewed users consider centralization and automation and unified control of IT structure resources to be very important in implementing the private cloud. During the in-depth interviews of a layer of application virtualization, we have realized that the small machines would continually be preferred as business-critical applications by Chinese enterprise users. In the first place, users will consider how to improve the resource utilization rate through Unix virtualization. Then they will consider how to conduct the transition from small machines to x86 without affecting business operations when assessing the converged structure technology.

In China, there are two main ways used in the selection of virtualization software (excluding the open-source software): (1) The application-oriented in which various virtualization software coexist, and (2) IT process orientation in which one type of server virtualization software dominates. This is quite evidently presented in different industries. For those industries whose applications determine the business processing capability, business growth and user experience, such as petroleum and natural gas, scientific research and other industries, the applications always work as the orientation to select virtualization software, so application manufacturers have a very strong influence on the process of users assessing virtualization software. These users will usually select different virtualization software for different applications. However, for those industries whose application features are not obvious, or virtualization is primarily used in office software and IT services (such as telecommunications, education and other industries), users will first assess a mainstream virtualization software with the process of IT deployment and management as the core, and then gradually transfer applications to a virtualization platform built with that mainstream virtualization software as the dominance.

Server virtualization has driven the demands on servers with higher configuration (CPU, memory, high availability, low latency, and remote and intelligent management capability). In addition, the network also plays a decisive role in application performance and security of virtualization. How to ensure the deployment efficiency of enormous network resources of virtual machines and the dynamic allocation of the network resources required by virtual machines, and how to ensure network performance and security during the transference process of virtual machines, are the keys for users to assess the virtualized network.

Half of the survey participants expressed that the existing storage was able to meet virtualization needs, while one third of interviewees said it wasn't. The two important considerations to determine whether the storage can meet current or future virtualization needs are:(1) the stage of virtualization and future plans of enterprise, and (2) the existing storage structure and technology. In the stage of Virtualization 1.0, the requirements of test and development environments on

storage performance are far lower than the environment of production applications virtualization, and the existing storage of enterprise users can meet the basic needs. However, for small and medium-sized enterprises, the most commonly used DAS deployment still shows large limitations to Virtualization 1.0. During the evolution process from Virtualization 1.0 to 2.0, some limitations appear in all of the dynamic allocation capability, parallel processing capability, and the performance of the mixed loads of traditional storage structure, no matter whether they are enterprise users or small and medium-sized enterprises, thus they need innovative storage structure to meet the demands of Virtualization 2.0 and 3.0. The survey shows that in the next 24 months, virtualization will drive the integration of storage.

Virtualization is not equivalent to cloud computing. In the survey on the correlation between virtualization and private cloud computing, 74% of interviewees said that private cloud should be based on virtualization, and 80% agreed that the "centralized, unified and automatic IT management platform" was "greatly crucial" for enterprises to implement the evolution from a virtualized data center to cloud computing. Compared with the public cloud and the hybrid cloud, the private cloud market will experience a strong enhancement in the next two years in China, which is another IT rapid-growing point following virtualization.

Survey Conclusions

The total number of people who have participated in this survey was 753, and 683 have answered and met the requirements of this survey, of whom 279 (40.8%) had deployed virtualization, 144 (21.1%) said they were assessing virtualization and would complete it in the next 12 months, and 186 (27.2%) said they were planning to deploy virtualization in the next 12 to 24 months. Therefore, the conclusion of the survey is as follows:

