Designing and Implementing Car Rental System

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Abstract: Car rental was one of the business entities in the field of four-wheeled vehicle/cars rental services. The information system for borrowing and returning cars in Lampung was considered effective because the data of borrowing and returning cars and the daily transactions were recorded and reported manually - in the written form such as books and paper – so that this system was inefficient in terms of saving time, energy, and materials. The objective of this study was to build the website-based information system for car rental businesses in Lampung. The method used in this study was a structured approach method through the prototype development. The data collecting techniques used in this study was observation and interviews. The analysis and designing tools used in this study were the case diagrams, 0- levelled data flow diagrams, and 1-levelled flow diagrams. The supporting software used in this study was PHP and MySQL database. The sublime was an idea used to expanding the web application using PHP. This tool was facilitated to use to symbol, word, or line using a keyboard shortcut in a quick way. The result of this study was that the information system for borrowing and renting the car for car rental service was expected to facilitate the employees in managing the data of customers, borrowing and returning cars, and reducing errors from the data records and reports.

Keywords: Information Systems, Car Rental, Borrowing, Refund.

1. INTRODUCTION

The use of IT is cutting-edge and innovative, such as the integration of ICT (information and communications technology) into business processes, complete digital information and communication systems and in large enterprises, ICT as a formal responsibility with dedicated managers. Therefore, there is little or no evidence to support the adoption or ladder model, where companies develop additional e-commerce models, ultimately reaching a position where they transact online sales. Strong evidence emerges from research that internet adoption is not a gradual process. On the other hand, most companies adopt ICT technology to suit their business model, and only change their ICT provision when new technology that is useful to them becomes available [1].

The dataset has been compiled mainly from the Phish Tank archives, Miller Smiles archives and Google search operators. One of the challenges faced in this study is the lack of reliable training data sets [2]. In this paper, we are interested to the car rental business. this is a business in the transportation service sector which is currently developing, but in general the data management is still done manually. At first the manual system was not a problem, but along with the increasing number of cars owned and the increasing number of tenants who made transactions, the data being managed was getting bigger, thus managing data manually became ineffective and efficient again, so as to ensuring accuracy in recording transactions, security in

data storage, as well as accuracy and speed in presenting information, it is necessary to build a computer-based car rental management information system. Making this car rental management information system begins with collecting data related to the system to be built, then analysis is carried out, and continues with designing the system based on the results of the analysis, the next step is to write a program according to the design results. After the program is written, then testing will be carried out to ensure that the program created is as expected. The final step of this activity is to create system documentation in the form of a research report. The result of this research is a computer-based car rental application which, when implemented, is expected to be able to overcome all problems in data processing in the car rental business.

2. REVIEW OF THE LITERATURE

The car rental business is a business in the transportation service sector which is currently developing, but in general the data management is still done manually. At first the manual system was not a problem, but along with the increasing number of cars owned and the increasing number of tenants who made transactions, the data being managed was getting bigger, thus managing data manually became ineffective and efficient again, to ensuring accuracy in recording transactions, security in data storage, as well as accuracy and speed in presenting information, it is necessary to build a computer-based car rental management information system. Making this car rental management information system begins with collecting data related to the system to be built, then analysis is carried out, and continues with designing the system based on the results of the analysis, the next step is to write a program according to the design results. After the program is written, then testing will be carried out to ensure that the program created is as expected. The final step of this activity is to create system documentation in the form of a research report. The result of this research is a computer-based car rental application which, when implemented, is expected to be able to overcome all problems in data processing in the car rental business.

