SHA532: Forecasting and Availability Controls in Hotel Revenue Management
This course includes

- Three self-check quizzes
- Multiple discussions; you must participate in two
- One final action plan assignment
- One video transcript file

Completing all of the coursework should take about five to seven hours.

What You'll Learn

- To explain the role of forecasting in hotel revenue management
- To create a forecast and measure its accuracy
- To recommend room rates
- To apply length-of-stay controls to your hotel

Course Description

Successful revenue management strategies hinge on the ability to forecast demand and to control room availability and length of stay. This course, produced in partnership with the Cornell School of Hotel Administration, explores the role of the forecast in a revenue management strategy and the positive impact that forecasting can also have on staff scheduling and purchasing.

This course presents a step-by-step approach to creating an accurate forecast. You’ll learn how to build booking curves; account for “pick-up”; segment demand by market, group, and channel; and calculate error and account for its impact.

Sheryl Kimes
Professor of Operations Management, School of Hotel Administration, Cornell University

Sheryl E. Kimes is a professor of operations management at the School of Hotel Administration. From 2005-2006, she served as interim dean of the School and from 2001-2005, she served as the school's director of graduate studies. Kimes teaches restaurant revenue management, yield management and food and beverage management. She has been named the school's graduate teacher of the year three times. Her research interests include revenue management and forecasting in the restaurant, hotel and golf industries. She has published over 50 articles in leading journals such as Interfaces, Journal of Operations Management, Journal of Service Research, Decision Sciences, and the Cornell Hospitality Quarterly. She has served as a consultant to many hospitality enterprises around the world, including Chevy's FreshMex Restaurants, Walt Disney World Resorts, Ruby's Diners, Starwood Asia-Pacific and Troon Golf. Kimes earned her doctorate in Operations Management in 1987 from the University of Texas at Austin.
Module Introduction: Creating a Forecast

Your ability to manage demand successfully and maximize revenue will depend on the accuracy of your forecasts. In this module, find out why forecasts are so important to revenue management. Learn to create targeted, accurate forecasts that provide the information you need to manage revenue.

When you have completed this module, you will be able to:

- Relate accurate forecasting to revenue management
- Define *unconstrained demand*
- Describe two different types of forecasts
- Build a booking curve
- Create a pickup forecast
- Explain why forecasting is done by group
- Create a forecast by group
- Discuss the impact of errors on forecasts
- Calculate error using the MAD and MAPE methods
In revenue management, your goal is to work with demand and the resources you have to maximize your revenue. To do this effectively, you need to understand the subtleties of constrained and unconstrained demand and why accurate forecasting is a necessary part of any revenue management system.

The management team at the Random Stays Hotel is not sure how many guests might arrive on a given day, when they might arrive, or when they might leave. Team members are beginning to suspect that their lack of information is compromising their ability to make good management decisions and may even be contributing to their inability to reach their revenue goals. Their monthly reports indicate problems with labor scheduling, food purchasing, and guest-room occupancy levels. The team is wondering what to do next.

One team member suggests they start forecasting arrivals. Though some nod in agreement, others protest. Forecasting seems like a lot of bother! And besides, managers who have been there awhile know how many arrivals to expect, more or less. Why would it matter if their estimates were a little too high or too low?

Why should they go to the trouble of creating a written forecast?

Explore the activities in the following pages to find out.
Watch: **Forecasting Accuracy**

A presentation containing audio appears below. Use this resource to develop an understanding of the importance of accurate forecasting.
Accurate forecasts are essential to revenue management. Without a forecast, it’s not possible to set availability controls wisely or to use these controls effectively to grow revenue. A good forecast is a first and necessary step in revenue management.

Good forecasts are based on data. Let’s take a look at some typical booking data and see how past performance provides a basis for forecast estimates. Figure 1 displays guest-stays data for one hundred Thursdays at a particular hotel. From this chart, you can see how actual numbers of stays vary week by week, though usually keeping close to an average value. This average value can be estimated by inspection or calculated mathematically. It can be used, along with other characteristics of the data, to forecast the number of room-nights on a Thursday in the future.

