

Making the Invisible Visible

Knowledge Visualization at Open Systems Inc.



1. Introduction: To visualize or not to visualize?

For once, Martin Bosshardt, the CEO of Open Systems, was confused. It was Friday, late afternoon on a beautiful autumn day and he had just come back from his the weekly meeting with his head of communication and the company's designer.

Although it would be time to start the weekend, he opened his folder and spread the documents that they had just discussed on his desk. He paused to watch the leaves swirl outside his window. Most employees had already cleaned their desks and left the building in Zurich's suburbs and were heading towards their well deserved weekend. As Open Systems monitors internet traffic 24 hours a day, seven days a week, the security officers on duty were still sitting in the futuristic cube, monitoring network traffic around the globe.

In the meeting, Bosshardt and his colleagues they were discussing the next edition of the Open System's customer magazine, or more specifically a single page of it with an elaborate (and quite aesthetic) service visualization diagram. It was Bosshardt himself who had initiated the creation of this visual. It was his aim to have Open System's services visualized on a single page. IT security, their core business, is invisible and as he always said: "Anything you don't see – won't work." So he had asked for this

specific visual representation of Open System's main services. But something was off.

Franziska Eriksen, the company's talented and dedicated designer had put a lot effort into the creation of the security service visualization and, as always, the result was impressive. Martin Bosshardt was excited when he had first looked at the graphic: On one single piece of paper, you were able to find everything – from the different security-related roles at the customers' sites, to the various services offered by Open Systems.

"Anything you don't see – won't work"

But now a doubt started to lurk in his mind: Is this really the kind of visual we need? His team wanted to cover everything and created the Swiss army knife equivalent of a chart, the mother of all Open System diagrams: a visual which allows explaining what they were doing to both a CFO and the head of IT and – to some extent – even to your grandmother. But that was the problem. Wouldn't a differentiated approach to visualizing their services be better? Bosshardt and his chief communication officer Tobias Steger thought about different graphics for different target groups, such as CIOs, the general public, IT cracks, risk managers, etc. But Bosshardt had even more general doubts: Should a complex visualization like this one be used at all in a broadcast medium like a magazine? Or wouldn't it be better used in face-to-face interactions where it could be annotated and explained based

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Mission Control Security Services

Everything under control

With Mission Control Security Services you can secure and protect your ICT infrastructure. Around the clock. 365 days a year. Worldwide.