1. **Server Virtualization Market and Technology Trends in China**

- Virtualization Gradually Becoming the IT Strategy: Virtualization gradually becomes the IT strategy for enterprises to boost IT efficiency. 24.5% of the interviewed enterprises said virtualization is remarkably influencing our IT strategy as we transfer most of our applications and data to the virtualization platform, while others (57.2%) declared they would transfer part of their applications to virtualized environments.
- Virtualization Deployment: 40.8% of interviewed users have deployed virtualization, half of whom for less than 3 years, and 48.3% of them said they would deploy virtualization in the next 24 months. The China virtualization market shows a strong growth. At present, the ratio of users' virtualized servers to the overall number of total servers is still lower. 29.6% of participants pointed out that the virtualized servers accounted for only 10-20% of the total servers. And the ratios of the interviewed enterprises with a total number of virtualized servers registering more than 20% and 40% are respectively 41% and 14%, which still show a huge distance from its counterparts in U.S. and European markets with the ratio of server virtualization more than half. And the survey data indicated that server virtualization penetration and the ratio of virtualized servers in the Chinese market will sustain increase.
- The Virtualization of Production Applications (Including Business-critical Loads): The virtualization of production applications continues to rise. 32.4% of the interviewed enterprises (including enterprise users, medium users, and small and medium-sized enterprises) have applied virtualization to production and test environments, and 25.8% of them would consider deploying virtualization in production applications including business-critical loads, while virtualization has been used in office software only by 25.8% of them; meanwhile, the results of the survey demonstrated that virtualization will gradually evolve from test and development to office software, production applications, and business-critical loads along with the increasing deployment duration of virtualization. In the multiple-option survey, 36.5-46% of the interviewed enterprises said they have

implemented official virtualization and virtualization of IT service (web applications, document printing, and e-mail); 15-25% of them have implemented the secondary application virtualization (portal, collaboration platform, professional production applications, the second layer database, basic IT services-Active Directory, DNS, DHCP, desktop virtualization); only 5-10% have chosen to virtualized the first layer database and business-critical applications. The stable performance and security of virtualization is the primary factor for Chinese users to sit on the fence when facing virtualization of business-critical loads. The ratio of virtualization of production applications (including business-critical loads) in the Chinese market is much lower than that in U.S. and European markets.

- Virtual Machine Density: Currently, virtual machine density in 38.7% of the interviewed enterprises is less than 5 virtual machines. And in the next 24 months, the ratio of the enterprises with virtual machine density less than 5 will be reduced from 16.6% to 22.1%, and the average virtual machine density will see growth. Enterprises possessing more than 10 virtual machines account for 24.3% of the total interviewed enterprises, which will rise to 32.3% by 8% in the next 24 months. Compared with the U.S. and European markets, in which enterprises with virtual machine density less than 10 register 61%, there is still a large gap. The deployment duration and management experience of virtualization is one of the most important hindrances to the growth of the virtual machine density in enterprises and the rapid improvement of IT efficiency through virtualization.

2. Virtualization Challenges

- ✓ Three Challenges for Deploying Virtualization: Management complexity ranks first (67.3%); application performance comes second (55.3%); virtualization deployment follows behind (49%).
- ✓ Management Experience of Virtualization: 40.8% of the interviewed enterprises have deployed virtualization, 80% of whom for less than 3 years. These statistics show that Chinese users' management experience of virtualization has to be accumulated and improved, and more successful reference schemes about virtualization are required by users to reduce deployment and use risk of virtualization for promoting the penetration of virtualization.
- ✓ Technology Promotion of Virtualization: From the in-depth interviews that the promotion of technology and solutions by manufacturers are more to meet the needs of U.S. and European markets which is far away from the Chinese users' needs. Therefore, the dissociation between "Technology Positioning" and "users' needs" is one of the factors that leads to virtualization levels in the China market remaining low. Users are in urgent need of solutions and reference cases about virtualization, virtualization deployment and optimized process provided by manufacturers and integrators for Chinese users to set up a close correlation between the development requirements of their own business and the technology value of virtualization.
- ✓ The IT Stratified Management: At present, most Chinese enterprise users still follow the traditional IT stratified management model (server, storage and network), which have seriously restricted the improvement of virtualization penetration and virtual levels. Monitoring management with applications loads as the core in highly virtualized environments contradicts evaluation, procurement, deployment, operation and maintenance, and management of traditional stratification. In highly virtualized environments, traditional IT stratified management will bring great hidden dangers to business continuity, stability and security of enterprises, thus becoming an obstacle for Chinese enterprises to rapidly improve IT efficiency through virtualization.

