



SCHEDULE DISTRIBUTION

An Embark advisory product

Overview

Schedule distribution seems simple, but it is not. With customer demand continuously evolving, the published schedule must adapt while addressing constraints to the distribution process.

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In the airline world, few topics are as fundamental as the schedule. Because the schedule impacts almost every stakeholder, airlines expend considerable resources to get the schedule right. Trained specialists determine frequency plans driven by past and predicted future demand and profitability. Schedulers review operational feasibility with colleagues representing operations control, crew planning, maintenance, and airport operations. This paper, however, is not about that schedule development, but rather the much less discussed area of schedule distribution.

Broadly defined, schedule distribution refers to the process of communicating schedules to stakeholders. This sounds like a simple task, but really is not. First, defining the details of the schedule is complex. Second, the schedule is in a constant state of change. Third, the schedule must contend with being a critical informant to several cyclical processes. Lastly, every recipient of schedule information has specialized needs and requirements for processing the information.

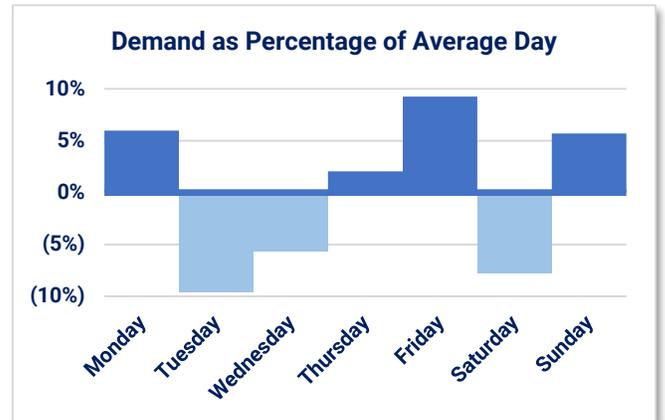
Within every airline planning group, there is a small and specialized team which handles schedule publications and distribution. Their job is to collect and organize all the schedule changes and ensure proper publication within the several cyclical processes. This team will ensure the planned and accurate publication of schedules to all recipients.

DEFINING THE SCHEDULE

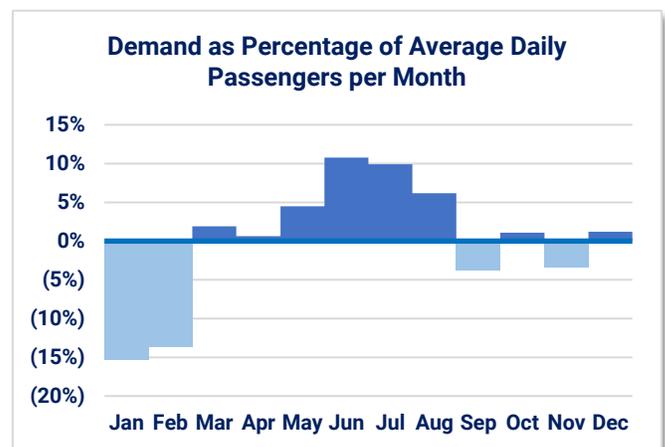
In its simplest form, the schedule is a series of flights organized into lines of flying, with the characteristics of each leg driven by departure, block, and arrival times. Because demand is not consistent, the schedule will vary over time in several different ways to try and accommodate demand. Demand varies by:

Day-of-Week. Underlying characteristics of customer segments drives day-of-week demand.

Mondays, Thursdays, and Fridays tend to be the busiest days of the week, as they have high utility to all traveler segments. Even within a segment, markets act differently by day of week. Leisure travel, for example, can be driven by weekender travel vs. week-long stays.



Seasons. Similar to day-of-week variations, demand shifts seasonally during the course of the year. These demand patterns are driven by larger societal calendars and the weather. Summer tends to be the busiest season because all customer segments demand travel. Leisure and “Visiting Friends and Relatives” (VFR) travel seasons are highly impacted by school calendars. During the winter, leisure demand shifts to sun and ski locales, and away from colder culture destinations.