Figure 1 - Sample data set for Thursday arrivals

This graph plots the actual number of guests staying on 100 Thursday nights. These data can be used to develop a probability analysis for future Thursday-night arrivals.

<table>
<thead>
<tr>
<th>Historical Average Weekly Occupancies</th>
<th>Forecast</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week</td>
<td>1</td>
</tr>
<tr>
<td>Sun</td>
<td>75%</td>
</tr>
<tr>
<td>Mon</td>
<td>76%</td>
</tr>
<tr>
<td>Tue</td>
<td>71%</td>
</tr>
<tr>
<td>Wed</td>
<td>72%</td>
</tr>
<tr>
<td>Thu</td>
<td>70%</td>
</tr>
<tr>
<td>Fri</td>
<td>71%</td>
</tr>
<tr>
<td>Sat</td>
<td>80%</td>
</tr>
</tbody>
</table>

Table 1 above contains occupancy data aggregated by day for seven weeks. The manager of the hotel can use historical data like these to estimate room-nights for days and weeks in the future.

The data provided here suggest something about future occupancy levels, but they also demonstrate how much these values can vary. If occupancies vary as much as they do here, how is it possible to create an accurate forecast?
Forecasts are estimates. You shouldn't expect them to be one hundred percent accurate. They tend to be more accurate when more data are available and when those data can be appropriately aggregated, or grouped. For the best results, occupancy data should always be grouped by day, but they can also be grouped by length of stay, by rate, and even by distribution channel or market segment. In addition, forecasts created for dates in the future can be made increasingly accurate as information is acquired closer to the target date.

**Forecast Variations**

**Types of Forecasts**

- **Arrivals Forecast** - An arrivals forecast includes guests arriving on the forecast day, but does not include guests arriving prior to the forecast day for multi-night stays.
- **Room-Nights Forecast** - A room-night forecast includes guests arriving on the forecast day and guests arriving prior to the forecast day for multi-night stays.

**Levels of Forecast Detail**

- **Day of week** - Most forecasting is done by the day of the week, that is, a Monday forecast would be built using data from previous Mondays, a Tuesday forecast would be built using data from previous Tuesdays, and so on. Demand varies reliably by day of the week, with certain obvious exceptions (holidays, emergencies).
- **Length of stay** - For length-of-stay forecasting, individual forecasts are created for each stay length (one-night, two-night, three-night, etc.).
- **Rate class** - For a hotel that offers more than one rate class (for instance, rack rate, discount, or super discount), forecasts can be created for each rate class individually.
- **Inventory type** - In the case of hotel-room forecasting, a forecast by inventory type might be characterized by king- or queen-sized beds, private bath, or view.
- **Aggregate** - Arrivals or room-nights are forecasted as one group, without regard to individual subgroups such as length of stay, rate class, or inventory type.
Read: Constrained and Unconstrained

How many customers will come to your hotel two weeks from tomorrow? How about three weeks from tomorrow? How about two months? Your forecasts attempt to answer those questions and many others. You base your forecasts on data, using a picture of past demand to estimate demand in the future. But how accurate is your picture of past demand? Here we take a look at some of the issues involved in documenting and estimating demand.

To a certain extent, past demand is reflected in the numbers of rooms sold. A large number of bookings indicates demand was high. Few bookings indicates demand was low. These data provide a rough estimate.

To get a more accurate picture of demand, you want to dig a little deeper. For instance, you may want to know whether the number of rooms sold represents everyone who was interested in booking a room or just a fraction of them. Is it possible that some interested parties were denied due to the unavailability of rooms, acceptable room rates, or desired room features? If so, these people should be counted in the estimate of demand. The sum of customers booked and potential customers denied is what is known as unconstrained demand.

In the context of hotel management, unconstrained demand can be defined as the number of customers the hotel could accommodate if its capacity were unlimited. It is the total demand for what the hotel has to offer in the absence of all constraints.