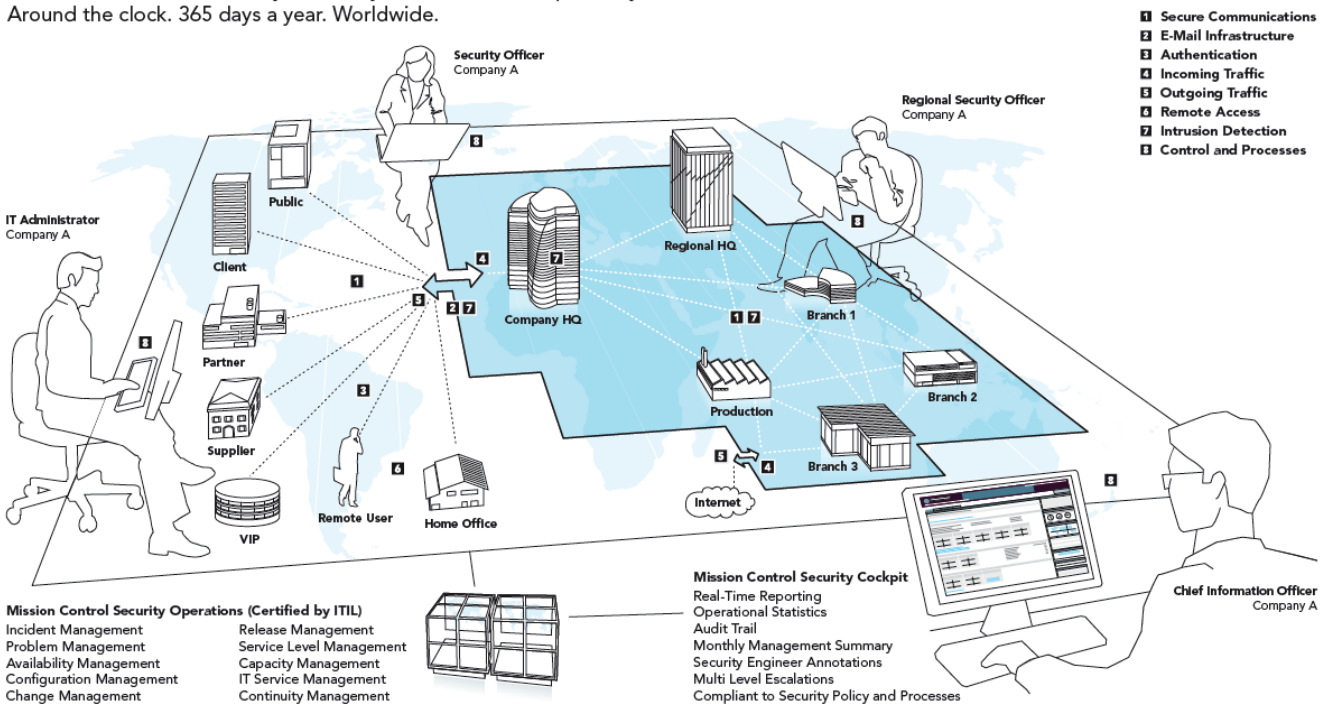


Fig. 1: Open Systems' Service Visualization

on the customer's questions and needs? And were all customers receptive to such an imagevisualization anyhow?

He came to a bitter conclusion: When in doubt, leave it out. None of the future users of this chart would be satisfied in the end. For the IT crack, this the chart was too simple and made the offered services look like gimmicks. For somebody who had no previous knowledge in this specific field, the chart still needed lots of explanations. Instead of a picture that says more than a thousand words, they had created one which needed a thousand words to be explained, Bosshardt thought. Besides that, the visual looked much to sellingsales-oriented, whereas the intention of the magazine always was to put emphasize the client and his context in the center of focus. According to that, it not only matters what you show, but also where you show it. So the argument was really not just about the image itself; it was also about where and how to make the best use of it.

While hunkering over the notes that he took during the meeting, Bosshardt started to think in broader terms: Brooding over this single service visualization made him think about how they used visualization at Open Systems in general. Communicating visually was widely used in his company and a lot of attention was paid to it (the company has already won several awards like the reddot design award and the communication design award and just got nominated for the German Design Prize 2011). IT security, and network security in particular, is neither tangible, nor visible. Hence making it visible really is a key to make people understand their services and finally sell them (for this sake,

they also have short videos on their homepage, explaining the offered services). But were they doing this in the right way? He settled sat back in his office chair and started to think of the different forms of visualization that they currently used in their daily business and how they added value.

2. The Visualization Spectrum at Open Systems

Probably the most eye-catching visualization of all at OpenSystems is the heart of the company itself, the so-called mission control operation center where the IT security officers monitor their client's networks. The enormous screen inside this glass cube visualizes all clients' sites on an animated Google Earth map and shows the values of key performance indicators, such as the number of IT security threats or open issues (tickets). It also integrates live global news feeds from CNN. The big large map helps employees not to lose sight of the fact that although they work in a virtual world from a remote location, they are doing something real. The whole concept of the mission control operation center focuses on visualizing the work itself: Instead of just sitting in front of a monitor on a regular desk, the security officers very intentionally change their workplace when they are on duty, locking themselves in a giant glass cubicle with an enormous overhead beamer. This visible ritual highlights the fact that the security officers take on responsibility and accountability when entering this monitoring zone. Although the two giant glass cubes might be the most prominent pieces, if you walk through Open System's offices, you will come across

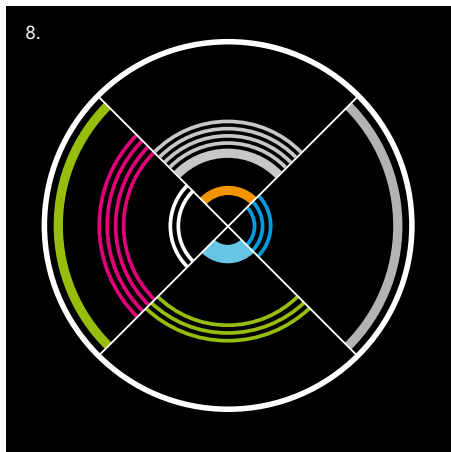


Fig. 2: A sample fingerprint

employees have their own glass cubes which give them both privacy and a direct contact with co-workers. In certain moments, when one really needs to focus on a complex task, you just don't want to get distracted. That's why all class cubes are equipped with a switch which turns the light below the cube from blue to red and signals to co-workers not to interrupt them now. These individual glass cubes host another particular visualization: on each cube's door, there is a so-called fingerprint which graphically displays the knowledge, experience and particular achievements of each employee. This system, which is similar to the merit badges that boy scouts sew on their shirts, is very easy to implement, as all the data is available, but effective in communicating skills acquired and merits achieved among staff.