- ✓ The Unified Management of Physical and Virtual Environments: Nowadays, many enterprises possess applications which do not support virtualization (or whose application development is bound to obsolete equipment). In addition, heterogeneous virtualized software gradually becomes the virtualization market trend. Along with the virtualization penetration in the Chinese market, users will first consider how to uniformly and efficiently manage applications and loads in both physical and virtualized environments when assessing virtualization strategy.

3. The IT Virtualization Structure and Technology

- Virtualization Driven Converged Structure: Virtualization drives IT deployment to evolve to highly integrated and converged structure, in order to reduce the complexity of selection, deployment and operation and maintenance of virtualization technology, thus ensuring the performance and security of loads virtualization. 43.3% of the interviewed enterprises choose the "Coordinated Assessment and Deployment of Server and Storage--the Integrated Scheme Deployment," while 30.7% first choose to deploy the servers and then escalate the storage according to the demands. The coordinated assessment and deployment of highly integrated (converged) IT structure is the key to ensuring virtualization of production applications and business-critical loads. Besides, during the evolution process from virtualization to cloud computing, more than 70% of users participating in the survey said the centralized, transparent and automatic management of IT resources are greatly significant to the implementation of private cloud.
- The Demands of Virtualization to Server Configuration: 40.4% of users receiving the survey said the server virtualization had promoted demands for higher configured (CPU, core, memory, PCIe SSD, high availability, high manageability) servers. Moreover, many Chinese data-critical industries, like financial services, energy & infrastructure, manufacturing, etc. will continue to run the business-critical database in the Unix environment. It is how to improve the resource utilization rate of the first layer applications by the virtualization of small machines that these industries are first concerned with.
- The Storage Demands of Virtualization: For those enterprises which have already deployed virtualization, SAN is tied with unified storage as the first choice. SAN occupies a very high share in the Chinese enterprise market as many enterprises use the original SAN storage resources to deploy virtualization. In terms of enterprise users, the storage security of virtualization is the first assessing factor for selecting storage. Unified storage is characterized by higher cost performance, easy deployment and management, flexibility, etc. And the unified storage of the horizontally- scaled structure has well satisfied the demands of virtualized environments for performance and capacity. The three most important considerations when users assess the virtualized storage are: the IO performance of storage of virtual machines with high density (39.4%), dynamic allocation of resources (37.6%), and the performance of mixed loads (34.1%).
- The Network Demands of Virtualization: In the survey on assessing the virtualized network technology, 45.5% of the interviewed enterprises said that network is very important to the application performance of virtualized environments, while 30.2% said the network is the most decisive factor for the application performance and security of virtualized environments. When assessing network problems faced by the virtualized application, 54% of the interviewed enterprises declared the greatest network challenge was "how to ensure the network security during the transition process of virtual machines," and tied for second were the monitoring of application performance in highly virtualized environments, and the dynamic allocation of network resources according to service level.