Holidays and Events are effectively short and hyper-focused seasons. Holidays have unique characteristics which include noticeable shifts of traveler segmentation over the holiday period and specific alterations to day-of-week and seasonal demand patterns. Events are similar, but usually more focused to a specific location. Both share a

unique aspect of a specifically timed reason to be in destination such as a holiday tradition, a big game, a conference keynote, a parade, or similar attraction. A common characteristic of these events is that demand prior to the event is often spread out over days, while demand following the event is very peaked in the 24-hours following the attraction.

Natural Growth. Over time, natural factors of economic growth and decline drive demand. Macro-economic factors can impact overall demand, while variations in local conditions drive change during good times and bad.

These influences on customer demand work to continuously drive change. Even though individual schedule details remain consistent over time, the entirety of the schedule is rarely the same, even day-to-day. In this sense, the schedule is constantly evolving.

THE MOVING FUNNEL

The continual evolution of the schedule creates a different view and definition of the schedule. Here, the schedule is the plan of all flights from today forward. In this definition, it is important to create absolute certainty in the short-term while maintaining flexibility in the long term. This creates a funnel of schedule development where the amount of change implemented in the schedule today is small for close-in travel dates and larger for travel dates further away.

Additionally, in this view, the schedule moves forward every day. At the end of operations, today becomes history. Some reservations systems literally add a new day to the selling schedule every day. These have the effect of the schedule rolling forward in time, every day. When combined, this gathering of schedule changes in the funnel as it moves forward in time describes the challenges of schedule distribution.

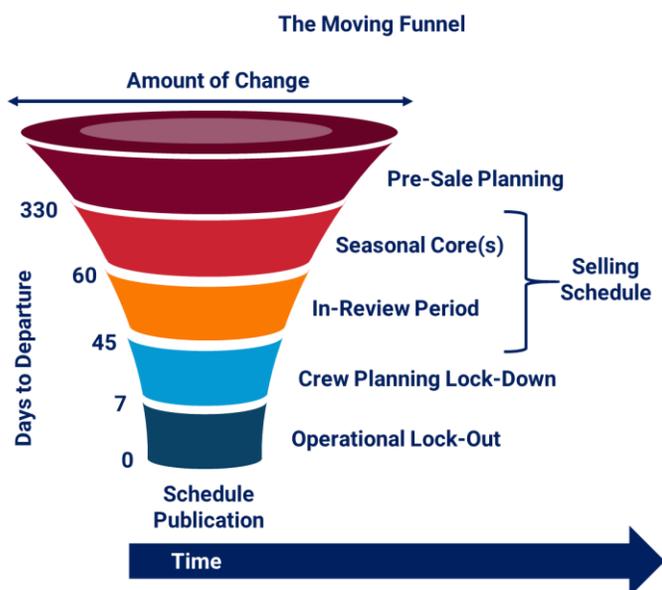
The height of the funnel represents the number of days until the schedule operates. The width of the funnel represents the size and scope of potential changes. Relatively close to departure date, few and small changes to the schedule are expected. However, prior to offering the schedule to sale, a large amount of change is possible. The output of the funnel is published schedules, including the changes processed through the funnel. The funnel moves forward in time, continuously organizing, processing, and publishing the schedule information put into it.

The funnel can be divided into sections, each showing the unique characteristics and ownership of the schedule development process:

Operational Lock-Out represents a period a few days prior to departure during which the schedule does not change. At this point, the schedule has been 'handed off' to the operational control center for day-to-day management. Any deviations from the schedule do not represent a schedule change, but instead an 'operational decision' in the form of a delay or cancel.

For large U.S. carriers subject to reporting on-time performance, the federal government inadvertently defined the operational lock-out period at seven days through regulations that define on-time performance and completion factor. For carriers not subject to this regulation, the operational lock-out is often at 72-hours prior to departure - the start of reservations check-in and related security processing.