The objective of this research was to create web pages for personal use and web e-commerce such as websites in building the Utilization of Information Technology (IT) in car rental applications by choosing the facilities and services available as well as up to date information.

a. Internet

There is strong evidence that companies use the Internet and technology significantly to support domestic and international activities. The fact that relatively small companies use the technology indicates a sophisticated level of Internet use. An outline of the use of this technology by case companies and the main areas of Internet use will be explored further in the next section. The majority of companies have activated the Internet since its inception (some from the 1980s, when they were using the Internet in its infancy) and are using the Internet in an integrated, sophisticated way. In fact, they can be described as high- end ICT (information and communications technology) users, not surprising given that the majority of companies responding are drawn from various activities in the software industry (62%), although other sectors are also represented.

From [3] The use of cutting-edge and innovative IT, such as the integration of ICT into business processes, complete digital information and communication systems and in larger enterprises ICT as a formal responsibility with dedicated managers. Therefore, there is little or no evidence to support the adoption or ladder model, where companies develop additional e- commerce models, eventually reaching a position where they transact online

sales. Strict evidence emerges from research that Internet adoption is not a gradual process. On the other hand, most companies adopt ICT technology to suit their business model, and only change their ICT provision when new technologies that are useful to them become available.

Without exception and in all locations, companies are actively using email as a medium of communication. For the most part, all managers have access to the Internet and email. Companies with international offices often use intranets to support email communications; indeed, companies that follow clients overseas often also have access to client intranets. High-speed Internet or broadband technology has proven important, and relatively few companies rely solely on dial-up Internet access. However, the lack of high-speed Internet access is a constraint on the ability of small companies to participate in e-commerce.

b. Economy

Based on [4], the sharing economy is increasingly receiving great attention from both academics and practitioners globally because it is one of the main forces driving economic activity. This new paradigm changes traditional trade channels by sharing tangible or intangible resources through individual interactions. A large number of platforms have emerged to leverage and promote resource exchange among individuals, such as Uber, Amazon Mechanic Turk, Airbnb Zhubajie, Crowd Searching Indiegogo, and Thread less. These social and technology platforms are generally Internet-based and are able to create great values for the company. However, there are also many challenges to achieving value creation in a sharing economy. Data privacy, security, and risk issues are of serious concern in the sharing economy because of the consequences of disclosing information. Trust and building relationships are also essential bases for sharing goods and services. Given the challenges and opportunities of sharing economies, it is important and urgent to have a systematic understanding of this new economic model.

c. Dataset and Website

In this world of fast technology, we need a network that can facilitate and accelerate the delivery of information widely, and can be easily and quickly by anyone with internet access. According to [5] the source phishing website dataset has been compiled mainly from the Phish Tank archives, Miller Smiles archives and Google search operators. One of the challenges faced in this study is the lack of reliable training data sets. This challenge is a difficulty faced by researchers wishing to work in this field. Lately a lot of research has been done on the prediction of phishing websites. Despite this, reliable training data sets have not been published so far. Therefore, consensus on possible defining features that identify phishing web pages has not been reached. This dataset has proven effective in predicting phishing websites. Apart from this dataset, several new features are proposed. It is contributed to the study and creation of these datasets and rules.

d. PHP

PHP or short for Hypertext Pre-processor is an open source programming language that is very suitable or specifically for web development and can be embedded in an HTML thesis. PHP language can be said to describe several programming languages such as C, Java, and Perl, and is easy to learn. PHP is a server-side scripting language, where data processing is done on the server side. Simply put, the server will translate the program script, then the

results will be sent to the client who makes the request. Another definition of PHP is the acronym for Hypertext Pre-processor, which is a programming language based on codes (scripts) that are used to process data and send it back to the web browser into HTML code. According to [6], "PHP (or formally PHP: Hypertext Pre-processor) is a server-side script that is added to HTML". In principle, the server will work when there is a request from the client. In this case the client uses PHP codes to send requests to the server. The working system of PHP begins with requests that come from web pages by the browser. Based on the URL or website address in the internet network, the browser will find an address from the web server, identify the desired page, and deliver all the information needed by the web server.

