

PART 4

Story Two

Please "migrate" this piece after I
retire!!!

I would like to dedicate this story/part to the following colleagues who implemented the ideas presented in the following pages

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THE DEATH OF AN OPERATING SYSTEM

Jibrán works for a large Hotel, PakLuxury, in the Software Development and Support section of the IT Department. He has just come back from a meeting with his boss who is the Manager Software Development, his name is Sinaan.

Sinaan has asked Jibrán to wrap up his current assignments and work full-time towards the migration of the legacy Billing & Account Receivable System (BARS). Though the assignment is exciting, yet Jibrán is more worried than excited.

Since Jibrán has 4 to 5 years experience developing software of varied complexity for the Hotel he knows that BARS sits at the heart of the entire Hotel's revenue stream and any mishap would mean severe damage to the Hotel's financial outlook. He knows that it is one of those systems which most IT people don't want to migrate during their working careers!

The Hotel had acquired the Hotel management system from a vendor more than a decade ago and it covered most of the required functionality. The only problem with the system was that it had a billing system which did not cover the requirements of the billing department. This was because the Hotel management system was acquired from

Europe and there were significant gaps in the delivered functionality.

At that time the management had decided to get the billing system built in-house to support the billing department. The migration had gone well but the operating system and programming tools used in the migration had become obsolete.

There was a need to migrate to more commonly used tools and technology since most of the programmers who knew the operating system and the tools had left the PakLuxury over time. They had also tried to hire people with the relevant skills but no one was available or interested to work on the obsolete tools and technology.

After much discussion and consultation with internal and external resources / advisers it was decided that the new system would be migrated using in-house technical resources because of their domain knowledge of the complex processes involved in "Guest" billing.

The management chose Linux as the new operating system. This was chosen because the Hotel management system was also available on Linux and they were already working on a plan to migrate to Linux with the help of the system vendor.

The programming language was selected to be Java, the web server would be Apache Tomcat and the database would be MySQL. Since Linux, Apache Tomcat and MySQL were all open source, the management felt that they would be able save significant financial resources on recurring license fees.

The management also understood that the internal technical team would require significant training on the above tools but the payback would be well worth the investment. Another advantage was that Java was quite popular among programmers and it was easy to hire new Java resources in the event that there is attrition in the technical team.

The Hotel Management System (HMS) modules implemented and running at PakLuxury were as follows:

- Guest Registration and Check-in
- Meal charging
- Laundry charging
- Hotel vehicle rental charging
- Movies and entertainment charging
- Salon charging
- Guest Check-out
- MIS

The current legacy BARS communicated with the HMS through the TCP/IP communication layer and read all the charges from a charge queue.

Jibrán was required to “migrate” BARS with minimal disruption and in a way that would make the transition as smooth as possible.

THE CHALLENGE

Jibran is sitting with Sinaan and going over the details. The BARS is integrated with all the other systems through a service/charge interface queue. All the systems send their "Guest" charging details to BARS on the queue against services rendered.

BARS reads from the queue and after performing due validation of business rules, creates/posts the "Guest" charges which it shows on the Hotel bill.

BARS has the following high level features in addition to charge consolidation

- Direct charge entry to BARS in the case some special charges are to be applied to the particular Guest
- Automatic room charging based on different room classification
- Application of discount for corporate customers
- Facility to setup bill consolidations based on corporate customer preference
- Facility to capture individual and corporate payments against bills

- Facility to track account receivable and its aging
- Facility to help corporate relationship officers
 - capture payment plans against outstanding bills
 - manage follow-up/reminders/meeting remarks with timestamps
- Managing double entry accounting within system and transfer of revenue/receivable/cash journal vouchers to the General Ledger accounting system on daily basis
- Generation of complex revenue reports (MIS)

Jibrán knows from experience that the system is quite complex to develop because it needs to marry high level of integration with very flexible "Guest" friendly bills. Additionally, it has to manage an internal architecture which should support double entry accounting.

Jibrán will use his domain knowledge and experience of the current billing system to identify a complete list of activities required for project completion. He will then organize the activity list into a work breakdown structure so that he can properly track the project.

SIZE DOES MATTER!

The number of core “use cases” in the billing system is coming to be around 50. In addition to these there are around 35 dictionary elements and 120 reports in the system. The billing system also has day-end and month-end midnight processes.