Martin Bosshardt got off his chair and started to walk around the now almost empty premises. The big flat TV screens mounted on the walls throughout the building immediately caught his attention while walking down the hallway. These screens show the most recent and most important key performance indicators (KPI), and even more important, they show a world map laced with little dots, indicating all locations, monitored by Open Systems in order to communicate, that they are covering almost every single spot on earth. The screens reminded him of a lengthy discussion in the course of the replacement of those screens that he had with Florian Gutzwiller, the chairman of the company. Showing KPIs to both clients and employees was an idea Gutzwiller came up with, quite some time ago. He wanted to take advantage of the fact, that in the service industry, a lot of data is available anyhow and that you only have to pull it from a database and visually display it. Instead of just crunching those numbers in a printed report at the end of the month, he wanted to have them available and visible in real-time. In a cloak-and-dagger operation, they had implemented a first version of those KPI screens. With its bold and simple appearance, they looked very rudimental but perfectly served the purpose to permanently show the relevant figures. But what means is the meaning of "relevant" in this context? In this context, the visual information fulfills three purposes: First of all, employees get reminded of the fact, that their company is a security operating company where people ensure reliable operations. Second, employees perennially see the

many more visualizations, Bosshardt thought, mentally walking through the futuristic offices they had entered only a couple of years ago.

The office architecture at Open Systems was peculiar: Instead of either cubicles or an open-space office, all employees

current number of open tickets and would can thus autonomous help out at the mission control operation center whenever there is a bottleneck. The third addressee target group of this information are external people, first and foremost, clients. They should get an understanding of the existing, but invisible thread that Open System is constantly monitoring.

The indicator screens were a great idea, for sure, Bosshardt thought. But after all these years, this hand-knitted home made solution didn't meet the company's requirements anymore and Franziska Eriksen got had received the assignment to come up with a new design of this KPI dashboard. Her preliminary design looked great and fit exactly into Open Systems' central theme. Florian Gutzwiller nevertheless was not satisfied. Although implemented in an appealing manner, he missed the focus on the relevant indicators. For the sake of design, the designer had to make sacrifices on the font size of the prominent key figures, like such as the customer counter. However, showing this numerical data on a screen, and thus letting it become emotional and allowing for directing taking action the company, was the very reason, why he had initiated those dashboards in the first place. Must there always be trade-offs between functionality and design, Bosshardt wondered.

The screen showing internal KPIs is not Open Systems' only dashboard. Much more important is the client's cockpit which



Fig. 3: The KPI screens

represents the interface between the customer and Open Systems. This web-based application allows the client's IT security officer to monitor his own network and also to get in touch with the IT security officers in charge. But Bosshardt and



his team had realized that their clients did not use the cockpit's reporting function was not yet used extensively. In their management meetings they had been busy discussing the reasons for the lack of adoption. Apparently, there were several reasons for the clients' reluctance. First of all, an array of clients was simply not aware of the possibility to pull those these monthly reports. Second, managers at a certain hierarchic level, e.g. CIOs, just don't log into the cockpit at regular intervals. Amongst the possible approaches, they came up with the idea to implement a monthly printed report, implying a shift from pulling to pushing information, or to fine-tune the cockpit to make it look more appealing or even display the information on a tool like the iPad. Automatically sending those reports by e-Mail nevertheless was is not an real option as it holds an undeniable due to security risk. So how could the clients be "made" to look at the cockpit and get an overview on their IT security situation in this way? Was eye candy the answer (i.e., making the cockpit look prettier)? Or was interaction the answer? This would make it easier for customers to create the visuals that they felt they needed. Were more features the answer or did the cockpit need to become simpler?