4. Virtualization Trends of Different Enterprise Size

- Enterprises: Enterprises lead the virtualization penetration and virtual levels in the Chinese market. In terms of enterprise sizes, the total trend is that the larger the enterprises' sizes are, the higher the ratio of virtualization deployment and virtual levels are. 59.1% of the interviewed large enterprise users have already deployed virtualization, 43.6% have applied virtualization in the production and test environments, and 31.8% of them are considering using it in production applications including business-critical loads. In enterprise users, the percentages are respectively 51.9%, 38%, 32.6%. But in the interviewed enterprises with less than 1,000 employees, an average 30% of them have deployed virtualization, and the ratio of virtualization of production applications and business-critical loads is far lower than that of enterprise users. Also, the total number of virtual machines and the density of virtual machines in enterprise users are well above that in small and medium-sized enterprises. When it comes to the total number of virtual machines, 26% of the enterprises with over 5,000 employees say the overall amount of virtual machines needing to be managed are within the range of 500 to 5,000. The automatic deployment and management of virtual machines, the storage and allocation of network resources of bulk virtual machines, as well as the real-time monitoring and automatic management of application performance and resource utilization rates in virtualized environments are crucial for enterprises to improve their virtualization deployment and management efficiency.
- Medium Users: In the next 12 months, virtualization in the medium users market will grow at the greatest pace. The deployment ratio of medium users (27.5%) within the next 12 months is higher than that of large enterprise users (around 15.5%), enterprise users (22.5%), and SME users (20.7%). As for the density of virtual machines, the interviewed medium users with a physical server deploying over 10 virtual machines account for 38.2% of the total, which is well above the 26% of enterprises, 29% of large enterprises, and the average about 15% of SMEs. Meanwhile, the proportion of the server virtualization being applied in the first and second layer of databases by medium users also exceeds other market segments. And in terms of the private cloud deployment, medium users (51%) are far more than any enterprise users (below 30%) and SME users (less than 28%) in deployment ratio in the next 12 months. Realized from the in-depth interviews for medium users, IT pressure is higher, IT funds are tighter, and business growth and expansion are faster for medium users rather than for large enterprises. And virtualization enables medium users to reduce business costs through IT and facilitate supportability of IT on business, to achieve business breakthroughs and innovation; moreover, medium users can speed up the business response to the market with fewer resources to challenge their enterprise competitors which are several times larger than themselves. This drives the virtualization penetration and virtual levels of medium users up to high speed within the next 12 months, thus enabling them to become the first batch of enterprises benefiting from private cloud. As far as the importance of virtualization to enterprises IT strategies is concerned, 32.1% of the interviewed enterprises in medium users say that virtualization has considerably influenced their IT strategies, and they will take into consideration the transfer of most of the applications and data to the virtualized platform. Such a ratio is higher than that of enterprise users (31%) and large enterprise users (28.2%).
- SMEs
  - ✓ Enterprises with 100-500 Employees: The virtualization deployment of enterprises with 100-500 employees will grow at the greatest pace.
  - ✓ Small Enterprises: Virtualization market trends of small enterprises still have lots of uncertainties. New IT expenses from virtualization and the deployment and management complexity of virtualization are the

primary constraints of virtualization in small enterprises. Along with the gradual improvement of public cloud service, public cloud may become the mainstream IT model of small enterprises.

5. The Maturity of Virtualization in Major Industries

The maturity of virtualization determines the IT efficiency of the enterprise and the capability of the physical data center in the enterprise evolving to cloud computing. The maturity of virtualization for different Chinese industry users has a relatively large difference. The analysis on the survey results about the maturity of virtualization in the Chinese industry is as follows:

- The Leading Group of the Maturity of Virtualization: Telecommunications& communications, finance and energy &infrastructure are the leading groups of the maturity of virtualization.
- The Following Group of the Maturity of Virtualization: The government and service industry belong to the mid-range of the maturity of virtualization.
- The Lagging Group of the Maturity of Virtualization: Medical & pharmaceutical, broadcasting &media, education & public utilities, research institutes, manufacturing and other industries are in the range of primary virtual levels.

The Maturity of Virtualization of Enterprise Sizes: The survey results about the maturity of virtualization of enterprise sizes indicate that enterprises and medium users have a relatively higher maturity of virtualization while the small and medium-sized enterprises have a lower maturity of virtualization.

6. The Market Trends of Cloud Computing

- The acceptance rate of the Chinese market to private cloud (66.1%) is much higher than the hybrid cloud (22.5%) and public cloud (11.4%). At present, 12.6% of the interviewed enterprises say they have completed the private cloud deployment. And in the next 24 months, the Chinese private cloud will experience a development by leaps and bounds. The survey shows that 32.9% of the interviewed enterprises will deploy private clouds in the next 12 months, while 32.1% in the next 12-24.
- The survey of the correlation between virtualization and the private cloud demonstrates that among the enterprises participating in the survey, 74.4% think that virtualization is the basis of the private cloud.
- The Correlation between Private Cloud and IT Structure Management: In the survey of the importance of intelligent and centralized management of IT overall structure on private cloud, 44.7% of the interviewed enterprises chose "IT structure as one of the most important technological components of the implementation of private cloud";and 36.6% chose "IT structure as the most important part for the implementation of private cloud, without whose centralized, unified and automatic management, the IT service delivery, would not be achieved."

Evolution Process of Virtualization

There are three stages in the evolution of virtualization.