Additionally there are many supporting activities like training, specifications writing, online help, data conversion, signoffs, etc. which will take significant time as well.

The total work estimate is coming out to be in the range of 100 to 120 person months.

Jibrán had never undertaken a project of this size and he knew that even with a team of eight trained people it would take him almost 15 months to deliver. This was going to be difficult because it would mean that any change request on the current system would need to be put on hold while the team works on the migration. The demands of the business would require that somehow all this be managed.

Jibrán decided to perform a brainstorming session with his senior team to consider possible

approaches. He felt that it would also give him an opportunity to prepare the team for what was in store for them.

GETTING THE TEAM ONBOARD

Jibran wrote a clear vision statement for the project and got it signed off from the customer. Now he was very sure about

- the key purpose of the system
- list of all stakeholders
- their key needs and
- product features which would address those features

With this wrapped up, he called the brainstorming session with his senior team and circulated the signed off vision document two days before the meeting to give everyone a good chance to study it properly.

As everyone walked in Jibran started out: "Hello everyone, hope you all have read through the Vision document I circulated?" Usman a senior software engineer responded "Yes, it was really quite nice to read since it covered all the elements I wanted to know about".

Sana a senior business analyst had a confused look on her face; Jibran saw the expression and asked her for comments. She responded by saying "Well, the Vision statement is good but it would have been

nice if you had also circulated the overall Project Plan". Jibran smiled and said reassuringly, "Yes, in due time, in due time".

Looking at others who had also nodded their confirmation that they had read through the vision document, Jibran continued "As you already know that we are planning to build the "Guest" billing system in-house, we are now faced with a few key decisions and challenges. We are gathered here to brainstorm possible alternates so that we can work out the best way forward".

He continued "The system is very sensitive and we need to ensure that there is smooth GO LIVE with minimum disruption. We also have to ensure that the quality is at the highest level and testing is done thoroughly. I want to open the floor to questions and suggestions".

THE BASICS

Sana looked around and saw that everyone was waiting for someone to start. She decided to take the leap “Well, this is going to be quite a challenging project. The user group, though talented is not fully aware of the consequences of any mistake on their part.”

Jibrán queried “Mistakes?” Sana continued “I mean, when we have sessions regarding use cases or reports, they sometimes give us an explanation that is contradicted later. They don’t do it intentionally but the work pressure sometimes keeps them away from properly reviewing the functionality.”

Usman joined in “Yes, from the user perspective it is a small oversight but from a technical perspective sometimes it can result in considerable rework.”

Jibrán responded “I see what you mean, so do you have any suggestions?”

Sana looked at Usman and then said “Well for various internal projects we have now started doing formal signoffs of each specification, be it use case or report. It generally requires a lot of time

investment from the user side but pays huge dividends when it comes to quality of the work.”

Usman added “Sana and I are convinced that we should make it our standard practice in all our projects. Considering that “Guest” billing is such a complex application, we must follow this formal approach.”

Jibrán was now more relaxed and was really appreciative of the thoughtful inputs of his colleagues. He further asked “Yes, agreed, let’s follow this approach. What about the quality of our technical work products? We have seen that sometimes even when the specifications are of high quality, the software still has too many bugs. Any ideas on that?”

Hasan, another senior software engineer had been quietly listening to the conversation. He now joined in “Yes, I have had discussions with my team on this subject, there is consensus that while we should follow guidelines and standards, there has to be a formal mechanism to test the system and report its quality throughout the project.”

Usman added “We have tried various approaches, for example, giving testing responsibilities to programmers from within the team, but when the pressure mounts, invariably all the programmers

get sucked into the development cycle and testing somehow gets relegated. I feel that a dedicated test engineer with each major functionality set should be available to keep things tidy.”

Sana got up to draw something on the white board. When she finished, she had drawn a project team structure and a quality assurance team structure on the white board.

She then drew the reporting relationships of project manager and the quality assurance manager. In her diagram, they both reported to the software development manager.

She then said “This is what I propose, the test engineers working with the software team need to report to the quality assurance manager so that the testing is done in a planned way and that all aspects of the software are considered and reviewed for quality.”

