Quo Vadis IT Quality?

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ABSTRACT

This paper, ‘Gartner Consulting POV: Quo Vadis IT Quality?’, addresses the growing role of IT in the 21st century and, in particular, the increased quality demands on IT in an increasingly digitalised, mobile and automated society.

It is a best practice oriented point of view (POV) from Gartner Consulting and takes into account the diversified experiences gained from projects and continuous work with the world’s leading captive and non-captive service providers on the one hand and the users/companies on the other.

In this context, the issue of ‘quality’ is highlighted – especially with regard to the drivers of IT service quality – and an attempt is made to illustrate possible solutions for improvement on the basis of customer satisfaction.

TABLE OF CONTENTS

Introduction: The growing role of IT in the 21st century ..........................................................3
Consideration of different levels and dimensions of quality...............................................................4
  Level 1: Quality of the components ..................................................................................................5
  Level 2: Interaction of the components ............................................................................................5
  Level 3: IT delivery chain ..................................................................................................................6
Classical quality approaches are not enough:
  Customer satisfaction as the new ‘dogma for IT quality’ .................................................................7
  Digitalization tsunami and automation as drivers of rigorous availability .......................................7
  A common approach is necessary .....................................................................................................9
Introduction: The growing role of IT in the 21st century

Today, IT is an integral part of everyday life.

It is all around us, and makes our lives significantly easier, but we often take it for granted or don’t even notice it.

But without IT, nothing would work today: no mobile phone, no satnav, companies could not function/produce, traffic would not be controllable, banks would not work, and planes could not fly – not to mention that there would be no Internet.

Every day, we rely on the fact that everything is ‘always available’, everywhere – with a high level of quality.

The quality of IT is, of course, reflected in everyday life by being available virtually around the clock. This is often the case, but sometimes we realise how much IT influences our lives: when things don’t work! Suddenly you can no longer access your bank account, the mobile network is down or in the worst case there is a power outage.

Especially today’s generation of ‘digital natives’ is totally accustomed to being looked after and having access to IT all day every day – from social media to Google functions as a vast pool of information. It is no longer conceivable for today’s generation that these technologies and IT services would cease to exist.

Of course, all the systems involved must be ‘always on’ in the background, with high availability and quality. This comprehensive, highly complex network of IT and the services delivered by various providers is the backbone of today’s modern societies.

However, the efforts hidden behind this high-quality and available IT are not always apparent to normal users. They simply take these services for granted.

The nonchalance with which we consume IT services is to a certain extent frightening, but it also represents a serious effort on the part of manufacturers, IT providers and service providers: not only to get the actual quality of the products right, but also quality of their interaction within the complete delivery chain to guarantee the availability of IT services.

Different systems from different suppliers, a multitude of processes and also at the end the people involved have to interact seamlessly, interconnect and function 24x7 as a holistic system.

Here, the importance of quality becomes very apparent.
Consideration of different levels and dimensions of quality

What exactly is quality? What does it mean? How can it be defined?

A large quantity of scientific articles and research have dealt with the topic of quality already in the past. As a quintessence, a common definition of quality seems to be difficult.

“No consensus has been reached on a definition for quality; the term is defined differently for products and services, for different industries, and for different levels of dimensionality”.

Quality plays out at different levels and dimensions. Most of the participants within the delivery chain have so far pursued their own paths or have primarily sought financial self-interests. Therefore there is a lack of consensus.

- The first level of quality hereby is the quality of individual products/components (hardware or software).
- The second level is the quality of the technical interaction of components with each other.
- The third level is the quality of the IT services, which is created by the interaction of all these technical components, as well as the human factor in a complete chain (‘IT delivery chain’).

In each of these levels, however, quality is additionally influenced by several dimensions.

The dimensions can be divided into four basic areas that have a decisive influence on the final quality:

1) People  
2) Processes  
3) Technology (components, platforms)  
4) Security

In particular, the dimension ‘people’ plays a decisive role in quality in practice:

Practical experience shows that the vast majority of IT outages can primarily be attributed to the category ‘human error’ – in a broader sense more than 80 percent.

