THE FUTURE OF ENTERPRISE IS “Ubiquitous”

Imagine a world in which organizations can communicate with their consumers, as and when they choose to. Imagine a world where organizations can use these interactions to personalize every user experience, across contexts, locations and demographics. Imagine a world where an organization’s value proposition is an intrinsic feature of their customers’ lives.

Omnipresence has long been the holy grail of global enterprise. And recent technological developments mean that the scenarios detailed above are no longer well constructed hypotheses, but realities achievable through planning and diligence. This year, the number of internet-connected mobile devices will exceed the number of humans on the planet. Factor in the development of sensor and radio frequency identification (RFID) enabled devices, near field communication (NFC) and augmented reality (AR) applications along with the impending proliferation of wearable computing devices and the future of computing becomes apparent. From bridges that self-check their strength and embedded devices that detect and report illness, to refrigerators that order groceries and cars that read out social networking messages, a user no longer has to reach out to technology but, instead, technology reaches out to the user. The enterprise of tomorrow will have more access to the customer, more interaction with a customer and, as a consequence, a better understanding of the customer’s need. And it is in being ubiquitous that enterprises will fulfill this need effectively.

What is Ubiquitous Enterprise?

A recent United Nations study showed that six billion, of the planet’s seven billion people, own a mobile phone, while a mere four and a half billion have access to proper sanitation. While the concerns raised by this research are rather self-explanatory, it also reveals that computing, once a privilege, has now become a basic, omnipresent feature of human life. When we consider the progressively increasing power and constantly decreasing size of computing devices, it is easy to see how the world is moving towards a culture of pervasive computing. Technologies like ambient backscatter can create situations where devices can
power themselves and communicate seamlessly, even in locations previously inaccessible, thereby all but eliminating every logistical concern associated with the idea of ubiquitous computing. But what does this mean for organizations across the world?

By harnessing these technological developments, organizations now have the opportunity to deploy enterprise computing on a scale previously unimaginable, blurring the lines between personal and professional computing. Businesses can now communicate with consumers in a seamless and non-intrusive manner that makes users internalize the enterprise process, creating and facilitating new avenues of engagement. This technology-driven ability is what we at Wipro call ubiquitous enterprise.

**The change required for adoption and implementation**

While ubiquitous enterprise is set to change the way organizations conduct business and deploy IT systems, it also necessitates a fundamental change in the approach to framework creation and deployment. The challenge will now be to maintain computing landscapes that scale effortlessly and work round the clock without any downtime. These new-generation IT architectures will need to reshape themselves based on the edge device being used for access. These systems will need to intelligently balance functionality and consistency with effectiveness in order to service volumes and optimize resource utilization.
This would mean a three-step change for business:

i. Enterprise IT systems will now have to shift their current focus on efficiency to a one centered on effectiveness; this also means a move from being a system of record (data) to a system of engagement (customer focus) and a reduction in the number of platforms and applications.

ii. IT departments will need to use new age development methods, polyglot programming, automated, agile development, and enterprise app stores for rapid response to market needs.

iii. The creation of multi-channel, variable functionality with always-on computing architectures that employ effective, context-aware applications will be imperative to massive scale benefits, reducing cost and increasing returns per transaction.

**Salient features of ubiquitous enterprise**

- **The Multi-Device Experience:** IT industry forecasters predict that by the year 2020, over 50 billion devices will be connected. Soon we will live in a world where computing is all around us – seamless, accessible, powerful and unobtrusive – signifying a seismic shift in technology consumption patterns. This mesh of connected devices will allow consumers to enjoy consistently satisfactory user experiences across devices and locations. In order to facilitate this unfettered, high-performance access to enterprise experiences, organizations will use web scale application programming interfaces (APIs) and services that allow for constant, scalable and flexible performance. Responsive design will be the guiding force of all IT architecture with constant innovation and integration taking place at the intersection of technologies.

- **Hyper Connectivity and Hyper Personalization:** The success of ubiquitous enterprise, similar to that of the Internet of Things, will rely upon one hundred percent adoption by target users. A hyper-connected web of computing devices – sensors, RFID tags, microprocessors and the likes – will generate and draw intelligent inferences from “ubiquitous” data to deliver a hyper-personalized service. Applications must be context aware and inherently functional. This ambient intelligence run on always-on systems that allow for multi-client, multi-device access will give rise to an unprecedented quality of user experience, driving organizations to focus on adding value.

- **Decentralization of Enterprise IT:** The world of ubiquitous enterprise will also cause the decentralization of enterprise IT systems. With the IT eco-system now outside the organization, the success of a business will be driven by the robustness of its security and the optimization and use of its open and linked data. This extended enterprise, with IT systems external to an organization and its employees, will reach out to users on day-to-day basis, forming, cementing and enhancing enterprise-customer relationships.

**Readiness test for ubiquitous enterprise**

Before you make the decision to shift to a ubiquitous IT infrastructure, it may be useful to ask yourself the following questions.