Usman added “Some people believe that the quality assurance manager should not even report to the software development manager but instead report to the director who oversees the whole spectrum of operations.”

Jibran now addressed Sana and Usman “I agree with the whole idea, let me get some feedback from Sinaan because so far we have not factored in the cost factor.”

Hasan said “I personally feel that the high risk nature of the application requires some very formal processes and if we can’t put them in place we should not attempt this project at all”. When he looked around the room, he found consent on all faces including Jibran’s.

The senior team then went on to discuss some more lessons learned from previous projects. They all had war stories to share and did not want to repeat past mistakes.

Jibran called the meeting to an end after sometime and headed off to his office to ponder upon the responses further.

THE MISSING PIECE

Jibran felt quite happy with the way the senior team discussed the project. They definitely owned the project. He knew that he was very lucky as a project manager to have such talented and committed people on his team.

His heart was still heavy though, he was convinced that this project would need a lot more ceremony and formalism than past projects his team had worked on but something was still missing.

He still needed to figure out two things. His gut feeling told him that he needs to address these sooner than later. They were:

- Figuring out how to do parallel run without which a project of this risk profile should not be attempted for GO LIVE
- Figuring out how to give new features to the customers while the project is in the process of development. Expecting the user department to wait 15 months before getting their change requests done is asking for too much

He knew it was time to call his mentor, Amin.

AMIN THE SPORTS MAN

Amin was a Software Professional of high repute. He was the Managing Partner at a high profile Software Consulting Company. Jibrán knew Amin from his college days.

Amin was a year senior but carried with him wisdom and knowledge equivalent to that of a Sage, even in those days of teenage carefree life. They both had one thing in common. They both loved playing cricket.

Jibrán could still remember the countless matches they played together representing the college in inter-college matches.

Jibrán made a mental note "Team sports bring out the best in people because it gives them a chance to learn the principles of personal sacrifice and leadership." The two words "sacrifice" and "leadership" were synonymous as far as Jibrán was concerned.

THE TRIP

Jibran picked up the phone and rang up Amin. They had not talked in a while. Amin recognized Jibran's voice and the conversation immediately got going. After the initial niceties Amin asked the question "Jibran is there anything particular you wanted to talk about?"

Jibran took the cue and started out "Well, I am in a bit of a soup. I have been assigned a very challenging project but I am not too sure whether I am up-to the task. Need to talk to you to bounce off a few ideas and look at some options".

Amin took sometime to digest Jibran's statement. He knew that Jibran had good experience and if he was struggling with something it would be a really tough task.

Amin responded "Hmm. Let me see, I guess we should meet up and go over it in detail. What are you doing this weekend?" Jibran had no plans yet for the weekend so he informed Amin that he was free.

Amin continued "Why don't you join me for a trip to Gawadar?" I need to go there for a meeting with a

customer. The meeting will only last a few hours the rest is all free.

Jibran knew that this was a great opportunity because the road trip was about 10 hours each way and he will get plenty of chance to chat with Amin. He had heard so much about the Hongul National Park and its breath taking mountains which one crossed on the way to Gawadar, an upcoming port city. He immediately confirmed his availability.

Amin was now quite excited; he continued "This is perfect! I was looking forward to the trip because I love the beach at Gawadar but was dreading to go without any company."

After a pause he continued "We will stay at the Pearl Continental (PC) Hotel at Gawadar for Saturday night. I have a friend who works there. He will get us affordable rates for the night."

With the trip all worked out. Jibran hung up, feeling much better now that he will get a chance to look at options with somebody whose advice he respected and cherished.

DIGESTING THE SCENARIO

Jibran got up at 6:00 am to have an early breakfast and get dressed. Amin wanted to leave from Karachi by 6:45 am so that they can reach Gawadar by Sundown. They had planned to do lunch at the beautiful Ormarah beach which is about midway Karachi and Gawadar.

Amin came on time to pick Jibran and found him ready and waiting outside his house. Amin was not driving; he wanted to enjoy the conversation and the scenery which was mostly coastline, desert and majestic mountains, and hence had brought his driver along.

Once settled they began the conversation. Amin asked "So should we start our discussion or you want to do it later?"