This includes, in particular, non-compliance with defined principles and policies (e.g. the ‘two heads are better than one’ principle or change management processes), missing skills or insufficiently practiced processes in a case of emergency. The remaining 20 percent can be attributed to pure hardware defects or security issues (e.g. attacks from outside such as DoS, brute force attacks or phishing).

1 ‘A Satisfaction-Based Definition of Quality’, Angela M. Wicks, Bryant University  
Christopher J. Roethlein, Bryant University, Journal of Business & Economic Studies, Vol. 15, No. 1, Spring 2009
Level 1: Quality of the components

The classic quality and quality control of individual manufacturers for their products is nowadays ensured by a series of industry standards, norms and standardised processes, for example typical norms such as ISO9000/9001 or de facto standard process frameworks such as ITIL for the provisioning of IT services.

These standards and norms describe the quality output, but usually only the ‘What’ is described, rarely the concrete ‘How’ it should be achieved. As such, the way respective manufacturers actually achieve their quality is often quite differently defined in the ‘How’.

Example: Release cycles for software vendors

Vendor A ensures the continuous quality (in this case functionality, security fixes, etc.) of their product with release cycle R1, vendor B with R2:

- R1 = 2 major releases/year, 10 minor releases/year + hotfixes
- R2 = 1 major release/year, 2 minor releases/year + hotfixes

Example: Reaction and recovery times from vendor maintenance contracts

Vendor A guarantees in the maintenance contract a reaction time of

- 24 hours for severity level 3 (non-critical)
- 8 hours for severity level 2 (critical)
- 4 hours for severity level 1 (mission critical)
- guaranteed recovery time / Mean Time to Repair (MTTR): not defined

Vendor B guarantees in the maintenance contract a reaction time of

- 8 hours for severity level 3 (non-critical)
- 2 hours for severity level 2 (critical)
- 1 hour for severity level 1 (mission critical)
- guaranteed recovery time / Mean Time to Repair (MTTR): 4 hours

In this example, both vendors achieve their promised ‘quality’ (expressed by the maintenance level) in quite different ways (here, the ‘time’).

Level 2: Interaction of the components

Due to the fact that different suppliers have different approaches to ensure their quality, in particular the quality of their products or services, when different components from the various suppliers are plugged together into a ‘solution’, an ‘undefined level of quality’ is usually the result.

This interaction of very different technologies and components from multiple suppliers in particular is a real challenge in practice, because the assembly of components is not conducive to a consistent performance of IT.

From the outside view, the problem is usually not directly recognisable because, for example, the storage or server systems are working fine and possibly also the software or applications running on the machines – but somewhere the devil is in the details: an update goes wrong, a patch doesn’t get implemented… and now there is ‘a little spanner in the big works’ that will have a major negative impact on the overall performance.

In the search for errors the (in)famous situation of ‘problem dispatching/ping pong & finger pointing’ between the participating suppliers/parties in the heterogeneous chain often arises.
Level 3: IT delivery chain

Service providers in particular are then often faced with the situation that the warranty or promised service level (→ maintenance promise) of the manufacturers are respected for each individual vendor/supplier (‘My systems are green’, ‘I provided a patch within the agreed time’). From the perspective of the provider and the customer, however, the entire system doesn’t function in the sense of an IT delivery chain – the IT service itself is not available, or at least not with sufficient quality.

As shown in the previous example, the consequence of the different qualities in the ‘How’ of the vendors is therefore very complex. It doesn’t help if vendor B’s system is available again after 4 hours, because vendor A’s system is still down and the recovery time ‘is written in the stars’ (no MTTR defined/assured).

Although all defined quality standards and norms (‘What’) have been adhered to at the individual levels, the IT service is still not available because the ‘How’ isn’t harmonised.

In practice, however, we observe that the majority of vendors do not guarantee MTTR in their maintenance contracts, but rather only a reaction time. From the perspective of the contracting party (company/provider) this is, in practice, completely unsatisfactory: A lot of money is paid for maintenance, but with no guarantee that in the case of a serious problem the products will be ‘repaired’ within an appropriate timeframe.

