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Taking your airline to new heights

A portrait of Muhammad Ali Albakri, Chief Information Officer of Saudi Arabian Airlines, wearing a dark suit and glasses, looking directly at the camera. The background is a bright, modern office space with large windows.

## THE JEWEL

A Conversation With ...  
Muhammad Ali Albakri,  
Chief Information Officer,  
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# STRIKING A BALANCE

Customization Versus Configuration In Enterprise Software

Customization

Configuration

Depending on an individual airline's needs, it may opt for highly customized enterprise operations technology or, perhaps, something more rapidly reconfigurable. In the end, it comes down to weighing the cost and risks of full or partial customization against the level of configurability available through a third-party solution.

By J. Alan Baumgarten | *Ascend* Contributor

**A**laska Airlines is a traditional passenger carrier, but it also happens to be the most extensive air cargo operation on the U.S. West Coast. Until 2007, its fleet included nine Boeing 737-200QCs (Quick Change) with cabins that could be quickly reconfigured for different combinations of seats and cargo palettes. The same aircraft could be used to transport passengers during the day and cargo overnight because quick configurability was built into the design of the aircraft. Changing the configuration could be done anytime and incurred no additional cost.

Compare Alaska's Boeing 737-200QC with NASA's SCA, a heavily modified Boeing 747-100 used to ferry space shuttles from landing sites back to the launch complex at the Kennedy Space Center. To bear the weight of the orbiter, mounting struts were added, the fuselage was strengthened and vertical stabilizers were added to the tail to improve stability during flight. Such extreme customizations were necessary to meet the very specific requirements of transporting the shuttles, but it meant that the SCA could not easily be reconfigured for any other aviation purpose.

These two examples underscore the differences between customization and configuration. Both involve change but on a sliding scale of complexity.

Customization represents a dramatic, fundamental change to an object or system, making it suitable for purposes for which it was never designed. Configuration is a less invasive change that does not permanently alter the core system. Instead, configuration introduces instructions or conditions that cause the system to behave in a different way.

Customization versus configuration is always a hot topic in the context of airline information systems. For all that they have in common — they all fly passengers and cargo from one place to another — there are striking differences in the unique operational approaches that define each airline's brand and competitive strategy. The only real constant in commercial aviation seems to be that all airlines operate differently.

Nowhere are these differences more apparent than in crew operations. For most passenger airlines, crew operations comprise the second- or third-largest single cost center, so it is not surprising to see unique business strategies applied here.

For example, a low-cost airline may put a higher premium on crew utilization, which in turn requires crewmembers to be more flexible. An international carrier may compete on schedule and service levels, which can translate into somewhat lower crew utilization and more complex crew rules.

The uniqueness of airline operations presents a challenge for those who manage airline information systems. They must

decide whether to create proprietary in-house systems or invest in third-party enterprise solutions to help manage their operations. The ultimate decision often comes down to cost versus risk, but the primary drivers of cost and risk are customization versus configuration.

Many questions need to be considered. Can an off-the-shelf system be configured to support the airline's unique business model? If not, to what extent can it be customized, and what will be the added cost? At what point does it become advantageous to develop in-house, fully customized software, in spite of the risks?

### Customization Pros And Cons

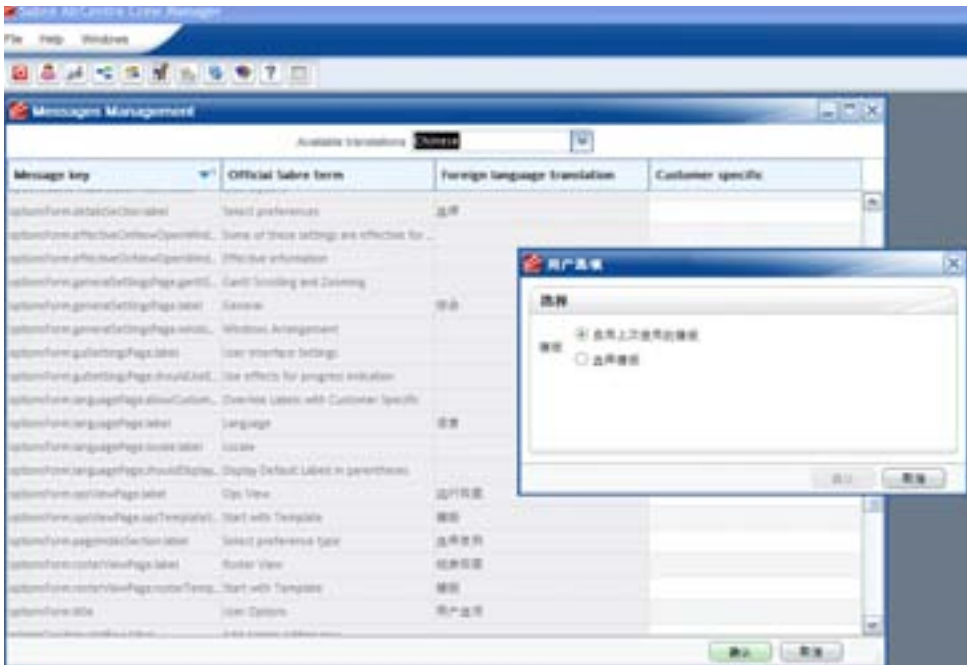
Custom software development by a talented and well-qualified internal team is always an attractive option, promising features that align perfectly to the airline's current business model. Once completed, the customized solution maps perfectly to the operation and contains business logic that precisely replicates current workflows. Like a custom home or hand-tailored clothes, a customized solution is a desirable option.