Jibran was waiting for the cue as he wanted to start the discussion at the first opportunity "Let's start. I will begin by filling you into the detailed scenario". It took Jibran the better part of the next two hours to give Amin the full run down of the situation. Amin was a keen listener and only interrupted Jibran when a question was desperately needed. Mostly he listened and nodded.

When Jibran had finished, Amin gave a big smile and said "My dear Jibran, this is a very tough problem to solve, but you are very lucky. We had come across a very similar situation with one of our clients. Interestingly our client had also raised similar questions

- They wanted to do a parallel run but did not have resources to do it manually
- They did not want to wait till the end of the project to add minor changes to project scope, for example adding business rules to use cases and additional columns and calculations to reports

Incidentally they were also moving away from their current operating system to an open source operating system. So they also had the issue of different platform along with the above constraints.

Hearing this Jibran felt like jumping with joy, it is very rare to find a solution to a tough problem this easily. He reminded himself that since Amin was the Managing Partner of a large software consulting firm, he had to solve many such problems on a regular basis. Amin had a knack of solving problems through realistic approaches. No wonder his salary was many times more than that of Jibran's.

THE DRAGON THAT WON'T DIE

Amin began "What we did with the project is that we broke it down into various pieces. We understood that if we can make the project LIVE in pieces, we would be able to address both the constraints."

He continued "Initially we thought of selecting groups of use cases which work together along with the related reports and making them LIVE. This posed the problem that it would add considerable additional programming work at both ends of the communication layer. He glanced at Jibrán who quickly said "Exactly!"

Amin continued "The advantage of this approach would be that we will use the charge queue concept to transfer charges across the operating system using TCP/IP at the communication layer. This way we will be able to push the charges "to" and "from" each piece sitting on different operating systems."

Amin paused to see Jibrán's expression, to ensure that he had not lost him. When he was sure that Jibrán was clear he continued "The legacy system will need to be kept updated with complete data at all times, reason being that the customers will need all the reports available in legacy so that they can

validate these with the reports of the new system with production data.”

Amin continued “For example, if we make the discount processing LIVE then the discounts would be processed in the new system. The discount functionality of the legacy system would be disabled. In this case there are many reports in the legacy system that still needs that information to churn out the correct numbers. We had to push the discount transactions back to legacy and file them in legacy system to keep it complete”.

While Amin was speaking Jibrán listened intently showing a lot of patience and restraint. He knew he will get ample time to ask questions and did not want to break the flow of Amin’s explanation. He was also aware of Amin’s predicament because he had gone through this approach in his mind and had given it up because of what Amin was about to explain.

Amin looked outside for a long time to take in the scenery and then looked back at Jibrán to continue “The main problem with this approach was that there were very few programmers who knew the legacy application. Writing back to the legacy system would mean that we will need to receive the data from the PORT and then process it through the same methods of “Validate”, “Save” and “Post”

which were being used to file discounts from within the legacy application.”

Amin looked outside again and then sighed before continuing “You see the legacy code was not this structured so we did not have clean segregation of functionality in the legacy system. This meant a considerable re-write of the legacy application. Adding more risk to the project.”

Amin continued “The fact that there were very few available legacy programmers, added to the problems because they were already neck deep in supporting the day to day operations of the legacy system.”

Jibrán looked at Amin who had now stopped speaking; Amin was now waiting for Jibrán to ask questions.

Jibrán spoke “This is exactly the situation that I got stuck with. This is why there are so many sensitive legacy systems still running in their legacy platforms because nobody has come up with a workable solution. There are some who risked doing it without parallel run and the horror stories related to what happened next are many.”

Jibran continued pensively "Before I gave you a call I had almost resigned myself to the fact I would just build the application and test it thoroughly, then GO LIVE all in one go. Parallel run just seemed like a distant dream."

Jibran continued "The other problem with this approach is that the customer cannot benefit from any of the new features and user friendly interface till the whole application is ready. Waiting fifteen months is a long time in business."

Amin smiled and said "Don't be so despondent, I have something for you that will work for you. But you will have to wait till after lunch. We have almost reached Ormarah and I have brought along the lunch fit for a king. Let's not talk about work till we are done with lunch."

Jibran readily agreed as all this conversation had made him very hungry.

ORMARAH BEACH

Though they had not stopped at the Hongul National Park to admire the seemingly hand carved mountains. Just a drive through is what they contended with. They made up by having a proper one hour stop over at Ormarah.

