BCGEU Long-Term Assisted PD leave Report 2021-2022

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Introduction

The foundational technical skills required to be qualified as an Information Technology Systems Architect was the focus of my professional development. With the need for this skill set growing and the high demand for this career role, it is crucial that we have a knowledge foundation within our faculty to plan and maintain our ITAS curriculum for our students so that they are ready to enter into a career path where this knowledge is required.

Many company's have to perform large upgrades of IT infrastructure or they may need a brand new infrastructure design if they are moving into a new physical location. It is also common that company's add new products or services. In the case of upgrades there are a number of factors at play – hardware is aging out and is too slow and unreliable and more capacity is needed as the company grows. If new products are coming online then they often need specialized equipment and designs to ensure that the products "launch" properly and then can maintain a revenue stream. The various iterations of BC's provincial campground booking web site is a good example. They have revamped it a number of times recently including the user interaction on the website and all of the code needed to ensure the booking and registration system works properly along with the database servers to store all of that data. They also needed to design and build servers and the underlying networking to ensure that it can handle the high demand capacity of booking requests. All of these above scenarios have to be extensively planned by IT systems architects and in the case of the BC government's campsite, were likely contracted to work alongside in house provincial IT staff.

This field is interesting as it requires Information Technology expertise and experience in the aforementioned design and implementation of servers and networks but, as my research indicates, it also requires skills and experience in project management. This includes the initial determination of the IT goals, cost analysis, initial schematics, and proposals with alternative designs to be decided on.

Research and Activities

I used several online learning sources and courses to research Systems Architect skill sets including IT Infrastructure Library (ITIL) tutorials and various other online articles and videos from Amazon Web Services and the RedHat Linux training academy. These courses had less of an applied aspect from previous development leaves as it is more theory based and assumes that you have extensive practical IT technical skills and experience working with enterprise IT systems. The major topics that I researched included:

- Integrating IT departments into a business to ensure flexibility and efficiency and ensuring collaborative design procedures – working with the entire range of business personnel and departments that make up a company.
- Change management – structured processes to obtain official approvals for IT proposals and a proper implementation road map that is agreed on by all parties involved.

Integrating IT departments

Gone are the days where IT staff could reside in the basement of a business and work in isolation – essentially only providing a role of putting out fires and keeping the computers alive. ITIL methods dictate that IT staff must be involved in the business decisions as much as product or code developers and sales staff. The IT team ultimately will have to support the systems that deliver or serve the business products and services, so it is critical that they be involved in business decisions and future planning from the onset.

Major strategies that ITIL suggest for IT integration include:

- Work with department heads and educate them on the value of having IT staff be involved in strategy meetings, new product and services design concepts.
- Encourage company's to continually provide training to IT staff in project management skills.
- IT staff should know the fundamental details of their company's revenue and expenses – how IT infrastructure affects bottom line expenses and the various revenue models. Also detailed information on how systems downtime affect revenue.
- IT staff should work periodically in different departments such as support to ensure that they fully understand what their company does and its customer interaction rather then just concentrating solely on IT management.

Results

The research was interesting, and I think beneficial as I will outline shortly. These types of strategies made sense as from my own experience as an IT department manager I have seen the value in them. There were new aspects though for me – the value of working with developers from the beginning of a concept or proposal plan rather then being presented with an end goal without having any input is crucial. Too many times I was surprised by what the company's goals were and the reality of what it would take to implement them. ITIL strategies also included cost analysis aspects that needed to be investigated – I have a list below of the key concepts some of which I was aware of already but many I wasn't:

- Researching new server and infrastructure costs
- Bandwidth and power cost calculations for new or upgraded products and services – use established software to compare current daily, monthly and annual costs in these areas and how they are trending. Software available for this includes Munin, RRD or MRTG to graph cost trends in these areas.
    - By having existing baselines and working with the project's marketing team's research on user uptake along with the developer team on how the applications work, cost projections can be added to a project with reasonable certainty on:
        - How many servers will be required and what specifications they need (Memory, CPUs, storage space, speed of storage drives required)
        - Bandwidth costs (incoming, outgoing data)

        - Power calculations – more equipment creates higher wattage draw – include discussions with datacenter operations on the expected increase of server requirements and obtain documented power cost projections from them.
        - If you don't have baselines to compare with there are methodologies that can be used to research the costs.
            - It requires that product developers provide systems administrators with prototype schematics
            - Marketing provides details on what kind of content is involved and their file types (audio, video media)
            - Research and questions sets to be answered by cloud providers and/or co-location providers on their datacenter costs for the aforementioned bandwidth, power and physical space leasing.
- Monitoring costs for new products – how much more personnel demand is something new going to create above and beyond existing services?
    - Will more IT staff be required to maintain the new systems?
    - Does it require more support staff based on usage projections and expected growth of clients?
    - Is there specialized training required for IT staff to manage the new designs?