So the vendors often purposely leave their customers in the lurch, and we are increasingly observing that customers are often no longer willing to sign such maintenance contracts blindly. However, those contracts are the ‘holy cow’ for the vendors because they are also their ‘cash cow’: Maintenance revues today usually significantly exceed those from the actual licensing business. Negotiations for guaranteed service levels as per MTTR are therefore almost always strictly rejected.

From the perspective of the users and superior quality aspects, a rethinking in the industry is urgently needed – away from profit orientation towards customer satisfaction.
Classical quality approaches are not enough:
Customer satisfaction as the new ‘dogma for IT quality’

From the above examples it becomes clear that classical quality approaches in IT are not sufficient for a continuous IT chain.

“[In the history of IT...] However, many quality initiatives have failed. Reasons for such failures include a continued focus on financial returns instead of customer satisfaction. Some recent industry declines may be due to customer satisfaction factors and a focus on quality as it is now narrowly defined\(^2\).”

Customer satisfaction can only be fully achieved if all parties that participate in the IT chain commit to a holistic approach that includes the dimensions people, process, technology and security.

This means that a holistic approach has to ensure that we get rid of all single point of failure (‘SPOFs’).

Digitalization tsunami and automation as drivers of rigorous availability

The challenges with classical IT services are already enormous today, and they will increase exponentially in the coming decades.

New technologies and approaches derived from them reinforce the need for non-stop availability and robust end-to-end services in highly complex and critical environments.

Major drivers and challenges that force new quality demands can be seen in the market, e.g.:

- Digital business innovation creates disruptive effects that have a wide-ranging impact on people, technologies and budgets
  - Therefore companies have to prepare to survive the ‘Storm Winds of Digital Disruption’
  - The average CIO is already spending 18 percent of the organisation’s budget on the support of digitalization, with that number expected to increase to 28 percent by 2018
- Rising amount of ‘connected devices’ is driving the need for Internet of Things (IoT) platforms and a quality-related focus on integration & security
  - Sensors are growing pervasively: By 2020, Gartner predicts that the world will contain more than 20 billion IoT devices (connected sensors and endpoints), generating trillions of dollars’ worth of business value
  - Through 2018, half the cost of implementing Internet of Things (IoT) solutions will be for integration and security
- Artificial Intelligence (AI)
  - Hyperconnectivity will increasingly create complexity for users. Consumers will have to use AI-enabled technologies to orchestrate their lives more effectively in a rapidly evolving and complex digital world.

AI is the predominant theme of investment across the giants of consumer technology and will come to shape experience and relationship design.

By 2018, 30 percent of our interactions with technology will be through ‘conversations’ with smart machines.

Over the next 10 years, consumers will increasingly provide more and more intimate data to AI-enabled technologies to calibrate their reasoning so that they may not only serve more efficiently but can ultimately act on a user’s behalf.

- Dramatic changes in the way projects are planned in a fast developing digital world
  - Technology change (and its disruptive business consequences), once gradual, now occurs so suddenly that what used to be a vision for the next era is now a project for next year
  - 85 percent of organisations have started or planned to start a tactical bimodal project. More than 40 percent of organisations have implemented bimodal IT.

- In addition, cloudification and globalisation are driving complexity of and dependency on network components; globally distributed service provisioning is further boosting that dependency.
  - Cloud computing is mainstream, with approximately 58 percent of organisations well down the path of using cloud services to support some aspects of their business.