The Ormarah beach was as beautiful as promised. It had all the qualities of Karachi beaches only better, soft sand, lots of Sun, cool fresh air, miles and miles of beach.

They put up their umbrella and mats and sat down for a hearty lunch. Since Ormarah is sparsely populated as compared to Karachi the beach was almost empty and it was nice to have such peace and quite after a long hectic work week. The only thing you could hear were the waves crashing along the shore line.

They chatted about their college days and the cricket matches. Those were the days! Jibrán informed Amin about his veteran's cricket team that he had recently formed. He also invited Amin to join them as they played every alternate Sunday, very doable even for somebody as busy as Amin.

SOLUTION

When they had left Ormarah Amin continued the pre-lunch conversation “Jibran, we struggled with the problem for quite a few days before we decided to attack it differently. To encourage out-of-the-box thinking we took our senior team away from work.”

Amin continued “We have a beach hut which is very well furnished along with a meeting room with a white board. We use it even on work days to brainstorm tough problems like this one”

Amin was now talking faster with excitement because he was nearing the solution “You see, ideas are very elusive when you don’t have the right setting. You need to be away from your work and you need to have tools like mind maps, etc. at your disposal. Only then can you properly address complex problems.”

Jibran nodded in agreement thinking how he will convince his boss to make the investment. He forced himself back to reality to fully digest Amin's next statement.

Amin continued "The brainstorming gave a good result. We came to the conclusion that we should first "migrate" all the reports before migrating any of the use cases. This meant that we will only push data one way through the TCP/IP layer."

Jibran interjected "Hmm, I see, but how does this save extra programming?"

Amin answered "It doesn't, but the volume of extra code gets reduced significantly. For example, we still need to write programs to push transactions from the legacy system to the PORT and then read these in the new system from PORT using the TCP/IP layer. The savings come when you structure your new application in such a way that you can reuse the "Validate", "Save" and "Post" logic behind each type of transaction."

Jibran was caught off-guard; he could only manage a meek "Huh". Amin almost knew this would happen; he smiled and re-explained "You see, at the moment you are only interested in "migrating" all the reports so you need all the transactions,

charges, discounts, payments, etc. into the new system so that your reports can produce the correct results. Do you agree?"

Jibran nodded, faking confidence.

Amin continued "So if we structure the new application in such a way that when the front-end goes LIVE (after all the reports have gone LIVE) then it should re-use the same "Validate", "Save" and "Post" functions that have already been built for each type of transaction (charges, discounts, payments, etc.)."

Jibran now understood, he said ecstatically "This is absolutely brilliant, you guys are geniuses! The concept is so simple yet so elusive".

Amin had the urge to say "Elementary, my dear Watson" but resisted the urge and remained quite.

When Jibran had settled down from the excitement Amin further said "It gets better you know". Jibran shot a glance at Amin to see if he was jesting. He wasn't.

Amin continued "You had mentioned that you have a complex background program that transfers

charge queue data into the "Guest" billing application. This data is written to the queue through the other modules of HMS".

Jibrán replied "Yes, this program is somewhat the heart of the billing system because it transfers more than 90% of the charges. The remaining 10% are generated from within the billing system."

Amin continued "Well since HMS and the new billing system are going to be both in Linux, you could actually design your solution in such a way that the charges from the queue are directly read by the background program and only the charges produced in legacy billing get transferred through the TCP/IP layer. Mind you, the background job that transfers these charges to the legacy system should continue to do the work otherwise your legacy will go out of synch."

"This is perfect. This way I will be able to test this background program and its stability with production data well before the cold cutover" said an ever excited Jibrán.

Amin added "I think using this approach will definitely make life easier for you and your team. You will be able to add new features and offer these to the customer soon after they pass the user acceptance testing. The customer won't need to

wait fifteen months to start using the new features. The features would be available on weekly or fortnightly intervals.”

“That is correct but the new features being delivered to the customer will only be related to reports and not the use cases” mused Jibrán.

“Yes, this is the best we can do for the moment. The real benefit is significant mitigation of the GO LIVE risk” confirmed Amin.