e. Database

According to [7] Database is a large data set, from ten historically, used for sophisticated analysis oriented to decision making. The model is based on the notion of dimensions and f-table. An F-table is a construct used to represent factual data, and is the logical equivalent of a multi-dimensional array; the way current analysis tools store data. The query language is a calculus for f-tables, and therefore offers high-level support for multi-dimensional data analysis. Scalar and aggregate functions can be embedded in calculus expressions naturally, address the conceptual problems associated with multidimensional query language design, and compare our model and language with other approaches.

f. Data Flow Diagrams (DFD)

In the system development life cycle, a system model can be developed using Data Flow Diagrams (DFD). [8] said that DFD is a graphic diagram for determining, building and visualizing a system model. DFD is used in defining requirements in a graphical display. In this paper, we focus on DFD and its rules for drawing and defining diagrams. We then formalize these rules and develop tools based on the formalized rules. Formal rules for consistency checks between diagrams are used in developing tools. This is to ensure the syntax for drawing the diagram is correct and strictly followed. This tool automates the process of manual consistency checking between data flow diagrams.

g. MySQL

[9] Argued, Structured Query Language (SQL) is the main language responsible for data management and data structures in a relational database management system. SQL is a practical science that must be learned in order to have a solid foundation in writing complete programs with database applications. Basic SQL Operation is an important topic, which is considered as a core element in Database Management. Implementing basic SQL operations in developing a comprehensive IT program is both a project and an important role.

h. Sublime Text

Sublime Text 3 is the latest version of the popular text editor Sublime Text. This full featured text file is great for editing local text files. It has many built-in features to aid in code editing, such as syntax highlighting, auto-identification, file type recognition, handy file / Molder sidebar for easy editing of multiple files in a directory, macros for automating repetitive tasks, and separate tab and window options. To view and edit multiple files simultaneously. With many programmer-centered sublime text features, taking advantage of this editor increases productivity [10].

3. METHODS

To get an in-depth understanding, the authors limit the discussion in this practical work report only to the scope of web pages that contain car provision, managing customer data, car rental, and return. So it is further shortens the time in making the website.

a. Data Collection

To obtain primary data in collecting data, interviews, observations and questionnaires were conducted. Interviews are conducted to administrators because interviews are conducted directly and indirectly. This is done directly face-to-face; while indirectly, it is done through telecommunications media such as telephone and online conversations. To find out first-hand the activities in distributing information on goods, observation techniques are carried out. Meanwhile, the questionnaire was conducted when the customer relationship management information system was ready to be implemented. This stage is the steps that will be taken in solving the problem, can seen in Figure 1.

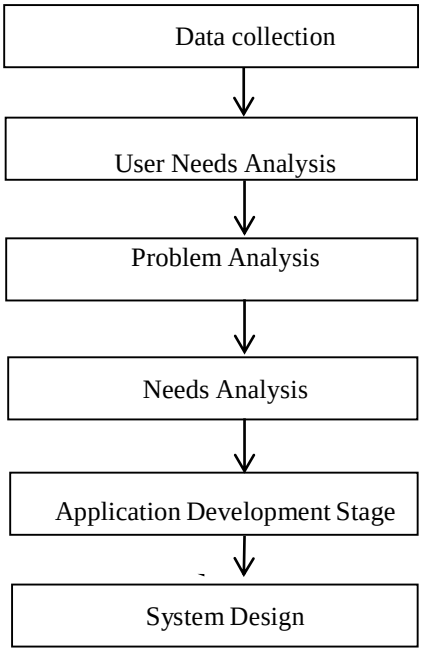


Figure 1. Research Steps

b. User Needs Analysis
The results of the user needs analysis can be seen in table 1.