Scenario 1: The rate is closed

Mrs. N paid a low rate to stay at your hotel last month, and she wants to pay that rate again this month. However, demand is higher this month, and the low rate is closed. When she calls to make a reservation, she isn't happy with the rate she is quoted and she decides not to book a room. Does her call represent demand for your hotel?

Yes. Your hotel has what Mrs. N desires—a lower rate. Unfortunately, that rate is closed (a constraint). This event should be recorded as a denial.

Scenario 2: The rate is too high

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Ms. S called to request a room at the senior rate at your hotel and was told that the rate was not available (a constraint). When she decided not to reserve a room, the event was recorded as a denial and Ms. S was added to the estimate of demand.

Later on, Ms. S continued her search for a room using an Internet service. She happened to see your senior rate listed on your Web site and thought to herself "That rate is too high! I wouldn't have taken it anyway." Aha! She should not have been counted in the estimate of demand. There really was no acceptable rate.

Scenario 3: The plan is changed

Mr. D called yesterday to request a room with a king-sized bed, but there were no king rooms available (a constraint). He decided to book a room with a queen-sized bed, instead. Your booking agent recorded this event as a room booked.

Now your estimate of the demand for queen-sized beds includes Mr. D's request. Your estimate of the demand for king-sized beds does not, however—but it should.
The Random Stays Hotel just might be ready to consider the value of forecasting arrivals. Though some managers insist that forecasting is too much bother, others believe it can help them begin to address problems at the hotel related to labor scheduling, food purchasing, and occupancy levels. But whether they are in favor of forecasting or against it, no one is entirely sure how it is done. If they take this on as a project, how will they get started?

As it turns out, the Random Stays Hotel possesses booking data going back several years. None of the data are aggregated, but the IT manager says that aggregation is not a problem. His team can get started as soon as someone produces a specification document. Meanwhile, a few recent hires are talking about "booking curves" and "pickup forecasting." What do these terms mean?

As of today, the general manager has approved the project. Now even the detractors are expressing interest. The Random Stays Hotel has forecasting in its future, and its management team needs a step-by-step approach.

Do you know how to forecast arrivals? The activities in the following pages provide guides and resources.
Watch: Meet the Booking Curve

Forecasting begins with reservation data. A skilled forecaster charts and analyzes the data, building curves and calculating averages, to get the information needed for an accurate forecast. In this section, learn to work with reservations-on-hand (ROH) data to chart the accumulation of reservations over time. This chart is called the *booking curve*. As you study this curve, consider how corporate hotels, airport hotels, and resort hotels might differ in terms of when reservations tend to come in and at what rate. Finally, find out how to calculate *pickup* and create a pickup forecast.

A presentation containing audio appears below. Use this resource to develop an understanding of booking curves.
Read: How to Create a Booking Curve

A hotel manager reviewing her booking data notices that she has only twenty reservations on hand for a Thursday night five weeks in the future. She's hoping to sell 110 rooms. Should she be concerned?

Of course, it's not possible to say if she should be concerned unless you are able to ask a few questions. For instance, what occupancy level has she achieved in the past on that date or day of the week—is 110 rooms a realistic goal? And then, if it is, how many of those 110 reservations should she expect to have on hand at this point, five weeks in advance of the arrival date? Do most reservations tend to come in many weeks in advance or during the last week? Without answers to these questions, it's very difficult to interpret the current reservation data.

Table 1. Reservations Data

<table>
<thead>
<tr>
<th>DBA</th>
<th>ROH</th>
</tr>
</thead>
<tbody>
<tr>
<td>-1</td>
<td>100</td>
</tr>
<tr>
<td>0</td>
<td>110</td>
</tr>
<tr>
<td>1</td>
<td>102</td>
</tr>
<tr>
<td>2</td>
<td>90</td>
</tr>
<tr>
<td>3</td>
<td>80</td>
</tr>
<tr>
<td>4</td>
<td>75</td>
</tr>
<tr>
<td>5</td>
<td>70</td>
</tr>
<tr>
<td>6</td>
<td>60</td>
</tr>
<tr>
<td>7</td>
<td>50</td>
</tr>
<tr>
<td>14</td>
<td>42</td>
</tr>
<tr>
<td>21</td>
<td>30</td>
</tr>
<tr>
<td>28</td>
<td>25</td>
</tr>
<tr>
<td>35</td>
<td>20</td>
</tr>
<tr>
<td>42</td>
<td>15</td>
</tr>
<tr>
<td>56</td>
<td>10</td>
</tr>
<tr>
<td>70</td>
<td>8</td>
</tr>
<tr>
<td>84</td>
<td>6</td>
</tr>
</tbody>
</table>