Virtualization 1.0

Objective: Resources consolidation

- Value: Reduce CapEx

Virtualization 2.0

- Objective: Application virtualization
- Value: Reduce OpEx and standardize data center

Virtualization 3.0

- Objective: Efficient IT services
- Value: Efficient IT services for agility

The survey shows that compared to the U.S. and European markets, Chinese enterprise users are developing in leaps and bounds in the evolution process of virtualization, rather than a progressive development. In recent years, some industry enterprises have had an exploratory mode with the Virtualization 1.0, 2.0, 3.0 three stages being deployed at the same time. It is common that virtualization is used for test and development environments (Virtualization 1.0), office applications and IT services (Virtualization 2.0), and selecting individual business applications to deploy "small cloud" (Virtualization 3.0).And each project is relatively independent without unified planning or standards. During the Virtualization 1.0, 2.0, 3.0 stages, users mainly used virtualization to improve resource utilization rates and reduce costs to meet requirements of certain projects, and then to establish and refine the process for the virtualization of production applications and cloud computing. Therefore, Chinese users are well advised to develop the strategies for each stage of virtualization in the evolution process of virtualization to protect long term investment, and to minimize potential risk of business continuity, security, processing capability, expansion capability and management efficiency during IT evolution.

The Assessment Methodology for Virtualization Maturity

Compared with U.S and European markets, the China virtualization market is still in a transition from "accepting" to "popularizing". As a result, measure indicators of the maturity of virtualization in U.S. and European markets usually exclude the influence of penetration to the maturity, which is not suitable for the Chinese market. Therefore, two latitudes, six indicators are used by Sino-Bridges to assess the maturity of virtualization according to the current stage of development of virtualization in China.

The maturity of virtualization in China greatly varies in different industries. As the maturity of virtualization directly determines IT efficiency, the analysis to industry maturity of virtualization produces a reference and guiding significance for the users to assess how to improve competition through virtualization.

Virtualization Penetration	Factor 1:The ratio of enterprises with virtualization deployment	Factor 2:The ratio of enterprises with virtualization deployment for over 3 years	Factor 3:The ratio enterprises with virtualized servers accounting for 20% of total servers
Virtualization Levels	Factor 4:The ratio of virtualization of production applications	Factor 5:The ratio of virtualization of production applications including business-critical loads	Factor 6:The ratio of the density of over 10 virtual machines

Analysis Methods:

1. According to the combined score of virtualization penetration in each industry, high, medium and low segments are divided.
2. According to the combined score of virtualization levels in each industry, high, medium and low segments are divided.
3. According to the combined score of the maturity of virtualization in each industry, high, medium and low segments are divided.

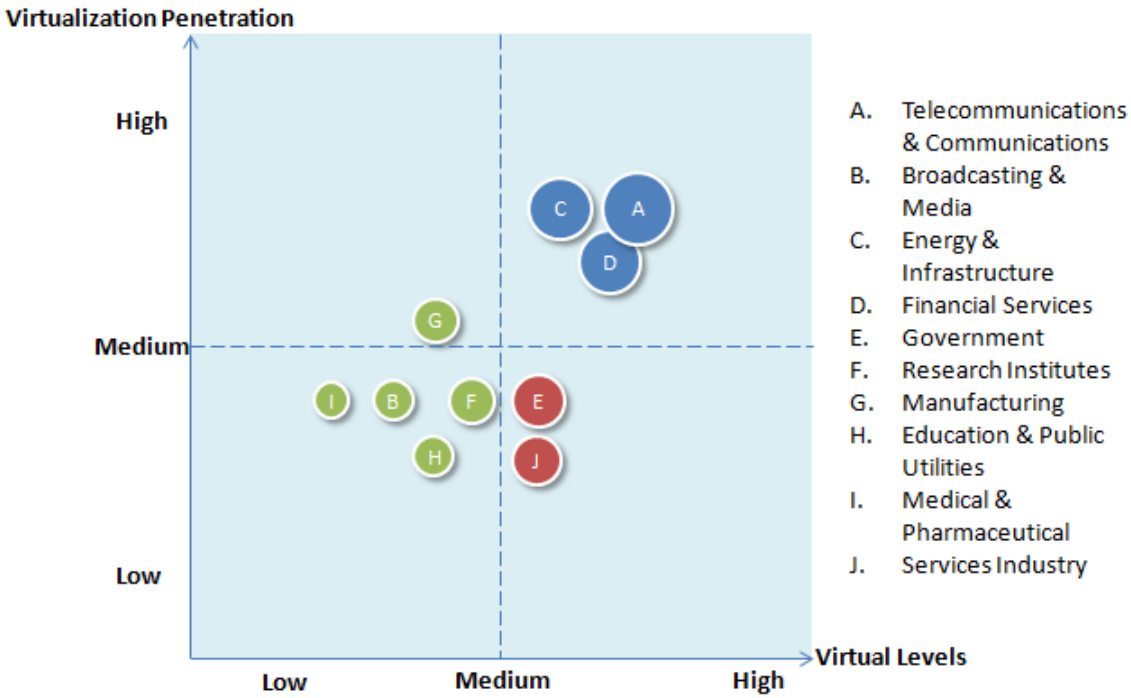
The Results of Survey Analysis:

- The Leading Group Industries of Chinese Virtualization: Telecommunications & Communications, Energy& Infrastructure, Financial Services
- The Following Group Industries of Chinese Virtualization: Government, Services Industry
- The Lagging Group Industries of Chinese Virtualization: Medical &Pharmaceutical, Broadcasting& Media, Education& Public Utilities, Research Institutes, Manufacturing

The maturity of virtualization, virtualization penetration and virtual levels in different industries is shown in the quadrantal diagram below:

- Quadrant 1 (Leading Group), is characterized by high virtualization penetration, high virtual levels and balanced maturity of virtualization.
- Quadrant 2 (Following Group), is characterized by low virtualization penetration, higher virtual levels.
- Quadrant 3 (Lagging Group), is characterized by both low virtualization penetration and virtual levels.

Figure 1. The Quadrantal Diagram of Virtualization Penetration and Virtual Levels



Notes: Blue represents the leading group of the maturity of virtualization in China.
Red represents the following group of the maturity of virtualization in China.
Green represents the lagging group of the maturity of virtualization in China.
And the size of circles represents of maturity levels. The bigger the circle, the higher of virtualization maturity.

- The Leading Group of the Maturity of Virtualization: The comprehensive survey results based on the dimension of virtualization penetration and virtual levels show that the telecommunications & communications, finance and energy &infrastructure are the leading groups of the maturity of virtualization, which is specifically embodied by the following: The average virtualization deployment time is longer; the density of virtual machines is relatively higher; the application of virtualization to production environments including business-critical loads is of a higher ratio than other industries; the average ratio of server virtualization to the total servers is relatively higher; the ratio of virtualization deployment of more than 3 years is higher. The enterprises with higher virtual levels as the leaders of Chinese virtualization are making necessary preparations for the evolution from virtualization to private cloud.
- The Following Group of the Maturity of Virtualization: The government and service industry belong to the mid-range of the maturity of virtualization, typically characterized by the application of virtualization mostly in test and development, office software and quasi-production environments, and the low ratio of the application in production applications and business-critical loads.
- The Lagging Group of the Maturity of Virtualization: For the industries of primary virtual levels (medical & pharmaceutical, broadcasting &media, education & public utilities, research institutes, manufacturing and other industries), they are characterized by the application of virtualization mostly in test environments, and the low comprehensive index of virtualization penetration and virtual levels.