Because the control center team is responsible for operational performance and evaluated by their ability to execute the 'locked-out' schedule, they must approve any planned deviations. Any commercial change requested will be evaluated as



an operational decision and internally reported as 'commercial' delay or cancellation. This is very rare, and generally occurs with 'shock' events that have lingering impacts where commercial issues are considered in the recovery plan.

Crew Planning Lock-Down. The process to assign pilots and flight attendants to work assignments is especially complex. Carriers typically use linear optimization models to build unassigned work plans (known as pairings) which maximize crew efficiency. This process will also create bid packages, or listings of pairings, which crew members will bid in seniority order. This process staffs every flight, creates 'reserve' crew members to accommodate sick-calls and delays, and defines work schedules for each crew member as well as a complete staffing plan for every flight.

Once the schedule enters Crew Planning Lock-Down, changes to the flight schedule become complicated and costly, due to the need to adjust crew assignments. These costs are driven from de-optimizing the crew plan and work rules that drive duplicated compensation for the same work when altered after the bidding process. Changes to the flight schedule also become part of managing other complex day-to-day crew schedule issues including sick calls, delays, and cancellations.

To accommodate the optimization and crew bid process, the crew planning deadline generally locks down the schedule for a period of about 1 month and occurs about 1 month in advance. Therefore, the schedule is generally locked down about 8-weeks at each crew planning deadline, shrinking to just 4 weeks prior to the next deadline. After the deadline, changes to the schedule should be limited to only those whose benefits outweigh the cost of making the changes.

Selling Schedule. The Selling Schedule is a broad term that refers to all travel dates after the Crew Planning Lock-Down through the last travel date available for sale. The cost of change during this period is substantially reduced as operations teams can generally adjust their plans to new schedules. The most substantial impact of changes to the selling schedule is to booked customers, to whom the airline must communicate the changes and arrange any additional accommodations.

It is common to break down the selling schedule into sub-sections for the purpose of managing workflow and seasonality. Typically, the closest-in period of the selling schedule is in **Operational Review** in preparation for Crew Planning Lock-Down. During this period, the scheduling team is shaping the schedule into one that is flyable and meets feasibility constraints facilitated by communications and feedback from operational teams. Beyond the Operational Review, Selling Schedules are broken down into **Seasonal Cores** as dictated by the dates represented.

Pre-Sale Schedule. Airlines often maintain schedules beyond the selling period for long-term planning purposes. These schedules are generally of little consequence to the schedule distribution process, except when assisting in the communication of long-term plans, and for carriers which publish schedules with defined end dates.

OPEN-ENDED VS. DEFINED END SCHEDULES

Large legacy reservations and global distribution systems offer the concept of an **Open-Ended Schedule**. These systems have a fixed total available schedule period, typically 330 days. A new day is added to the end of the schedule as each current day ends; the new day is populated with flights which lack end dates in computerized schedule files. This concept, from which the Moving Funnel concept is based, is widely utilized by network carriers on legacy systems. Airlines using this process will adjust schedules well in advance of receiving reservations for the impacted schedule dates, which makes this process invisible to most customers.

Low cost carriers typically use **Defined End Date** schedules. This is rooted in their origins with newer generation reservations system which did not offer the rolling and Open-Ended Schedule on their platforms. These carriers will periodically open a new range of dates at the end of their schedules in line with overall sales strategies. Some LCC's spend considerable effort in making their schedule extensions fit feasibility parameters, which in turn is designed to reduce changes over the lifecycle of a schedule. This design is intended to minimize impact of schedule changes to customers and increases the importance of Pre-Sale Schedules.

FORMAT AND PACE OF SCHEDULE DISTRIBUTION

Internal schedule publication is largely driven by the operational concepts described in the Moving Funnel concept, and generally occurring between 90-day and 30-days prior to departure. For most operational teams, visibility beyond 60-days is not material to manage day-to-day, and there is little review beyond 90-days in most circumstances.

External schedule publication is complicated as it is impacted by a separate distribution cycle.