But full customization comes at a cost — including many hidden costs — and a high risk. First, large and complex IT systems are difficult to accurately estimate and plan, so the chance of huge cost overruns and project delays is high. Second, there are hidden costs that are easily overlooked or underestimated, such as the need for ongoing software maintenance or continued investment in upgrades and improvements. And remember that the significant long-term cost of designing, developing, supporting and maintaining a custom IT solution must be borne solely by the airline.

In terms of risk, all IT development projects at the conception stage are vaporware: nothing real exists except the hope and expectation that a solution can be built. It is a risk that can only be mitigated by forming and retaining an experienced, knowledgeable and talented multidisciplinary software development team.

There are also hidden risks, one being the likelihood that the developed solution will be inflexible and resistant to change. This is not the result of ineptitude, but the simple economic reality that it costs more to build highly scalable, flexible systems. In the final pass, the organization will spend less to get the system it needs today. Yet in the face of a major change, such as an acquisition or merger, an inflexible custom solution becomes a major impediment.

Let's be clear: there are no good guys and bad guys when it comes to customization and configuration. Each has its place, and every implementation of an IT solution includes elements of both. But a fully customized IT solution will always cost more than a third-party solution, and it always entails greater risk.



**System Translations** Airlines want third-party solutions that adapt to their unique terminology. Many airlines also require language localization. The utility in *Crew Manager* handles both, allowing airlines to quickly modify or translate every label and every message in the system.

**Striking A Balance With Configurability**

When work was started on the *Sabre Airline Solutions*® next-generation crew management system, *Sabre*® *AirCentre*™ *Crew Manager*, in 2008, a goal was set to deliver a viable compromise between the high cost and risk of developing fully customized software and a solution that offered native support for a wide range of crew management strategies. The only way to achieve this was through highly granular configurability.

Achieving this level of configurability doesn't just happen automatically. It must be planned, designed and built into the foundation of the system, then rigorously enforced. Whenever there's a question about how a feature in the system should behave, the answer is always the same: make it configurable.

Now that the solution is maturing, it's evident that it shares more in common with an IT platform — a structure on which to build a crew management solution — than a narrowly defined solution in its own right. This is

precisely what airlines want based on ongoing conversations and feedback.

A complete list of configurations available to airlines would take too long to name and would be far too tedious to read. Instead, the more interesting configuration types are grouped into three broad categories — localization, crew and airline data, and business rules.

**Localization**

Localization means providing a translation of the solution into the native language of end users, including the ability to display international character sets. Users should never be penalized for wanting to use their native tongue. But the official language is only part of the localization story. The solution must also be able to “learn” the internal language that is unique to each airline.

Every airline has a word to describe a series of flight duties that are assigned to a crew. Some airlines call it a “pairing,” others call it a “sequence,” or a “rotation,” or even a “tour of duty.” When it comes to solution adoption, expecting an organization to adopt a new terminology should be avoided. At best, it guarantees that end users will resist adoption of the new solution. At worst, it invites confusion and increases the likelihood of user error.