Appendix:

The Distribution of Survey Participators

Figure 2. Interviewees' Survey, by Enterprise Size

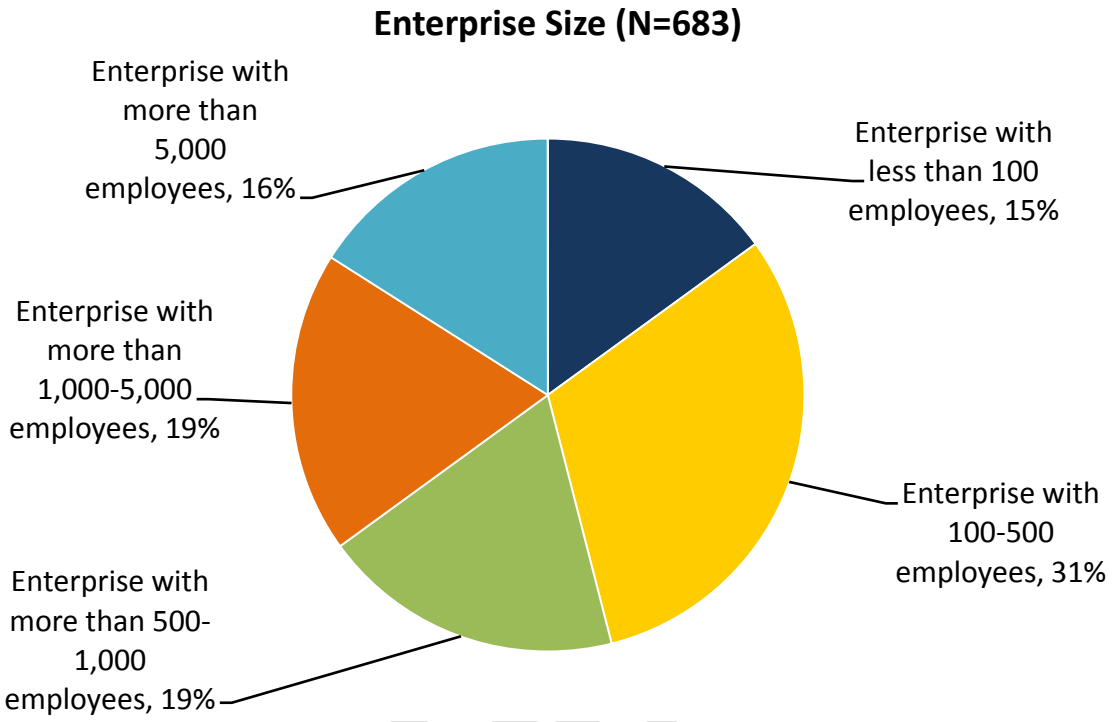
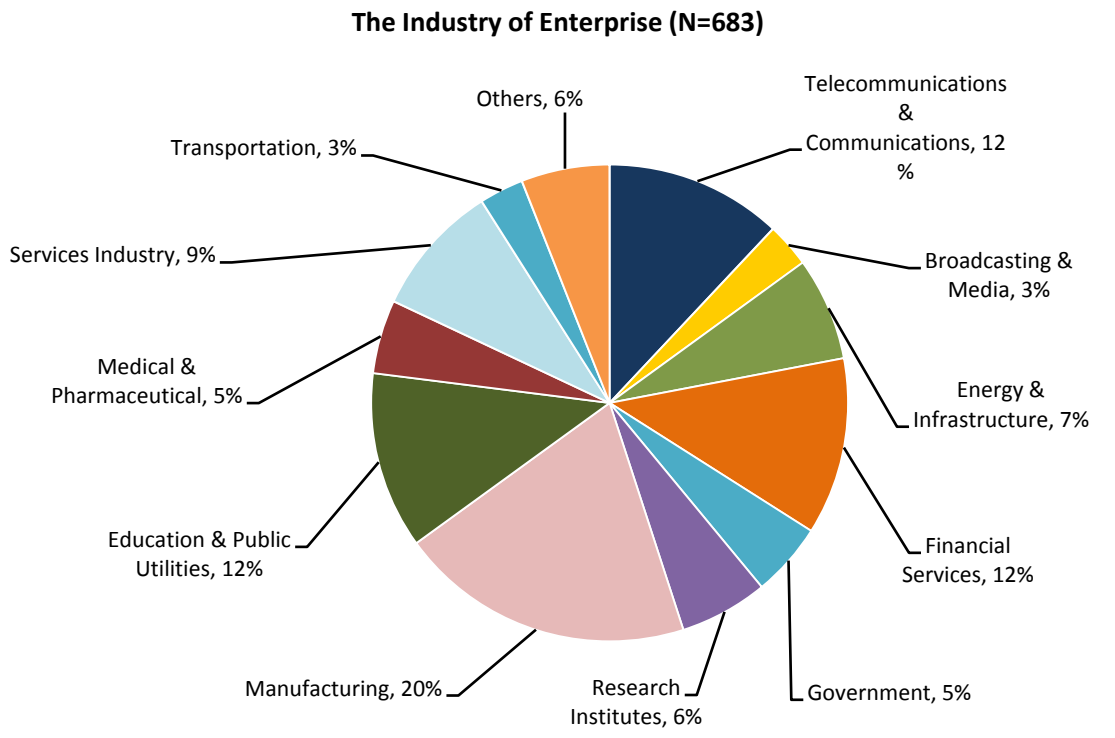


