As usual, our annual mainframe survey provides a snapshot of the System z user community’s existing hardware and software configuration, and also their plans and concerns for 2017.

This year we have continued to track the growth of mainframe integration with mobile and cloud computing, and other areas of new development, as well as gauging the extent to which BYOD, Big Data, and DevOps are changing the face of mainframe computing. In addition, we have continued to explore relative cost in more details, asking respondents how fast their distributed server costs are growing relative to the mainframe.

Profile of respondents
The mainframe user survey was completed by 100 individuals between the 1 November 2016 and the 30 November 2016. Survey respondents were either contacted directly by e-mail or other Web-based means and invited to complete the mainframe user survey on the Arcati Web site. Responses from large mainframe vendors and multiple entries from different people at the same site were excluded from the survey.

The distribution of all respondents is shown in Chart 1. Close to half (46 percent) were from North America with over a quarter (29 percent) from Europe, leaving 13 percent from the Asia/Pacific region, eight percent from the Middle East/Africa, and four percent from South America.

As usual, a wide range of industry types are represented in our sample (Chart 2). Banking/finance made up over a third of respondents (36 percent), and insurance over a quarter (27 percent). IT accounted for 18 percent and retail nine percent. Manufacturing and government both accounted for five percent each. This year, there were no respondents from education, healthcare, utilities/energy, transportation, or telecommunications.

A third way to categorize respondents is to look at business size. As shown in Chart 3, nearly half...
2017 user survey

the respondents are from companies with over 5,000 employees worldwide – 39 percent with over 10,000 staff and nine percent with 5,001 to 10,000 staff. Below that, with 30 percent of respondents, are staff sizes of 1001-5000. With 15 percent of responses we have staff sizes of 201 to 1000 and nine percent have 0-200 staff.

75 percent of our respondents were involved in running in-house data centres, similar to last year’s figure of 78 percent. 21 percent (up from last year’s 16 percent) of respondents said they were working in an outsourced operation with a further four percent saying that they were partially outsourced, and we had no responses from outsourcers.

Installed MIPS and capacity growth
As in previous surveys, we have used MIPS as the principal measure of size. We asked respondents to indicate the total mainframe MIPS installed on their systems, and the result is shown in Chart
4. 29 percent had under 500 MIPS (up from last year's 20 percent). 14 percent had 500 to 1000 MIPS (down from last year's 24 percent). 38 percent had 1000 to 10,000 MIPS (up from last year's 32 percent). 14 percent had 10,000 to 25,000 MIPS (last year it was none). And five percent of respondents had over 25,000 MIPS (last year it was ten percent). As in previous years, we use installed MIPS later in the survey to identify differences between small, mid-sized, and larger users.

Chart 5 shows the annual MIPS growth of respondents. 78 percent of sites (up from last year's figure of 72 percent) of mainframe installations are experiencing some growth, with 48 percent of sites reporting growth up to 10 percent and 26 percent reporting growth between 10 and 25 percent. Four percent of sites have growth in excess of 50 percent! Nine percent (up from two percent last year) of sites are reporting a decline in mainframe capacity growth. 13 percent of sites (similar to last year's 12 percent) are not
experiencing any kind of change in their MIPS this year. Looking at Chart 6, however, we can see that the picture varies considerably depending on the size of the system. Unusually this year, we find that the larger systems not only have the greatest growth, but also the highest percentage of decrease in size. Middle range sites are also likely to see some decrease in capacity, whereas smaller sites are most likely to see a small growth in capacity.
We also compared the rate of growth of the mainframe with that of other IT platforms within the enterprise. As shown in Chart 7, the System z looks relatively strong in the slow-to-medium growth range. Both Linux and Windows are showing strong patterns of growth, whereas Unix (like the mainframe) is showing some decline. This year, we found only about a third of sites (down from 40 percent) have IBM i installed of which half have experienced zero growth and half a slight increase.

Hardware and software currency

The IBM mainframe hardware range continues to receive a regular makeover, with new high-end and low-end systems generally being announced on alternate years. January 2015 saw the announcement of the z13 mainframe, which had a new processor design, faster I/O, and can address up to 10TB of memory. It can house 141 processors, and run 8 000 virtual servers. And then in February 2016, the z13s was introduced, which is similar, but has a smaller footprint. Delivery dates for each range of processor are provided in the Mainframe evolution section of the Yearbook.