One tool this manager could use is a booking curve. A booking curve is a chart of reservations on hand (ROH) for a given day, recorded at regular intervals. These intervals might be months before arrival (MBA), weeks before arrival (WBA), or days before arrival (DBA). The booking curve is a picture of the accumulation of bookings in the weeks leading up to an arrival date. Based on historical data, this curve provides information about general tendencies in booking behavior that can be very useful in forecasting future bookings.

You create a booking curve using reservations-on-hand data of the kind found in Table 1. That is, the ROH values must
be associated with specific intervals before arrival (in this case, DBAs). Because booking curves are used in building forecasts, you should use historical data for arrival days or dates similar to the day or date you are forecasting. Typically, the booking-curve data set includes data for each week before arrival and for each day before arrival in the final week, as in Table 1. (The data-gathering days are called "reading days"). These data are then plotted as in Figure 1.

**Figure 1 - A Booking Curve**

![Graph of booking curve](image)

*This chart presents the number of reservations on hand at different times. Times are charted as days before arrival (DBA). DBA = -1 refers to the day before arrival, when actual arrival numbers are finally available.*

Booking curves, like forecasts, can be created for specific days of the week, rate classes, or market segments, or the data can be an aggregate of all reservations on hand. If you have enough data to work with, you may want to create an average booking curve using averages of six to eight data sets like the one in Table 1. An average booking curve may provide stronger evidence of general trends than a booking curve based on just one data set, because it draws on a greater number of experiences.

To return to the manager with twenty reservations, should she be concerned? If the booking curve in Figure 1 is relevant to the date in question, the answer is probably not. Twenty reservations on hand 35 days before arrival is about what she should expect. It appears that she's right on track for 110 rooms reserved on the day of arrival!
Read: Forecasting the Pickup

Key Points

The "pickup" is the number of reservations you expect to receive, but have not yet received, for a particular arrival date.

You can estimate pickup using historical ROH data.

You can create a forecast by adding the estimated pickup to the actual reservations on hand.

Use this guide to arrive at a forecast for a future date of arrival using pickup forecasting. These instructions will help you to calculate the expected pickup for that date. Then you'll add the expected pickup to the reservations on hand to get the forecast.

1. Gather ROH Data

To create a forecast for a future date X, gather reservations-on-hand (ROH) data for one or more past cycles relevant to X. That is, if you are forecasting a Tuesday, then use historical Tuesday data; if you are forecasting a holiday weekend, then use historical data for that holiday weekend.

Some typical ROH data are shown in Table 1. Note the column of data labeled DBA = -1. This column provides the number of rooms sold for each arrival date, confirmed by the hotel staff on the day after arrival. In other words, this number represents the final number of reservations taken for that day. The average number of rooms sold is 110 for the dates this data set.

<table>
<thead>
<tr>
<th>Arrival Date</th>
<th>Days Before Arrival</th>
<th>14</th>
<th>21</th>
<th>28</th>
</tr>
</thead>
<tbody>
<tr>
<td>16-May</td>
<td>-1</td>
<td>100</td>
<td>60</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>120</td>
<td>70</td>
<td>45</td>
</tr>
<tr>
<td>30-May</td>
<td>-1</td>
<td>110</td>
<td>70</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>100</td>
<td>70</td>
<td>35</td>
</tr>
<tr>
<td>13-Jun</td>
<td>-1</td>
<td>120</td>
<td>80</td>
<td>40</td>
</tr>
<tr>
<td>Average</td>
<td></td>
<td>110</td>
<td>70</td>
<td>40</td>
</tr>
</tbody>
</table>

Table 1. Reservation data for given dates in May and June. Reservations on hand are given for 28, 21, 14, 7, and -1 days before arrival.