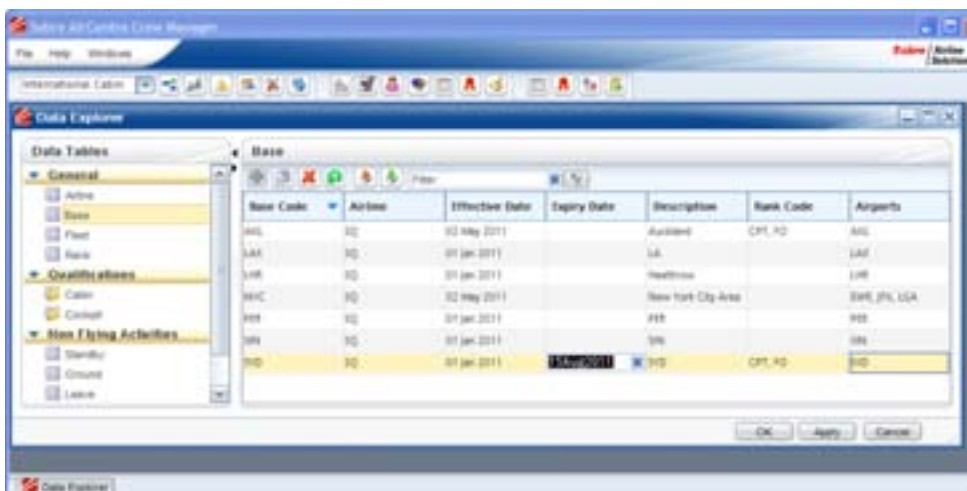
*Sabre AirCentre Crew Manager* features a configuration table that lists every instance of every label or word or message used in the system. These are the system defaults, and there are several hundred at present. Airlines can choose to keep the default or enter an airline-specific alternative. Using the same tool, airlines can enter translations in as many different languages as they wish to support. It would take a native speaker no more than a day or two to enter all of the translations.

**Crew And Airline Data**

A second cousin to localization is setup of the crew and airline data. This includes crew ranks and positions, qualifications, crew bases, aircraft fleet, required flight complements, the many types of non-operating assignments, and so on. Think of it as the DNA of crew operations.

To be perfectly clear, and fair, this is something that all crew management systems can do. It's a minimum requirement. Where *Crew Manager* takes a step beyond the minimum expectation is in keeping these configuration tables decoupled from the core system and providing user interfaces that giving airlines direct access and control over their own data.

If the airline decides to add several new Boeing 787s to the fleet, what kinds of changes must be made in the crew management system? The new aircraft type will be added to the fleet definition, there will be a new minimum operating complement defined, new qualifications for pilots and cabin crew, and so on. In a hard-coded system, changes of this kind must be programmed and tested by the



**Data Explorer Table** Airlines can define and maintain their crew bases. If the airline adds a new crew base or discontinues one, this major change can be implemented system wide in a few minutes, and at no additional cost.



Photo: Alaska Airlines



Photo: Alaska Airlines



Photo: NASA

**Customization Versus Configuration** NASA's Boeing 747-100 SCA, used to ferry space shuttles and Alaska Airlines' Boeing 737-200QC, once used to support different combinations of seats and cargo, required specific change to meet their respective needs. The level of complexity for each defines the difference between customization and configuration.

vendor (or the internal IT department), a process that can take months and incur additional costs.

**Business Rules**

Everything in crew management is about making sure flights can depart on time with a legal crew complement. To ensure that crewmembers can legally operate each flight, the system must know every rule — regulatory rules, contractual rules and airline policy rules — and give advanced warning if any crewmembers are illegal to fly.

The same drawbacks inherent to hard-coded airline data apply to hard-coded business rules. Crew contracts change. Regulations change. To minimize costs, airlines need to be able to define, manage and even test their own business rules and introduce changes in weeks instead of months.

**Interfaces**

Major enterprise systems such as crew management cannot operate in a vacuum. There are many interdependent systems that either provide critical information to crew managers or rely on crew information to function adequately. Creating these interfaces between systems is one of the principal challenges of solution adoption and ongoing maintenance. Like many of its siblings, *Crew Manager* follows the Sabre® ASx<sup>SM</sup> Airline Services Exchange platform to create crew data services to which other systems can subscribe. This innovative methodology puts control back in the hands of the airline's IT department by exposing the crew system interfaces rather than relying on the vendor to do all the heavy lifting of systems integration.

**Evaluating System Configurability**

Perhaps the enterprise solution that an airline needs is comparable to NASA's SCA — something highly customized to meet very specific requirements. Or it may be that the right solution has more in common with the rapidly reconfigurable Boeing 737-200QC once used by Alaska Airlines. The answer will come only after weighing the fully loaded cost and risks of full or partial customization against the level of configurability available through a third-party solution provider. **F**

*Sabre AirCentre Crew Manager overview*



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