Our research suggests that, traditionally, users upgrade on a regular basis to the most recent hardware to take advantage of capacity increases and cost benefits. Chart 8 shows that a quarter of sites had a z12 (either the EC or BC models) or a z114. The z13 was catching up with with around 16 percent of sites having one installed. And the new z13s is installed at just under ten percent of sites – similar to the older z196, z10BC, and z9BC. It must be noted when looking at these statistics that many sites had more than one model of mainframe installed.

With the greater availability of Intel-based machines such as z Personal Development Tool Adapter or the Secure Enterprise Desktop, we wanted to know whether anyone was actually using them to run mainframe applications. We found that eight percent of sites were using them for production (up from six percent last year). But, strangely, no-one was using them for development.

We also took the opportunity to ask people whether they were interested in LinuxONE Linux mainframes and when they were likely to get one.
Disappointingly for IBM just over three quarter (76 percent, up from last year’s 49 percent) said they wouldn’t get one in the foreseeable future. But, on the brighter side, five percent said they already had one, with 20 percent expecting to get one at some time in the future.

Software currency (Chart 9) presents a more mixed picture and usually lags a little behind hardware. This year’s survey found that 41 percent of sites were using Version 2.1, and 32 percent of sites were using Version 2.2, with only 18 percent using Version 1.3. Four percent were using older versions of the operating system. This year, for the first time, five percent of sites said their primary operating system was Linux.

**Mainframe strategy**

We asked respondents what, in their opinion, are the main benefits for their organization of the mainframe over other platforms. Everyone highlighted the benefit of availability, with 83 percent highlighting security. 75 percent identified scalability, and further 71 percent picked manageability as a mainframe benefit.

75 percent of sites (up from last year’s 60 percent) thought mainframes are too expensive (or appear to be), making it the biggest obstacle to mainframe acceptance within the enterprise. 70 percent of respondents (well up from last year’s 44 percent) thought there were cultural barrier between mainframe and other IT professionals. Other obstacles identified by respondents included 45 percent (down from last year’s 52 percent) who said difficulty in obtaining or retaining the necessary skills, 30 percent (down from last year’s 34 percent) identified concerns about future availability/support for mainframe applications, and another 30 percent (up from 24 percent) thought mainframes are too complex (or appear to be). As has been the case for a number of years, this part of the survey still illustrates the cultural divide between mainframers and other IT professionals.

Within the industry as a whole, opinion is clearly divided over the role of the mainframe in new applications. For some companies the mainframe remains a separate legacy environment while others are leveraging the strengths of large systems by using them in cloud and mobile working. You hear mainframers talking about JSON and RESTful interfaces along with smartphone app designers. We found that 50 percent of sites viewed their mainframe as a legacy system.
(down from last year’s 62 percent). Happily, 22 percent (up from 16 percent last year) still viewed mainframes as strategic, and 28 percent (up from 22 percent) viewed them as strategic and legacy.

We asked respondents whether their z/OS systems participate in Web services and SOA environments, and the results are shown in Chart 10. 65 percent of organizations said that their mainframes participate partly or fully in Web services (up from last year’s 53 percent).

50 percent (well up from last year’s 30 percent) went on to say that they run Java-based applications on the mainframe, with a further 17 percent planning to. 35 percent of respondents (up from...
last year’s 22 percent) said that they run Linux on the System z, with another 13 percent (up from last year’s 4 percent) at the planning stage. There are considerable cost and management benefits of consolidating distributed Linux workloads onto the mainframe. IBM made the IFL (Integrated Facility for Linux) specialty processor available in 2001, and announced the LinuxONE in 2015. Running Linux on a mainframe could so easily be a mainstream technology.

And while we were thinking about Linux on mainframes, we asked how many sites were running Oracle under Linux on System z. Only four percent of sites surveyed said that they currently run Oracle on Linux on z Systems, which is down from last year’s figure of six percent. Another eight percent of respondents say they plan to use it in the future.

71 percent of organizations said that they are Web-enabling their CICS subsystems (Chart 11), which is up from last year’s 64 percent. 58 percent of sites are Web-enabling DB2, which is much the same as last year’s 56 percent. 33 percent of sites are Web-enabling IMS, up from last year’s 22 percent, and WebSphere Application Server rated 37 percent (up from last year’s 28 percent). And 12 percent of respondents are Web-enabling other software.

We asked whether respondents currently used their mainframe for cloud computing. No-one said that they did. Last year, only four percent of respondents said they did. We also asked whether respondents were planning to adopt cloud computing as a strategy. 52 percent (similar to last year’s 50 percent) said they weren’t at present. 18 percent (down from last year’s 26 percent) thought some mainframe applications would be cloud enabled in the future. Only nine percent (down from last year’s 12 percent) planned that all of their applications would use the cloud model.