Integrating with new designs from the beginning is essential as IT input is needed to ensure that costs of building and running new projects are realistic as can be seen from the question points above. Without that input designs can become financially unrealistic and may not pass approval to decision makers if margins are not able to be met. Ultimately the goal is to have a smooth and efficient IT infrastructure that saves a company money by delivering on-demand growth when needed and overall stability.

So really it is about being an integral part of the company's development and growth decision making. ITIL certifications are available for as part of the training for IT systems architects that provide the planning methodologies, templates for project documentation and strategies to ensure the questions points above are accurate and able to be signed off on.

These kinds of skills are going to be crucial, and these strategies will be enhanced in our ITAS 164 IT project management courses and as a criteria for our student capstone projects where we simulate proposal scenarios and expected end goals before implementation and final delivery.

Change Management

Assuming the adoption of successful IT department integration and a harmonious relationship with other departments the next major area to investigate was the processes involved in change management.

Assuming that a proposal is agreed upon there needs to be formalized processes and documentation that ensures that the IT department has full permission to purchase required equipment, hire more personnel if needed and provide IT staff training based on the needs of the proposal. In essence to ensure that there are no surprises and disagreements over what was designed to fulfill the proper expectations. Many companies run a fairly loose environment where proposals aren't analysed enough,

or approvals are just verbal and forgotten as projects take a long time to be implemented. This can result in cost overruns and product/service launch delays. There are a number of different standards for all types of situations – I chose to research the ITIL method due to its aforementioned development orientation to IT operations. Ensuring that IT infrastructure can be developed to meet all proposal criteria then the steps for change management are essentially as follows:

- Ensure decided project goals are documented in a centralized location for all final decision-making stakeholders to view and edit.
    - ITIL training indicates that there can be many goals towards building a new product and that each one should be indicated in detail – examples can include what programming languages are used, 3rd party software needed, if proprietary software is needed.
- Ensure that project goals have been researched and evaluated and that factors such as development time, expected IT infrastructure costs, training costs and potential risks to the company are included in the documentation to the best possible degree.
- Ensure that each goal has a benchmark timeline for initial demonstrations and testing and expected deadline dates for each goal's completion are indicated in the documentation.
- Who is responsible for each aspect of the development cycle – this should be granular to individuals or teams – essentially who is doing what so that there is no confusion.
    - Also, where possible to have remedial processes, i.e., if one department is behind can there be a categorization of staff who have the skills to move to another department briefly to help them catch up.
- And finally, having official final sign offs from upper management and the stakeholders that they approve the expected costs, timelines and vision that is to be delivered. This is the most important step – it is essential that non-technical people understand the roadmap to get from the vision to the actual implementation. It keeps check and balances in place so that everyone is on the same page and if there is any deviation the change management document is essentially a signed contract dictating what was agreed to.

Results

There are several tools that can be used to centralize the documentation of business project goals ranging from Google docs to more formal software such as Wikimedia, Wrike, Microsoft Project and Viima. We already use some of these but more expansion of this topic and having them use trial versions of the more popular change management software would be beneficial as our students do their project development across our courses.

Having our students work through the establishment of goals and documenting them will provide them with stronger interaction skills in dealing with both customers and company decision makers and the value of being able to show proof of the agreements that were signed off in the case of any disputes.

Conclusion

This professional development was beneficial in learning more about the modern IT architectural cycle. While it isn't as flashy to focus on documentation and project standards as it is to actually work and build new systems and software, it is absolutely crucial that project management curriculum is continually enhanced. Looking into job postings it is very clear that there is a huge demand and expectation that the modern IT employee or owner must be able to manage new systems as nothing stays static in business. System architects are sought out by businesses or are developed as on staff specialists for this very reason.

While our students entering the field will have to work their way up with experience to become an IT systems architect, having base skills and practical training will be hugely beneficial to them. My research will help facilitate the curriculum building we need to do to stay current with not only employer expectations, but prospective student expectations as well as more and more post secondary IT programs will begin to provide this curriculum.