More technology is not always better, Bosshardt thought. Using the advantages of visualizing thingsvisualization does not always call for sophisticated, cutting edge technology. Far from it. A simple example of how visualization can improve a process is how Open System now manageds its inventory. In the past, all components were stored in the basement and the stock was tracked using spreadsheets, actually a rather common way to manage an inventory and that is practiced in thousands of companies. But eEvery now and then, the placement of a repeat order slipped the responsible's mind which finally led to a supply bottleneck. When Open Systems became aware of this problem, they chose a straightforward and effective visual solution: The inventory is was now located where they assembled the customer's components. Every storage rack is was visibly marked with labels indicating the point in time, when someone has had to reorder components, making the order point visible to everyone. Since the implementation of this visual reminder process, they never had any shortage on components anymore.

Reflecting on these diverse visualization forms, Bosshardt was

still confused, but at least at a higher level: Visualization did seem to add a lot of value, but perhaps not yet consistently so. To really understand its potential, he also needed to reflect on the history of Open System, its corporate culture and business context. All of this seemed somehow relevant to him to make better use of visualization.

3. The Birth and Maturing of a Boutique Security Company: Open Systems' history

To understand Open Systems corporate culture, one has to understand the philosophy and history of the Zurich-based company. Open Systems was founded in 1990 by then 20 year old Florian Gutzwiller. Gutzwiller had just finished his training as an apprentice at the IT department for integrated systems at the Federal Institute of Technology in Zurich (ETH Zurich). He mainly focused on experiments with Unix and the back then modern TCP/IP-protocols. He was fascinated by the complexity of Unix and those novel network-protocols and eagerly wanted to know what they could fetch out of those so called open systems, which were in opposition to existing systems, truly open. A forthcoming merger of their department with another department made him decide to become self-employed, without actually restraining limiting himself on to a single business model. He was driven by his passion for computer networks and simply wanted to transfer this into business. In the beginning it was all about fathoming how IT systems could communicate with each other. As this was also the time when World Wide Web arose, he also started to explore the rapid development of this new technology. He and his employees where the geeks that spent day and night in front of PC screens in order to test the limits of those technologies.

In those years, the community of people dealing with the Internet was relatively small. Being part of this community, they where pioneers in this technology virgin soil. The topic of security emerged during project work with their first customer in the financial industry. Since the year of 1994, they concentrated on firewall-solutions and many well-known companies knocked at their doors. One assignment let to another and they took advantage of referral marketing. "It was a hectic period of time, everybody wanted to get online", Bosshardt thought. Five



Fig. 4: The screen in the Mission Control Center

years after its creation, in 1996, the company started expanding internationally and opened its first office outside Switzerland in New York and implemented the first project in Germany the same year. Of course, they got the occasional joke at that time that there could be better names for an IT security firm than Open Systems, but the name stuck and people got to like it, so they decided to keep it.

The idea of the Mission Control Security Services nevertheless was a subtle process: After a couple of years, they had established their products on the market and their security installations could be found all across Switzerland. The only setback at that time was that after a completed project, there was hardly any customer contact. Clients only called Open System when there were urgent problems to solve. That was when they started to think about a solution which not only would fight symptoms, but would provide all-encompassing protection. The subsequent shift in their business model was far-reaching, mainly because they first had to prove that their idea would actually work. Implementing this new service during the new economy boom had the advantage that a lot of companies were interested and Open Systems acquired its first managed-security customer in 1999.

After eleven years as CEO, Gutzwiller handed over his position to the current CEO, Martin Bosshardt and became the chairman of his company. The dotcom-bubble had burst and Open Systems had lost some customer volume from one day to another. The increased menace through attacks and the growing complexity of IT security nevertheless supported the company's efforts to convince prospective clients about the advantages of the Mission Control Security service model.

These days, 60 people were working for Open Systems. Year round, there would be three employees on an exchange in Sydney to ensure 24 hours security and helpdesk services. Florian Gutzwiller had created this outpost to make night shifts more

acceptable for his staff (of whom many didn't mind spending six months in Sidney). Maintaining the corporate culture and creating a corporate climate where people liked to work and took over responsibility, as well as looked after the quality of life of their employees were key tasks of the chairman. He felt that Open Systems "always managed to attract the best people. Our team commits itself every day with an enormous passion for our company."