As for the future of legacy systems, once again the answer depends to a degree on the size and maturity of the installation. Chart 12 clearly shows that 75 percent of the largest sites expect their legacy applications to be maintained and actively integrated/enhanced with new apps.
Although a quarter of these largest sites anticipate a mixture of things to happen to their mainframe applications. For mid-range sites, the picture is less clear with over half expecting their legacy applications to be maintained but not integrated with new apps. A quarter of sites are predicting a mixture of strategies, and thirteen percent think their applications will be ported to Windows. For smaller sites, 45 percent believe that their legacy applications will be maintained and actively integrated/enhanced with new apps, with about a third of respondents expecting the applications will be maintained, but not integrated.

**Relative cost**

There are many ways of comparing the costs of mainframe systems with those of other platforms, but none of them are straightforward and few are meaningful. CIOs and finance directors all too often have little experience of the factors that contribute to mainframe total cost of ownership and there is still little published data available to help them make informed comparisons. It is beyond the scope of this short survey to go into detail on cost, but the following questions explore some areas where financial comparisons can be made between large centralized systems and distributed servers.

We asked respondents how fast their System z-related expenditure is increasing, in terms of the technology itself and the people needed to support it. In Chart 13, we compare these results with the growth in mainframe capacity. From the graph, you can see that 78 percent of sites have seen some kind of increase in capacity, and 81 percent have seen an increase in technology costs, but 38 percent of sites believe their people costs have decreased or stayed the same! Only five percent of sites are seeing a decline in technology costs although nine percent have seen a drop in capacity. At some stage, management will have to realize that you can’t always do more with less – no matter how good the technology is.

We went on to ask what proportion of the total IT budget is absorbed by mainframe-related costs, and what proportion of enterprise data resides on the mainframe (Chart 14). This year’s results seem to indicate that slightly more data (55 percent to
45 percent) is stored off the mainframe than on it. Organizations’ spend on the mainframe and distributed systems is disproportionate to the data split, with 87 percent (60 percent last year) of budgets going off mainframe. The figures absolutely dismiss the view that System z soaks up financial resources without providing a good return on investment.

Again this year, we asked how fast respondents believed their acquisition/maintenance and support costs for distributed platforms were growing relative to the mainframe, for an equivalent amount of capacity or size of user population respectively (Chart 15). In other words, did they think that their mainframe costs were increasing faster or more slowly than their Unix, Linux, Windows, and IBM i costs. Of course, these numbers have to be treated with great caution because we are asking respondents to make direct comparisons, which, as we have just stated, are very complex. Once again, this chart can be used only as an indication of a general trend, but it’s a very interesting trend nevertheless! Anything above the green block in each column suggests higher costs for alternative platforms. Again this year, a substantial number of respondents felt that their Linux and Windows user-support costs were increasing faster than the mainframe for an equivalent amount of capacity or support.

**IBM versus the ISVs**

The mainframe independent software vendor (ISV) business is continually evolving, and there have been a number of small companies acquired by larger organizations, but, on the whole, not any obvious shifts in the landscape.

IBM regularly argues that some ISVs are too inflexible and need to change their software pricing strategies, while the third-party suppliers respond that IBM is placing excessive pressure on them by using its size and influence to win over their customers. Mainframe management is now sold as a way of allowing customers to maintain the quality of the service they get from the mainframe without the reliance on experienced mainframers. In other words, the software will identify a problem and, as well as informing a less-qualified human, will take the necessary steps to negate the problem. In addition, vendors are beginning to use GUI-type screens, which younger IT people are more familiar with, to display important
information. And much mainframe monitoring data can now be accessed from a browser.

We asked respondents what makes them consider a change of vendor for their mainframe tools and utilities. It’s clear from Chart 16 that cost is by far the biggest driver, even though cheaper tools often offer less functionality. ISVs may be pleased to know that although 17 percent of sites said they rarely if ever change their software, this figure is much the same as last year’s 18 percent.

We also asked how much of users’ mainframe software budget is spent on IBM/Tivoli software, and how much on products from other vendors. This year (see Chart 17) we found an exact 50:50 split amongst respondents as to whether they pay more to IBM for software than to other vendors.