Table 1 provides five cycles of data for dates four weeks, three weeks, two weeks, and one week before arrival (in addition to the rooms-sold data). These data can be displayed as several booking curves or one average booking curve.

2. Estimate the Pickup

The data provided in step one (Table 1) show the accumulation of reservations over time for five different cycles. Because we know the final number of reservations taken (this is shown in the column for DBA = -1), we can calculate the number of reservations that were not received yet at each point in time. The number of reservations not received yet is the pickup.

Using the data provided in Table 1, we can calculate the pickup for each number of days before arrival. Here is how to do
3. Find the Forecast

Now the final step: finding the forecast. To find the forecast, use the pickup values calculated in step 2 and apply them to your situation at the present moment as expected pickup. To find the forecast for the date X in question, add the number of reservations on hand in your current data to the expected pickup calculated in step 2 using historical data.

\[
\text{Forecast} = \text{ROH (now)} + \text{Expected Pickup (previous)}
\]

Example 1

**Question:** You currently have 20 reservations on hand for a date 2 weeks from now. You're wondering how many more reservations you might expect to receive, because you would like to create a forecast for this day. Assume the dates covered in Table 2 are relevant to this day or date, so you can use the pickup values for this forecast. Based on the available data, what is your forecast?

**Solution:** To get the forecast, just add the pickup provided in Table 2 to the number of reservations you have on hand currently. According to Table 2, you can expect to receive about 70 more reservations.

\[
\text{Forecast} = 20 + 70 = 90
\]

The forecast for the date 14 days from now is 90.

Because we can never have hard data about the future, expected pickup is always calculated using historical data.
sets. To get the best result, expected pickup calculations ordinarily use four to eight periods of data. For example, to calculate the forecast for a Thursday in the future, you would average the historical data for four to eight Thursdays and find the pickup values for each DBA, as in Table 2, to get the expected pickup.
Read: A Group Decision

So far in this course we have studied the forecasting of transient business—that is, predicting future demand. We will now consider the forecasting of group business—a fundamentally different exercise. For group forecasting, the question is not what the demand will be, because that question is answered when the group is booked. The question the group forecast tries to answer is what the sales will be, given the demand. Luckily, this question can be addressed with many of the same tools used for the forecasting of transient business.

At the Random Stays Hotel, they're digging through their booking data and other information sources, working on forecasts for the weeks ahead. Unexpectedly, they hear from the Northeast Hand Fan Collectors Organization (NHFCO), a group of enthusiasts who congregate in Random City each year to share recent finds, meet up with old friends, and compete for prizes at the annual Fan Collectors' Ball. Last year this group met in July, and many were guests at the Random Stays. This year the group intends to meet in June. What does this mean for the June forecasts at the Random Stays?

Explore the activities in the following pages to find out.
Watch: Groups, Channels, and Segments

A presentation containing audio appears below. Use this resource to enhance your understanding of how booking curves and pickup forecasts can be used to provide various kinds of specific forecasts.
Read: The Actual Facts

The idea of forecasting has been gaining momentum lately at the Random Stays. However, the general manager commented in meetings this week that the forecasts are not accurate. It's true: the forecasted numbers are not exactly the same as the actual numbers of arrivals—but isn't that to be expected?

The management team at the Random Stays has questions about how to calculate forecasting error and how to evaluate that error. Explore the activities in the following pages to investigate these issues yourself.
Watch: Errors in Forecasting

A forecast is built far in advance of the arrival day in question and concludes when the bookings for that arrival day are complete. On the following day (designated as -1 on the booking curve), it's possible to compare the number of actual arrivals to the number you forecasted. Chances are, these numbers will not be exactly the same. Now we have to consider how much error is too much and what the impact of this error is.

A presentation containing audio appears below. Use this resource to enhance your understanding of forecasting error.
Absolute Value

Key Points

Mean absolute deviation (MAD) is the average error in terms of number of rooms.