Figure 3. Interviewees' Survey, by Industry



About Research

The Sino-Bridges Research and Consulting Meeting completes the following three main reports according to the research data:

- Chinese Virtualization Market and Technology Trends (Page 52)
- The Virtualization Value and Challenge for SMEs (Page 30)
- The Evolution Trends of IT Structure and Management (Page 30)

The 2013 Research Projects of Sino-Bridges Research and Consulting Ltd.

- First Quarter: Virtualization Market and Technology Trends
- Second Quarter: The Market and Technology Trends of IT Structure
- Third Quarter: The Market and Technology Trends of Cloud Computing
- Fourth Quarter: The Market and Technology Trends of Big Data

Combined with the survey reports above-mentioned, Sino-Bridges Research and Consulting Ltd. will release a series of Webinars in www.webinars-china.com platform. Please keep your focus and interest.

About Sino-Bridges Research and Consulting Ltd.

The Sino-Bridges Research and Consulting Ltd., established in 2006, is a company focusing on consulting and research in the field of data center, committed to provide forward-looking, reliable market and technology trends references, as well as an online learning and improving platform for IT manufacturers and IT professionals from a global perspective combined with survey data and market technology (www.webinars-china.com). Its main services and research fields are focused on data center-related technology, such as storage, server, network, client facilities, business intelligence and structure management software of data centers, etc. And its main research subjects include: virtualization, cloud, big data, data protection, IT structure and application trends, etc.

The analysts at Sino-Bridges Research and Consulting Ltd. possess many years of accumulation of research and consultation of data center technology and markets in U.S. and Europeans well as in China. In addition, Sino-Bridges has tens of thousands of end-user data and research members, who can help thoroughly understand Chinese users' needs, challenges and problems by enhancing interaction with end users. The main service forms of Sino-Bridges Research and Consulting Ltd. include research reports, evaluations of products and usage, analysis reports and technology white papers, etc. During 2008~2012, the joint brand ESG-Sino (combining Sino-Bridges and ESG), one of the world's ten largest consulting companies, has provided technology and market consulting services in China. With offices in Seattle, U.S., Beijing, Wuhan, and other places, Sino-Bridges retains customers, such as IBM, Dell, HP, EMC, NetApp, etc., and domestic manufacturers like Huawei, Lenovo, Inspur, and UIT, etc.

For a main report of the survey results, please contact: contact@sino-bridges.com.

Analysts

Kim Wang is the founder of Sino-Bridges Research and Consulting Ltd. and a senior analyst. She has 23 years of international management and consulting experience in Europe, South Asia and North America, including 13 years of experience in data center. Kim has in-depth knowledge of storage, server, networking, clients and data center management software. In 2012, Kim gave more than 60 lectures on data center technology and market trends

(www.webinars-china.com, online and onsite) as the most influential analyst in the field of China providing credible reference for users in China from a global perspective to hasten the assessment and acceptance of new technologies in the Chinese market.

Mary Ma is a Sino-Bridges analyst. She joined Sino-Bridges Research and Consulting Ltd. in 2006 and began to perform investigations of data center, and evaluations of the planning and execution of various projects. Mary has led the completion of project planning of a number of surveys, the designing of surveys and in-depth interviews, evaluation of white papers, and the writing of survey reports. She has a good understanding of the data center technology segments.

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