Other issues
We asked about IBM’s ‘specialty’ processors such as the Integrated Facility for Linux (IFL), the Application Assist Processor (zAAP) intended for Java applications, and the Integrated Information Processor (zIIP) intended primarily for DB2. We asked respondents which specialty processors they had. 12 percent of sites had all three (up from last year’s value of four percent) but no sites had just two specialty processors (down from last year’s 38 percent). More sites had zIIP processors (44 percent – down from 56) than any other. 26 percent (much the same as last year’s 24 percent) had IFL processors, and 18 percent had zAAP specialty processors (well down from last year’s 27 percent). 12 percent of sites don’t have a specialty processor installed (down from a third last year. The full results are shown in Chart 18. We also asked whether respondents thought that these specialty engines made the mainframe more attractive in terms of reducing costs and cost-justifying new applications. 65 percent said a little more attractive, 35 percent said much more attractive.

In the USA, regulations such as Sarbanes-Oxley Act (SOX), HIPAA (Health Insurance Portability and Accountability Act), and BASEL II, plus what’s
estimated to be over 150 state and federal laws dictate the length of time that Electronically-Stored Information (ESI) needs to be retained. These regulations, and they do depend on the industry, have greatly increased data retention periods. Similarly, outside the USA there has been a growth in regulation affecting the length of time that data needs to be archived. Nearly half (47 percent) of sites (up from 30 percent last year) said they were compliant, with a further 16 percent nearly...
compliant, with these regulations. The figure for sites not having an archiving strategy is 16 percent, well down from last year’s 40 percent. Clearly, compliance is an important issue and many organizations are making sure that they are (or will be) fully compliant. The full results are shown in Figure 19.

According to the IBM Web site: “PureSystems combine the flexibility of a general purpose system, the elasticity of cloud, and the simplicity of an appliance. They are integrated by design and come with built-in expertise gained from decades of experience to deliver a simplified IT experience.” We were interested to see whether sites were taking advantage of this technology. Ten percent (up from five percent last year) of respondents said they were using PureSystems. We were also curious about the take up of business analytics (IBM’s Smarter Analytics). Here five percent of sites (up from zero last year) said they are using the technology.

There’s been a huge growth in the use of social media in recent years, and we wondered whether those people “using their dad’s technology” found social media (Facebook, Twitter, YouTube, etc) useful for their work on the mainframe. 27 percent said that they did (up slightly from last year’s figure of 25 percent), with the rest not using it at all. IBM has Facebook pages dedicated to IMS, CICS, and DB2, it seems a shame if they’re not being used.

With the growth in number of software products that allow users to monitor the mainframe from a browser on a tablet/iPad or smartphone, and with IBM’s deal with Apple in mind, we thought it would be interesting to see whether our survey respondents were using these devices to monitor or control their mainframe. Only 5 percent said that they were (down from last year’s 13 percent).

Much has been made in the media about IPV4 addresses running out and the need for everyone to migrate to IPv6, which has many more addresses
available. The change would require a lot of effort for mainframers, but we wondered whether users had any plans to introduce IPv6 in 2016. No sites said they already have IPv6, although 20 percent (up from last year’s 11 percent) said that they were planning to implement it in 2017.

Another hot topic recently has been Big Data and all the things associated with that (such as Splunk, Hadoop, and Spark). We asked whether sites had any plans to use Big Data. A quarter of sites said that they were planning to use Big Data (down from last year’s 29 percent).

DevOps has also been talked about a lot during 2016 and so we were interested to see whether sites were actually embracing the technology. The survey found that five percent of sites were using DevOps with a further 48 percent planning to use it.

Similarly, we asked whether sites had any plans to reuse APIs to speed up application development. Using APIs means that organizations can re-use the best parts of their existing programs and new or updated applications can be created much faster by combining existing APIs. 14 percent of sites said that they were already using the technique with a further 41 percent planning to.

One way that CICS, IMS, and DB2 sites can easily allow their applications to link to mobile working is to use the Liberty profile. This is a cut down version of the WebSphere Liberty product. 11 percent of sites have already got it installed and 26 percent are planning to install it.