Table 1. User Needs Analysis

User	Function
Director	The director has access rights to log in, manage user data, manage reports of criticism suggestions, car rental reports, booking reports, best car rental package reports, best customer reports.
Customer	Customers have access rights to log in, view and order car rentals, pay, make suggestions, manage profiles.
Rental	Rental has access rights to log in, manage car rental data, manage promotional data, manage customer data, manage booking data, manage data payments, and manage data return.

c. Problem Analysis

Based on the analysis of the problem according to (Hakim, 2019)[11] using the PIECES framework which consists of Performance, Information, Economics, Control, Efficiency, and Service. And the results of the analysis are as follows:

Table 2. Problem Analysis of the PIECES Framework

PIECES	Problem
Performance	The difficulty of promoting car rentals to customers.
Information	To provide information about a car rental that can be customized, the company has difficulty in how to inform customers that car rental can tailored to the wishes of the customer.
Economics	The company incurs a routine fee every time a car rental price changes, because the promotion system still uses brochures and telephones.
Control	Companies have difficulty knowing complaints, criticisms, and suggestions from customers, which results in companies having difficulty in doing so policy / service
Efficiency	Promotions that are applied in the company are still in the form of brochures and telephone. It costs money to make brochures and requires a long time to carry out the promotion process, because you have to print brochures and it takes time to call customers one by one, because they have to see the transaction history data first.
Service	Customers feel burdened to come directly to the company to get detailed information about car rental.

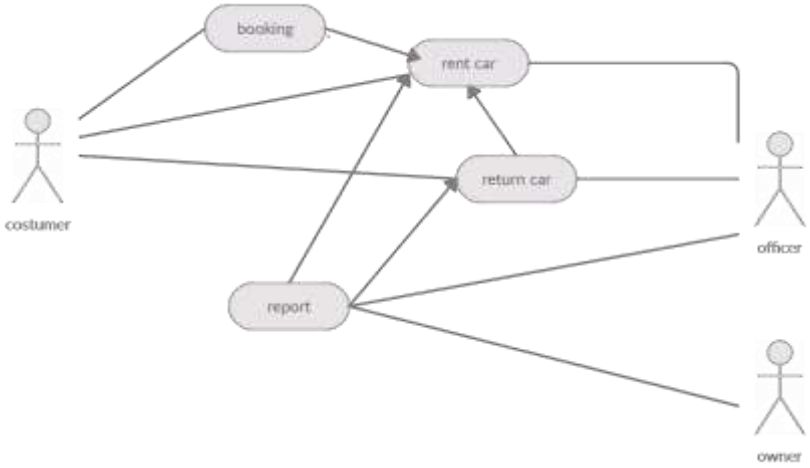
d. Needs analysis

In this requirements analysis, the functional requirements and non-functional requirements of the system to be built can be described:

1) Functional Requirements

Use case diagrams are a model to describe system requirements, especially actors who will use the system, so that all good system requirements can be described. With use, case techniques, the functions can be described what is in the system and which users are

entitled to use the system. The following analysis can be seen in the picture 2.