The criticality of all these disruptive trends and dimensions within this ‘Digital Tsunami’ hereby increases in three typical levels:

- **Level 1:** classic critical systems at the **corporate level**
- **Level 2:** **national/global** critical systems
- **Level 3:** **human** critical systems

Examples of this are:

- **Level 1:**
  - Systems that are important for the success of the company (‘profit-oriented criticality’ approach)
  - e.g. production facilities for consumer goods, automotive, etc.; a failure primarily means lost profit and/or loss of image

- **Level 2:**
  - Systems in the field of infrastructure/energy
  - e.g. increased use of ‘closed-loop (feedback) control’ systems for critical energy sites (especially nuclear power plants)
  - In this area in particular we are currently seeing a large number of projects in the market, especially in the case of global industry players, but also specialised shops, that aggressively push use cases for increased digitalization – e.g. more and more based on IoT approaches. Especially in the case of these ‘closed-loop control’ systems, BI/data analytics is leveraged in an attempt to increase the quality and efficiency of the controls. From the perspective of the quality as a whole, however, it should be critically noted that the human factor is deliberately ‘faded out’, i.e. the final ‘control instance with real intelligence’ gets lost in complex critical situations.

- **Level 3:**
  - Systems in the field of ‘human mobility’
  - What is already standard today in, for example, the aviation industry (e.g. multi-redundant layout of all critical components, predictive maintenance), will also be mission critical for future IT services as soon as **protecting human**
life is a concern. An obvious example of this is the immense challenge of ensuring safety during autonomous driving.

- Various examples in the past have shown the devastating consequences of a faultily programmed software (or software that misinterprets data/correlations and therefore results in incorrect decisions) or the failure of components.

In this context, the topic customer satisfaction through quality gains a whole new dimension, and that calls for rethinking and new approaches across the board.

Therefore, the vision and claim staked for the future – for all participants in the IT ecosystem – must be an uncompromising level of quality to ensure 100 percent, non-stop availability with zero downtime of IT services across the complete delivery chain. This requirement will be mandatory – at the latest when we move from levels 1&2 to level 3 as an ‘insurance’ for protecting human life.

A common approach is necessary

Therefore we see a strong need for a common approach within the IT landscape.

A major key to success will be alliances in the market to address and solve critical issues within the different dimensions by harmonisation of the ‘How’, based on common design principles. For example:

- People
  - Training initiatives: train the vendors based on common standards and best practices

- Processes
  - Common and detailed approach to handle the most critical ITIL processes such as incident, problem and change management
  - Harmonisation of release cycles for all components
  - Harmonisation of monitoring: integration of all participants on vendor side in the monitoring process
  - Establish common multidimensional view (such as a triangle model) and metrics to measure and report quality, e.g. for Infrastructure & Operations: efficiency, productivity, customer satisfaction

- Technology (components, platforms)
  - Enable predictive maintenance for all components to avoid any failures

- Security
  - Harmonisation of security levels within the complete chain; different levels have to be supported based on industry-related (minimum and maximum) standards

In addition to typical internal quality approaches such as CMMI and ISO9001 or smaller strategic 1-to-1 alliances between technology vendors/providers, we are currently seeing that these required broader alliances have started to be addressed in the market.
For example, an announcement was recently made in November 2016 that an alliance has been founded called ‘Zero Outage Industry Standard Limited’, based on an association approach with the goal of defining a new industry standard for IT to enable the delivery of secure, reliable and highly available end-to-end IT services and solutions\(^3\) within the IT supply chain.

Apart from the fact that this initiative seems to address the right goals, topics and dimensions as outlined above, it is already supported by a collaboration of a broad range of market leaders and ‘tech giants’ as initial founding members\(^4\) and therefore it looks promising that they will be able to drive the overdue change in how IT quality is thought about.

Of course, it could be expected that solutions following this ‘zero downtime, uncompromising quality approach’ will be calling for an add-on fee for the solutions provided. However, such fees should be worth the guarantee; at least before we sit into a fully autonomous vehicle – asleep in complete trust.

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**Bottom Line:** The final goal and vision of such quality approaches and initiatives must be to overcome individual interests – and make a vision come true: by enabling, selling and providing end-to-end tested components and services based on common and reliable frameworks and design principles. If this can be achieved, quality based on customer satisfaction has the potential to reach the maximum possible level.

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\(^3\) See [http://www.zero-outage.com](http://www.zero-outage.com)

\(^4\) Founding members: Brocade, Cisco, Dell EMC, Hitachi Data Systems (HDS), IBM, NetApp, SAP, SUSE and T-Systems