Mean absolute percentage error (MAPE) is the average error given as a percentage.

Express deviations as absolute values in these error calculations.

We've established that an accurate forecast is of critical importance in hotel revenue management. Now the question is: how do you measure forecast error? This resource presents two methods. The first is mean absolute deviation (MAD), which is the average error in terms of the number of rooms. The second is mean absolute percentage error (MAPE), which is the average error given as a percentage.

Here are the forecasts for each day last week and the actual arrivals for each day. Sometimes the forecasted arrivals number was higher and sometimes it was lower than the actual arrivals (rooms sold). To get the error in the forecast, first we find the deviations between these two values by subtracting the actual arrivals from the forecasted arrivals. Consider this set of deviations: -10, 2, -6, -2, 5, 6, 10, and -5. Averaging them gives you a result of zero. But is your error really zero?

If you try to calculate the average error of your forecasts by averaging the deviations, the positive and negative error values will cancel each other out, giving you an incorrect sense of how much error is present. We avoid this problem by expressing the deviations as absolute values.

Taking the absolute value of a number means considering the magnitude of the number itself and not whether it is negative or positive. In effect, taking the absolute value of a number means expressing that number as a positive. For example, the absolute value of -7 is 7. The absolute value of 7 is also 7.

Mean Absolute Deviation (MAD)

This error-calculation method measures how large the deviations are, on average. Using the set of deviations we have
been working with and the additional data given below, let's find the MAD.

1. Find the deviations. The deviations are -10, 2, -6, -2, 5, 6, 10, and -5.

2. Take the absolute value of each deviation. The absolute values of the deviations are 10, 2, 6, 2, 5, 6, 10, and 5.

3. Find the mean of the absolute deviations. The mean of the absolute value is 5.75.

\[
\text{Mean Absolute Deviation (MAD)} = 5.75
\]

**Mean Absolute Percentage Error (MAPE)**

This error-calculation method measures how large the deviations are on a percentage basis. Using the data set we have been working with, let's find the MAPE.

There are several ways of calculating MAPE. The easiest and most intuitive way might be to start by calculating the MAD and then divide the MAD by the average number of actual rooms sold.

1. Find the deviations. The deviations are -10, 2, -6, -2, 5, 6, 10, and -5.

2. Take the absolute value of each deviation. The absolute values of the deviations are 10, 2, 6, 2, 5, 6, 10, and 5.

3. Find the mean of the absolute deviations. The mean of the absolute value is 5.75.

4. Divide the mean of the absolute deviations by the average number of actual rooms sold. In this case it would be

\[
\frac{5.75}{\text{(average of the actuals)}} = \frac{5.75}{93.75} = 0.06
\]

Mean Absolute Percentage Error (MAPE) = 0.06 or 6%

If you're interested in comparing errors in the forecasts of several hotels, the MAPE is probably a better choice than the MAD. The MAPE provides a way to compare hotels of different sizes. For instance, if one of the hotels has 100 rooms and the other one has 1000 rooms, an absolute deviation of 10 means a very different thing for one than for the other. Looking at percentage error corrects for that difference and allows for easy comparison.
Activity: What is the Error?

The summer is winding down, and it's been a full season of forecasting at the Random Stays! There is some concern, however, over comments the general manager made recently regarding the accuracy of hotel forecasts. It's true: the forecasted numbers are not exactly the same as the actual numbers of arrivals—but isn't that to be expected?

Help the team at the Random Stays calculate its forecasting error. Use the table above to calculate the MAD and MAPE for the forecast data provided.

Calculate the MAD to three places to the right of the decimal point (thousandths), then round your answer to two places to the right of the decimal point (hundredths). For example, if you calculate the answer to be 7.357, you would round up to 7.36. If your answer were 7.354, you would round down to 7.35.

Calculate the MAPE to two places to the right of the decimal point (hundredths), then round your answer to one place to the right of the decimal point. Do not include the percentage sign (%) in your answer. For example, 7.4 would be an acceptable answer, but 7.35, .07, and 7.4% would not be.