Historically, a substantial amount of time was required to technically prepare schedule loads for reservations and global distribution systems.

Schedule files would be finalized several days prior to final publication to customers. While the IT providers and schedule aggregators have largely eliminated the technical limitations, network carriers have built in time for the coordination of codeshare flight numbers which maintain the historic timing limitations. Carriers without codeshare limitations are able to publish changes much quicker following the decision to execute a change.

All carriers consider the impact of non-schedule events on their schedule publication. These considerations include fare sales, announcements of service changes such as new or suspended markets, other company news including financial releases, and holidays.

IATA has prescribed two schedule change formats in its Standard Schedule Information Manual (SSIM) which are nearly universal. Each format has its own language and format, although virtually every schedule element is accommodated in each. The primary distinction between them is the nature of what they represent. SSM messages, governed by SSIM Chapter 4, represent individual change instructions, and therefore contain a comparison between old and new data. SSIM files, governed by SSIM Chapter 7, represent the entire schedule valid at the moment the file is produced. These SSIM files are typically compared by receiving systems to understand changes from prior schedules.

	Chapter 4 SSM Message	Chapter 7 SSIM File
What is submitted?	Only changed flights	Entire schedule
Who does compare?	Originator to create SSM	Recipient, after receiving SSIM
What is actioned?	Every SSM is a change by definition	Only changed items following compare
When is it actioned	"Immediately"	"Open for Sale Date"

SCHEDULE DETAILS AND COMPLETION

Although the standards of SSIM are utilized to convey schedule information, there are significant finishing steps prior to publication. The distribution team acts as an editor, to ensure only intended changes are published. They process important supplemental and optional data elements largely ignored during the schedule development process, such as inventory classes, codeshare flight number coordination, on-time performance, and on-board service indicators. These and other options are managed for specific recipients, as the purpose of the receiving system may make some data unnecessary or redundant.

The schedule distribution team is also responsible for ensuring schedule integrity between systems, internal and external. A substantial part of this is creating recipient-specific templates of SSIM options which allow customized SSIM files to be created from the same base schedule. These functions are typically part of schedule editing software creating specifically for airlines. The team will also coordinate the direct entry of schedule information into the host PSS, share SSIM files with OAG and Cirium, and provide schedule files for other internal systems.

ENGAGING EMBARK

Embark can be engaged for several different projects related to schedule distribution. When we are engaged to act as a scheduling department, schedule distribution is part of our service. Our team has decades of experience with schedule distribution and key relationships to assist your airline.

Our Approach

No two airlines are alike. Therefore, our approach always starts by working with the airline's stakeholders to define the Moving Funnel. We review all aspects of distributing your schedule, including input from the scheduling team, defining an optimized external distribution strategy, and understanding the downline impacts of each publication. We work directly with your stakeholders because the output of this process is tangible deliveries, not recommendations based in theory.

Notable Engagements

Embark was engaged by a transatlantic carrier during a reservations system migration to revise their schedule distribution process. The new system required the carrier to change its communication format from SSM messages to SSIM files. The carrier recognized its schedule distribution process was already complicated by important but intricate internal systems, and therefore engaged us for an overall health check of the entire process.

In another engagement, Embark was tasked to support and develop airline partnerships, including improving a stressed codeshare agreement. Upon review, we determined the schedule distribution process was not properly adapted for its codeshare and caused significant errors in partner-originated bookings during schedule updates. We worked with our client and their partner to successfully adjust the schedule distribution process, which eliminated routine conflict and helped restore their overall relationship. Our client had renewed confidence in their codeshare capability and we created a path to successfully recruit and implement additional agreements.

CONTACT US

Embark is more than a consulting firm; we help craft airline business strategy - then work with our partners to make it a reality. Embark provides airlines with (short-term or long term) outsourced support across any commercial function. Whether support is required with scheduling, or developing strategic airline partnerships, or pricing and revenue management, Embark has over 100 years of experience to take airlines to new heights.

Contact our team via phone or email and we would be happy to discuss how we can work together to support your needs.

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