Today the offices of Open Systems are in futuristic glass cubes in an old building in one of Zurich's industrial districts. To enter the floors occupied by Open System, one has to go through doors secured by eye scans which grant access by iris recognition. Concrete, steel and glass are the most dominant materials inside the building. Attention is paid to lots of small details, such as creative and inspiring wall paintings, functional and aesthetic furniture, or a spectacular terrace cafeteria on the roof of the building for all employees. The core nevertheless is the so called Mission Control Center. This two story high class cube is the pace maker of Open Systems services and the place, where all the strings come together.

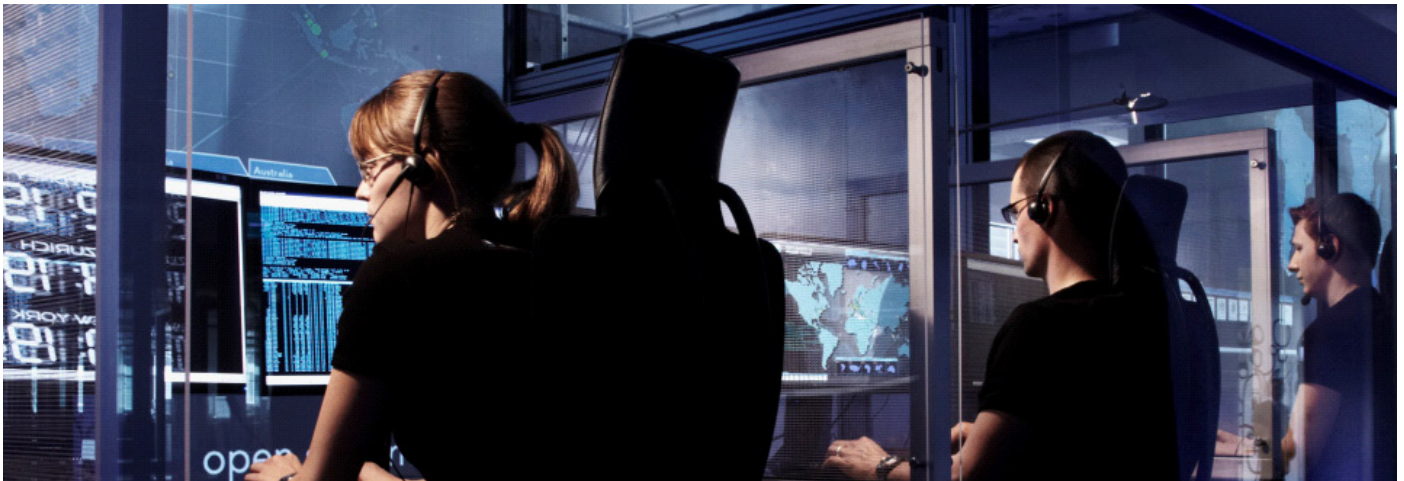
4. Securing the availability of critical IT infrastructure: Open Systems' business

Corporate IT teams nowadays have a wide array of responsibilities. They not only secure their corporate infrastructure and the communication between offices and factories, but they also ensure and monitor the availability of communication channels and resources. Those often challenging and continuously changing tasks are coupled with limited financial and personnel resources. Furthermore, for most companies, IT security is not one of their core competencies.

"Our team commits itself every day with an enormous passion for our company."

The demands on networks have today become comparable with a building's infrastructure. Availability, security and budget ability are decisive factors. The number of application networks systems, computing power and storage performance double every two years. Consequently, the complexity of communication systems also doubles. Complexity reduction is thus the a key competence for keeping these challenges under control. But according to one of Open System's clients "connecting a new location should be as easy as ordering a book from Amazon." Securing the availability of their client's critical IT infrastructure, called Managed Security Services, is what the company offered. Open System is all about. It is a kind of outsourcing, but in this sense Open System was an IT outsourcing company, but Bosshardt didn't like this term, as it had a certain (sometimes negative) connotation. Open System took care of company-networks not only in terms of technical and operational perspectives, but also designed solutions, deployed them and developed them further.