- Are our Enterprise IT systems open, collaborative, agile and externally accessible?
- Do the features of our latest applications support highly personalized location/ context driven services?
- Do we have cloud based solutions and architectures accessible by a wide array of user devices?
• Is our ‘always on’ IT architecture based on web scale enterprise systems?
• Are we adopting new enterprise platforms and technologies to create hyper connected applications?
• Does our IT architecture support automation in device management, application management and operations?
• Do we have next generation security and privacy solutions ready for use in an open, hyper-connected world?

If your answer to all of these questions was yes, then your organization is on the right path to ubiquitous enterprise and you need to consolidate and move forward. The questions to which your answer was negative should become your focus area in your journey to become ubiquitous.

The impact of ubiquitous enterprise on IT infrastructure

Making your enterprise ubiquitous will have a significant impact on your organization’s IT eco-system. In order to be comprehensive and effective, a CIO’s IT infrastructure plan must take the five following areas of impact into consideration:

1. Impact on end user devices: The use of sensor/RFID enabled devices will result in a significant increase in the number of end user devices and place a heightened strain on your IT infrastructure. End user devices will no longer be owned by you or by your employees but by individuals. Add to this autonomous devices that perform functions and gather data independently and it becomes essential to have a robust IT framework in place to support all end user devices consistently.

2. Impact on enterprise computing requirement: Another factor to consider is the increase in your organization’s computing capability requirement. The large number of devices, which I mentioned earlier, alongside external IT eco systems, virtualization and the need for high performance computing necessitate a significant boost in enterprise computing capability. Data collection, mining and analytics must now be ‘agile’ in real time with comprehensive algorithms that account for, both, structured and unstructured data.

3. Impact on enterprise storage requirement: Being ubiquitous will have a substantial effect on your organization’s storage requirement. While organizations continue to refine their Big Data analytics, a ubiquitous IT
system would allow for “ubiquitous” data. Consequen-
tially, data capture, storage capacity and retrieval re-
quirement would all need to increase in proportion with
the amount of information gathered and processed. The
cloud would be a ubiquitous revolution-enabler in this
situation.

4. Impact on security requirement: Perhaps the most
critical of the five areas, security must be of prime im-
portance in a ubiquitous IT infrastructure. Various types
of data – sensitive data, real-time data, personal data –
are now located outside the organization in a system al-
most entirely dependent on IT. This vulnerability means
your IT system is more susceptible to malicious attacks.
Robust, secure and adaptable systems that can detect,
report and eliminate threats effectively will be crucial to
the success of your organization’s move to ubiquitous
enterprise.

5. Impact on networking requirement: Also crucial,
to the success of seamless, ubiquitous enterprise is in-
creased networking capability. In an always-on world
with several internal, external and independent devices
utilizing, transmitting and receiving data constantly, your
organization cannot afford to be unavailable, even mo-
mentarily. Maintaining service levels and user experi-
ence in this situation then takes precedence over sheer
efficiency. A secured network, wired or wireless, capable
of transmitting, receiving and processing vast quantities
of data, is the foundation for the deployment, progress
and maintenance of ubiquitous enterprise services.

Think about the conveyor belt that calculates and op-
timizes production cycles at your manufacturing unit,
sends real-time data to your supply chain managers and
adjusts your inventory requirements accordingly. Think
about the retina scan payment system that decides what
conditions your customers are most likely to make a pur-
chase in. Think about wearable computing that sends
you rich, varied data about your consumer’s interaction
with the real world, allowing you to build not just a prod-
cut, but a comprehensive, customized user experience.

We too have put some of these systems in place al-
ready. For instance, in the oil and gas sector, we have
deployed a solution where seismologists sitting across
the globe can make on-site decisions based on sensor-
generated data. Our connected health solution, monitors
subject vitals in real time. For instance, in the case of
expectant mothers, this monitoring can ensure invalu-
able and timely intervention. The possibilities really are
limitless.

The Internet, smartphones, and more recently, wear-
able computing are just a few instances of technology
assisting, and enhancing, a user’s interactions in every-
day life. By becoming intrinsic to a user’s discovery of
the world, organizations can engage with consumers on
an elemental level, adding value, building relationships
and creating great consumer experiences along the way.
Furthermore, ubiquitous enterprise frameworks incorpo-
rate smart systems that will perform tasks such as data
mining, analytics, repair and maintenance autonomously,
thereby mobilizing the workforce into value intensive
tasks.

Early adoption will be the key as the organizations that
start the soonest will adapt the best, in addition to gain-
ing a monumental first-mover advantage. Diligent imple-
mentation of an adaptable IT framework in this process,
undoubtedly expected to evolve, will be a key differen-
tiator between organizations that thrive in a ubiquitous
world and those that don’t.

References:
http://www.vs.inf.ethz.ch/publ/papers/socialambient.pdf
http://seeit.mit.edu/Publications/CrackBerrys.pdf
http://www.vs.inf.ethz.ch/publ/papers/ubicomp2003-
chatty-env.pdf
http://abc.cs.washington.edu/
http://www.ericsson.com/res/docs/whitepapers/wp-
50-billions.pdf