When you've completed your work, enter your answers in the Answer boxes below and click CHECK to verify them.
Module Introduction: Controlling Availability

This module presents specialized guidelines for controlling various levels of demand to maximize RevPAR. Using information from forecasts and other sources, you develop room-rate categories and learn to apply rates effectively. You explore the use of length-of-stay controls and apply these controls to maximize occupancy. In all, you develop your skills in the area of availability controls.

When you have completed this module, you will be able to:

- Create a demand-control chart
- Discuss how a demand-control chart is used
- Develop rate recommendations based on demand patterns
- Discuss the impact of length of stay
- List several availability controls
The Random Stays Hotel has two different room rates corresponding to two types of rooms: standard and deluxe. To date, they haven’t offered discounted rates on their rooms. In fact, they haven’t made any efforts to vary their prices at all.

In a recent meeting, one of the managers suggested that they could charge higher rates on busy weekends. Another suggested they offer discounted rates to boost occupancy during lower-demand periods—for instance, off-season weekdays when there are no festivals, group meetings, or holidays.

Can the team at the Random Stays figure out a way to charge higher and lower rates for the same rooms? Steps like these would take them into new territory, that’s for sure. And if they choose to vary their prices, how will they set their new rates?

Explore the activities in the following pages to find out.
Watch: Demand-Control Charts

A presentation containing audio appears below. Use this resource to enhance your understanding of demand-control charts.
Watch: Rate Recommendations

A presentation containing audio appears below. Use this resource to enhance your understanding of how to develop rate recommendations.
Read: A Guide to Rates and Demand

Here’s an example of how to build a demand-control chart in three easy steps.

1. Create or obtain forecasts for upcoming dates.

Some sample forecast arrivals and forecast occupancies for a 150-room hotel are included below.

<table>
<thead>
<tr>
<th>DOW</th>
<th>Date</th>
<th>ROH</th>
<th>DBA</th>
<th>Pickup</th>
<th>Forecast</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Arrivals</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Occ%</td>
</tr>
<tr>
<td>Tues</td>
<td>13-Sept</td>
<td>85</td>
<td>1</td>
<td>-1</td>
<td>84</td>
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<td></td>
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<td>56%</td>
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<td>14-Sept</td>
<td>105</td>
<td>2</td>
<td>4</td>
<td>109</td>
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<tr>
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2. Next, determine the trigger points associated with hot, warm, and cold zones.

Some sample trigger points are:

- Hot: 100% occupancy
- Warm: 80% occupancy
- Cold: 0% occupancy

These trigger points indicate that the hot zone is 100% occupancy and above, the warm zone is 80% occupancy to 99% occupancy, and the cold zone is 0% occupancy 79% occupancy.

3. Now determine the minimum rates to quote for each forecasted day.

In this example, the hotel has three rates: $80, $100, and $120.

- An $80 rate is available if the projected occupancy is in the cold zone. The $100 and $120 rates are also available.
- A $100 rate is available if the projected occupancy is in the warm zone. The $120 rate is also available
- Only the $120 rate is available if the projected occupancy is in the hot zone. The other two rates are closed.

Using this information, you can assign minimum rates.

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The demand-control chart is complete.
Activity: Recommend a Rate

So, can the Random Stays figure out a way to charge higher and lower rates for the same rooms? For one thing, they need help creating a demand-control chart for their reservation agents to use.

You'll need the following data to create the demand-control chart:

- The hotel has 100 rooms.
- There are three rates: $100, $120, and $150.
- Hot is 95% occupancy and above. Cold is 75% occupancy and below.

Can you complete the demand-control chart below?
Read: No Control

Now that they’re digging into their booking data and focusing on raising RevPAR, the managers at the Random Stays have identified what might be a problem with occupancy percentages. The data indicate lower-than-expected occupancy at high-demand times. It is not clear why this should be the case.

At present, no length-of-stay controls are being used at the hotel. Could these controls be used to help raise occupancy during high-demand times? How can these controls be implemented, and when?