Open Systems today operates over 1'500 secure systems in more than 100 countries. Through their Mission Control services, it offers nine comprehensive IT security shield tools:



The Application Shield protects the client's applications with secure access and fends off attacks and threats from the internet. The Firewall separates multiple security zones, defines authorized connections and transparently implements security policies with a centralized auditable relay station. The Internet Proxy separates and organizes Web access and protects users from direct attacks on their browsers. The Security Gateway provides the client's branch offices with efficient site and communication protection to meet global objectives and local needs, whereas Client VPN allows the client, to work on the road or at home with the same comfort and security as in the office. Using the Passport service means implementing strong authentication and managing access authorizations centrally. Reliability prevents misuse of passwords and eliminates the dangers of key logger phishing or specific attacks. IDS/IPS scans the network continuously to detect and prevent intrusions and security breaches. The e-Mail shield protects the e-mail infrastructure effectively from overloading, spam, malware and attacks from the Internet. WAN Management finally uses a single point of contact to evaluate, operate and continuously benchmark providers in 440 cities in over 100 countries.

When the consultants from Open Systems present their



Fig. 5: The client's cockpit

services, their prospective clients often do not understand, what exactly the added value added of Open System's services is. Most of them already have all or at least some of those IT security shield tools in place. The crux nonetheless is the fact, that in the majority of cases, those tools are provided by different companies or are even coded and set up internally. Changing the operating system or adding an additional location can thus quickly become a challenging venture. The modular set up of Open System Security Services on the other hand can be deployed according to a specific customer requirement and business situation. The key benefits of Mission Control Security Services therefore can be summarized as reduction of total cost of ownership and minimized risk. Reduced total cost of ownership is achieved by operational synergies through highly customizable standardized services as well as reduced transport layer costs through secure local Web access. Business critical applications are available 24/7 and supported by Open Systems' global support team and therefore free the client's IT support team from this task. Complete transparency of budget and process avoids hidden costs. As the entire soft- and hardware for the security services is managed by Open Systems, there is no need for the client to take care of software evaluations and updates. On the contrary: He automatically receives best-of-breed solutions which include regular soft- and hardware updates, replacements of hardware and technology changes.

How is such a complex service sold? In a typical sales conversation, the consultant first explains the services offered by Open Systems. In a further step, the consultant and the client develop, in close collaboration, an understanding of the current IT infrastructure. Both steps can either be done based on a printed sample IT-landscape e.g. PowerPoint or by sketching the client's current landscape on flipchart paper. Either way, the consultant has to get involved with the customer to engage the customer in a dialogue to find out his needs, expectations and prior knowledge.

Sketching in front of the customer helps to establish a joint focus among the conversers and promotes interactivity. In many cases, the prospective client picks up the pen himself and starts to sketch or annotate the drawing with the IT landscape. The higher the competence of the consultant, the bet-



ter he can explain the offered services on an abstract level as well. He nevertheless is also capable to zoom into the details. When visualizing, the consultant always has to pay attention not to display something as being too simple. The client should get an understanding of the complexity inherent in the IT security area. It is therefore imperative to illustrate the data in an abstract manner, but it still has to be done in a simple and easy to understand manner. During the next step, the consultant positions the various security shield tools on the client's IT landscape.

Like in a jigsaw puzzle, the customer afterwards selects the security services he wants to have implemented. As every component has its accurately defined price, the customer knows upfront, what his monthly spending on IT security will be.

After having chosen one or more services, the customer receives the hardware and simply has to plug it in between the internal network and the internet. From this very minute on, more than 2'000 parameters of the client's network are monitored and in case of any irregularities, error prompts or menaces of his IT infrastructure, the experts at the Open Systems headquarters intervene.

But not only the experts in the Open Systems mission control operation center can monitor and, if necessary take action. The web-based Mission Control Cockpit delivers decisive and confident transparency and gives the customer control over his entire IT infrastructure and its operational processes. This real time control and reporting tool permanently monitors the IT infrastructure functionality and security at a global level and allows proactive intervention. It furthermore has the capability to produce management reports, monthly management summaries and documentation based on operational statistics. All modifications, actions, failures, attacks and system updates are documented transparently and comprehensively.

A list of Open System's clients reads like the "who is who" in the business world. Clients come from all industry sectors. Companies like AXA Winterthur, SwissLife, Sulzer, Axpö, Spiegel, but also Ggovernments and NGOs like the International Red Cross and Switzerland's National Emergency Operations Centre

secure their critical IT infrastructure with Mission Control Security Services.