GAWADAR

The Sun was just setting when their car rolled into Gawadar. They went straight to the PC Hotel and checked in. Jibran found that the Hotel was even better than its counter part in Bhurban which is situated in the North of Pakistan, so popular for its snow capped mountains and lush green valleys.

Amin showered quickly and went straight for his appointment which was a dinner meeting at the PC. Jibran spent the evening roaming the Hotel lawns and playing table tennis and pool in the Hotel common room.

Later Amin and Jibran met up to have lemon tea in the Hotel lobby before turning in for the day.

JET SKI

The next morning they rose early and after breakfast headed straight for the sea. The PC Hotel administration had arranged for them to spend the morning on the beach where Jet Skis were available.

They both thoroughly enjoyed riding the waves with heavy breeze against their face, for a fleeting moment they considered themselves no less than "James Bond" himself.

By noon they had showered and were ready for the journey home.

FREQUENT PRODUCTION RELEASES

The journey back to Karachi was uneventful except for the fact that Jibran got one more advice from Amin.

Amin spoke "You know we got an additional benefit from our approach without realizing it at first. We realized that we were releasing production quality reports every two weeks. This meant that the programmers got a chance to see their reports in action in the production environment. This was very good for programmer motivation and morale."

Jibran interjected "I hope you did not ignore the step of user acceptance testing of each report, before making it LIVE".

"Good point, we had the urge but luckily we didn't. We followed the process. On one occasion an important report did slip through to production with a miscalculation / bug. Luckily, the users always validated it one more time with production data from both the legacy and the new system. The miscalculation became evident and we fixed it quickly" added Amin.

When Amin dropped off Jibrán at his place, Jibrán thanked him profusely and promised to call him when he arranged the next cricket match.

PART 5

Lessons Learned from Story 2

We will now review the lessons learned in each chapter.

THE DEATH OF AN OPERATING SYSTEM

- It is a very big advantage if the technical team has domain knowledge of the software being developed
- Financial resources spent on effective training of staff have a high return on investment (ROI)

THE CHALLENGE

- System with high availability requirements are more difficult to build
- Systems with a lot of external interfaces with other systems tend to be more involved
- Systems which support double entry accounting internally tend to be more complex

SIZE DOES MATTER!

- Any system development effort involving more than 100 person months has to be managed with high ceremony

GETTING THE TEAM ONBOARD

- Develop a clear vision statement for each project. This will help you focus your energies and also help you communicate effectively with all stakeholders
- Arrange frequent brainstorming sessions. It will unleash a lot of creative solutions and also help to get people onboard and buy-in to the project

THE BASICS

- Specifications signoff should be taken seriously by both the technical team and the user team. This can sometimes be overlooked in in-house projects
- A separate testing and quality assurance team, though costly, can save the day on high risk projects
- Lessons learned from previous projects should be documented and discussed frequently in team meetings

THE MISSING PIECE

- It is important to consider the possibility of "Parallel run" with high risk projects

AMIN THE SPORTS MAN

- Team sports like basket ball, cricket, hockey, football, etc. are important to learn the skills of being good team players and subsequent leaders

THE TRIP

- It is important to have friends you can turn to in your time of need
- One should understand that no one has all the answers and the wise always ask for help when they need it. There is no point in worrying about a problem that someone else has already figured out

DIGESTING THE SCENARIO

- It is very important to be good listener. Most technical people are poor at listening

- Problem solving is a rare skill which should be acquired through constant observation and inquiry

THE DRAGON THAT WON'T DIE

- Team sports like basket ball, cricket, hockey, football, etc. are important to learn the skills of being good team players and subsequent leaders
- Yes the above is worth saying again ...

ORMARAH BEACH

- Some "time off" helps

SOLUTION

- To have a successful brainstorming session, have it off-site
- Use brainstorming tools, like mind-maps, etc.
- Try to break the project into manageable pieces to reduce GO LIVE risk
- Try to break the project in such a way that rework is not too extensive. Some rework can never be avoided and should be part of the effort estimation

GAWADAR

- Gawadar is a nice place to visit in Pakistan. It is about 10 hours drive from Karachi

JET SKI

- You can plan your project GO LIVE celebrations in Gawadar if your team is located in Karachi

FREQUENT PRODUCTION RELEASES

- Regular and frequent production releases are very good for programmer morale
- Follow a well tested process to prepare each release for the production environment