Finally we asked about BYOD (Bring Your Own Device). We wanted to know how important sites thought it was to make mainframe data available to other platforms. 83 percent (down slightly from last year’s 87 percent) of sites said that it was very important to the way they work at the moment. Nine percent (up from four percent last year) are in the planning stage, and a further four percent expect to do some work on this in the future. When it comes to how important is the idea of people using their own devices (BYOD) to access mainframes, 13 percent (up from last year’s 10 percent) of sites said it was very important to the way they work now – but 57 percent (up from last year’s 54 percent) said it wasn’t important. 13 percent (up from last year’s seven percent) are in the planning stages, and 17 percent (down from last year’s figure of 29 percent) expect to be in the future.
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CONCLUSIONS

It was an interesting survey this year to see how various sites are adopting the new technologies that seem to come out every year and how the world of the mainframe seems to be integrating with the other IT platforms used by most organizations. Clearly, working with mainframes is an interesting way to spend your day – particularly as they are able to reach out to mobile devices and the way they can speed up what was a very slow process of application development. In fact, even CICS now has quarterly updates that add value to the product.

In terms of what’s new (or, perhaps more correctly, what appears on a lot of PowerPoint slides), the survey found that 25 percent of sites are planning to use Big Data; five percent of sites using DevOps with a further 48 percent planning to use it; and 14 percent of sites were already re-using APIs with a further 41 percent planning to.

When it comes to Web-enabling subsystems, we found that 71 percent of organizations were Web-enabling their CICS subsystems; 58 percent were Web-enabling DB2; and 33 percent of sites were Web-enabling IMS. In contrast, only 11 percent of sites already use the Liberty profile, with 26 percent planning to install it.

In order to do more with the mainframe, sites need to spend more money, but many organizations already take the view that mainframes soak up as much money as they can already. The survey looked at that in more detail to see whether it was the case. Firstly, the survey compared the amount of data stored on a mainframe against that stored on distributed systems. It looked like a 55:45 percent split in favour of distributed systems. So, you might expect the spend on the two types of platform to be similar. And yet, the survey found that 87 percent of an organization’s IT spend was going on distributed systems. So, clearly, mainframes aren’t as expensive as many people think.

Despite that, 60 percent of respondents thought mainframes are too expensive (or appear to be), making it the biggest obstacle to mainframe acceptance within the enterprise. This value has increased from 52 percent last year.

Reinforcing the value of the mainframe to organizations, the survey found that 78 percent of sites have seen some kind of increase in capacity, and 81 percent have seen an increase in technology costs, and yet 38 percent of sites believe their people costs have decreased or stayed the same!

But no organization is going to develop an asset unless they view it as having a future, and we all know the mindset that still exists about the mainframe treating it as little more than your dad’s technology. Unfortunately, the survey found that 50 percent of sites viewed their mainframe as a legacy system (although, in a sense, this was good because it was down from last year’s 62 percent). Happily, 22 percent (up from 16 percent last year) still viewed mainframes as strategic, with 28 percent (up from 22 percent) viewing them as both strategic and legacy.

Worryingly, the survey found that 70 percent of respondents thought there were cultural barrier between mainframe and other IT professionals. And yet 100 percent highlighted the benefit of the mainframe’s availability, with 83 percent highlighting security 75 percent identifying scalability, and further 71 percent picking manageability as a mainframe benefit.

However, there must be money being spent by the mainframe community because, although there are more z12 and z114 mainframes in use, the z13 models are catching up with 16 percent of sites having a z13 and eight percent having the newer z13s. And in terms of operating system, 41 percent had z/OS 2.1, with a further 32 percent running z/OS 2.2.
It's interesting to see that cloud computing is not really making much impact this year. Not a single respondent said that they were currently using their mainframe for cloud computing. 52 percent of respondents said they weren’t planning to adopt cloud computing as a strategy. Looking to the future, 27 percent thought some or all their mainframe applications would be cloud enabled in the future.

Linux has had a lot of press this year, so it was interesting to see what our respondents had to say about it. Just over a third of respondents said that they run Linux on the System z, with another 13 percent at the planning stage. There are considerable cost and management benefits of consolidating distributed Linux workloads onto the mainframe. 76 percent of respondents weren’t interested in LinuxONE mainframes, although five percent said they already had one, with 20 percent expecting to get one at some time in the future.

And, not surprisingly, five percent of sites said their primary operating system was Linux.

Going back to costs, the survey found that the majority of sites, the support costs of Linux and Windows were growing faster than the mainframe’s In fact, the majority of graphs as you look through the survey find the mainframe providing more capacity and getting less of the available financing.

As is so often the case, the bottom line is that the mainframe continues to offer a cost-effective, secure, and powerful platform for organizations with the necessary background and expertise in place to support it. It seems that non-mainframe IT staff and managers are not getting the opportunities to find out about the multitude of advantages that using a mainframe can bring to an organization – in terms of security, reliability, availability, flexibility, as well as understanding the true total cost of ownership figures for the platform.
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