5. Conclusion

The night was already closing in when Bosshardt shut down his computer. Having brooded over the topic of visualization and Open System's context, he became convinced that having a strategy for visualization was crucial for the company's success in the future. Being aware of the factHe was aware of the fact that, the his company made much more in the field use of visualization than other companies., But he was thinking how could they to systematize systematically orchestrate all thethese efforts made in the past and how to manage and integrate all visualization techniques smoothly into the working process of Open System. ? The service visualization could not be published as it was, this he now realized. For many managers visualization was still "nice-to-have" and belonged to the category of great effort with little added value: lots of work without clear benefit. However, Bosshardt's experience showed otherwise. It showed that visualizing problems and solutions is not only highly effective, but can also be well accepted and received, when they are seamlessly and completely integrated into all communications and work procedures. At the end, Bosshardt thought, it all comes down to making the invisible visible and thereby enabling clients to comprehend their products and employees to manage their everyday's complex business.

But using visualizations in many different fields in an enterprise, for both internal and external communications, does not mean that a company already has a visualization strategy.

So before Bosshardt left the building that night, he stuck a post-it note to his PC monitor. This would remind him that as the first thing on Monday morning he would schedule a meeting with his staff to clearly define Open System's visualization strategy. He was still unsure about what that actually meant, but he was convinced that such a strategy would help Open Systems become even better at managing and selling an essentially invisible service.

6. Case Questions for Discussion

1. Open Systems uses visualizations in many different forms and for various purposes and target audiences. How could you classify Open Systems' visualization activities systematically? What practical implications can you derive from your classification-based overview of their visual practices?
2. From your point of view, what are the key success factors for a visualization strategy for a company? What are the components of a company's visualization strategy? How would you define such a strategy? Take Open System as an example and articulate a feasible visualization strategy for them.
3. Can you think of further activities in order to develop an integrated visual communication strategy for Open Systems? In which areas can OS make better use of visualization?
4. What are the opportunities and risks of using visualization images in this context? What could be the limitations of visualizations in this context? For example: Do you see any risks in the fingerprint visualization of each employee's skills and achievements?
5. Why is visualization essential for an IT security company like Open Systems? Which of the nine IT security applications could profit from visualization, how?
6. Why is corporate culture a relevant factor to consider when developing a visualization strategy for a company like Open System?
7. Selling complex services such as those of Open Systems is not an easy process. How could diagrams and sketching activities be combined to facilitate sales dialogues with potential customers? Outline a sales "dramaturgy" that OS consultants could use.
8. How can the service visualization be re-drawn for specific target groups such as CIOs, IT specialists or the greater public?

References

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- [5] Fingerprint Guideline, Open Systems AG, 2009

Appendix Fingerprint Guideline

The Fingerprint

Every employee at Open Systems is portrayed by an individual symbol called fingerprint.

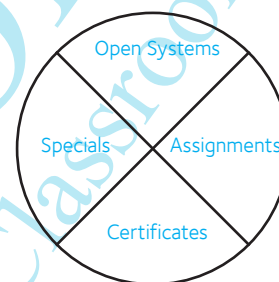
The Idea behind the Visualization

A circle, divided into four zones frames the basic shape of the fingerprint.

The four zone represent the domains "Open Systems", "Assignments", "Certificates" and "Specials".

In those four zones, circular paths grow in analogy to a tree-ring from the inside to the outside.

Every circular path is related to a topic which is connected with the corresponding zone.



Algorithm

The frequency or the number of an occurrence is visualized by the line width and the recurrence of the circular path.

1 to 4 light circles
= 1 to 4 times / year



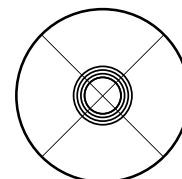
1 bold circle
= 5 times / year



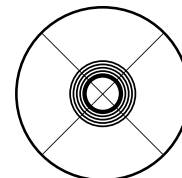
1 very bold circle
= 10 times / year



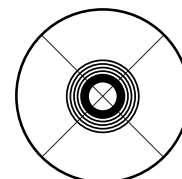
1 to 4



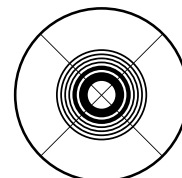
5 to 9



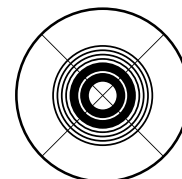
10 to 14



15 to 19



20 to 24



25 to 29