Explore the activities in the following pages to find out.
Watch: **Controlling Length of Stay**

A presentation containing audio appears below. Use this resource to enhance your understanding of length-of-stay controls.
Dos and Don'ts of Length of Stay

Key Points

Part of managing revenue effectively is controlling demand, not just responding to it.

Three approaches you can use to control demand are: setting a minimum length of stay, setting a maximum length of stay, and closing a date to arrivals.

In hotel management, it is sometimes necessary to control demand, not just respond to it. This is part of managing revenue effectively. Here are three controls you can use during high-demand periods to maximize revenue.

Minimum Length of Stay

When to use
Minimum length of stay can be used at any hotel where there will be a period of high demand (a string of busy nights) followed by a period of low demand. Some example scenarios are: a resort hotel over a winter holiday or any hotel in the vicinity of a major national festival or conference.

What to do
Implement a rule to accept longer-duration reservations and reject shorter-duration reservations for arrival during a hot period. In this way, you can fine-tune demand during hot times to increase occupancy during the slow period that follows.

Potential problems
You may not have anybody who wants to stay longer than the minimum you have in mind. Also, your guests may decide to leave early.

Requirements
Be sure you have sufficient demand for longer lengths of stay. Otherwise, use of this control could have a detrimental effect on RevPAR instead of improving it.

Maximum Length of Stay
When to use
This control is used when you are expecting to be able to sell out your rooms at higher rates. Using maximum length of stay, you can limit the number of rooms sold at large discounts during the high rate time period by limiting the (discounted) multi-night stays extending into that time period.

What to do
Do not accept reservations at specific discounted rates for multiple-night stays extending into the sold-out period. To do this, use the start of the sold-out period as a guide to determine the maximum length of stay allowable for discount customers. To accommodate guests who would like to stay at the hotel longer than the maximum length, it is possible to charge two rates: the discount rate for nights up to the maximum and the rack rate for subsequent nights.

Potential problems
Your guests may decide to stay longer. By law, you can't force them out of their rooms.

Requirements
Be sure you have high demand. Otherwise, you could decrease RevPAR instead of improving it.

Closed to Arrival

When to use
This control can be used to restrict arrivals during a time when you expect to reach maximum occupancy through guests staying on at the hotel for multiple nights (through "stayovers" as opposed to through new arrivals). Using this control would only make sense if you believed you would achieve higher occupancy by selecting a particular set of guests (i.e. those arriving before the closed-to-arrival date).

What to do
Do not accept reservations for arrivals on the day in question. Allow guests staying through from previous nights only.

Potential problems
Be very, very careful with this control, because using it will have an impact on the day you've closed to arrivals, and the day after, and the day after that. You may end up improving revenue on some days, but decreasing it on others.

Requirements
Be sure you have extremely high demand.
Activity: Fill Your Hotel

Now that you have learned about length-of-stay controls, try implementing them in this activity. In order to successfully complete this activity, you must try booking the hotel twice, once with and once without length-of-stay controls. However, you are encouraged to continue trying with different combinations of controls once you have completed the requirement. Note that it is possible to achieve 100% occupancy by finding the appropriate combination of length-of-stay controls at this hotel. However, it is important to understand that no combination of controls is universally appropriate for all hotels.
Hi. This is Sherri Kimes again. I hope you've learned all sorts of things about forecasting. You know all about unconstrained demand and demand-control charts and arrivals forecasting and length-of-stay controls, and I'm looking forward to hearing how you're using these at your hotel to help make more money. Thank you, and I hope to talk with you in another one of the courses.
Supplemental Reading List

The Center for Hospitality Research provides focused whitepapers and reports based on cutting-edge research.


Cornell Hotel and Restaurant Quarterly 43: 94-103. (This article originally appeared in Cornell Hotel and Restaurant Administration Quarterly in February of 1992.)


Center for Hospitality Research Reports 5.7: 1-19.


"Perceived Fairness of Yield Management." (Feb 2002) - Kimes, Sheryl E.


"Revenue Management: A Retrospective." (Dec 2003) - Kimes, Sheryl E.


Center for Hospitality Research Reports 1.1: 1-20.