Picture 2. The proposed U*se Case* diagram

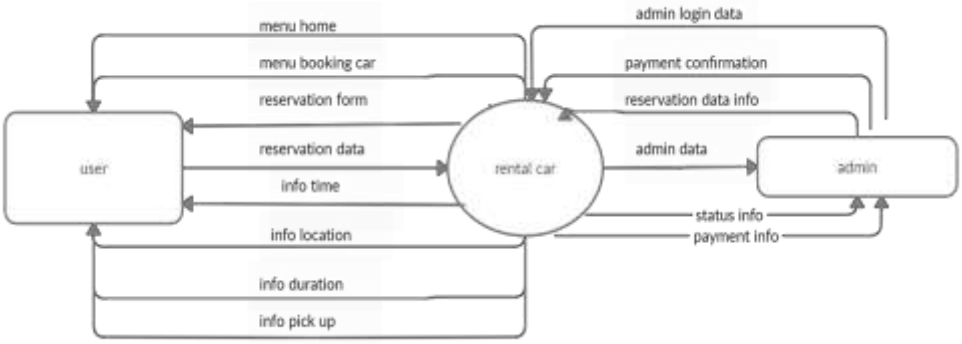


Figure 3. The proposed DFD Level 0

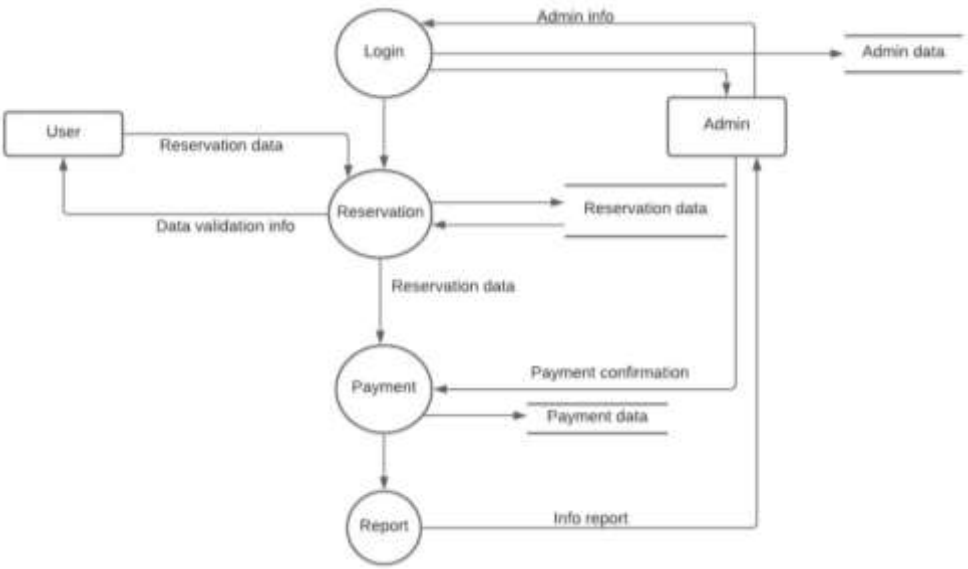


Figure 4. The proposed DFD Level 1

2) Non-Functional Requirements
Non-functional requirements refer to the performance of a system and its simplicity. Non-functional needs are considered when functional needs have been met, which becomes non-functional needs including quality aspects. This need must be possessed to support non-functional needs including quality aspects, among others :
- User
  The system built can be accessed quickly and easily and has a user friendly appearance.
- Control
  The system built is accompanied by access rights so that it can only be used by users who have the access rights.
- Service
  The system must be able to meet the needs of users in carrying out daily work.

e. Application Development Stage
After analyzing the needs and problems, the next step is to do application development or coding. This application is made using Notepad ++ and MySQL as a database. MySQL is a database server software or program. While SQL is the programming language, the language of the query (query) in the database server is included in MySQL itself. The methodology used is an iterative method which consists of the planning phase, the problem analysis phase, the design phase, the implementation phase, and the maintenance phase.

f. Database Design
Tables required
1) Login table
2) Pick-up table
3) Car rental booking table

Table 3. Login Table

No	Nama Field	Type
1	Id_admin	Int(10)
2	Usname	Varchar(30)
3	Pass	Varchar(30)

Table 4. Pick-up Table

No	Nama Field	Type
1	Location	Varchar(30)
2	D_pickup	Varchar(30)
3	Time	Time
3	Duration	Varchar(8)

Table 5. Booking car

No	Nama field	Type
1	Id_payment	Int(12)
2	Title	Varchar(5)
3	Fname	Varchar(30)
4	Lname	Varchar(30)
5	No_tlp	Int(15)
6	Car_type	Varchar(15)
7	D-rent	Date
8	D-return	Date
9	Ttot	Double(8,2)
10	Payment	Varchar(5)

g. Design Interface Design

The display design is used to make it easier to build applications. The following will explain the design of each screen that will be displayed in this application.

1) Home Home Page Display Design

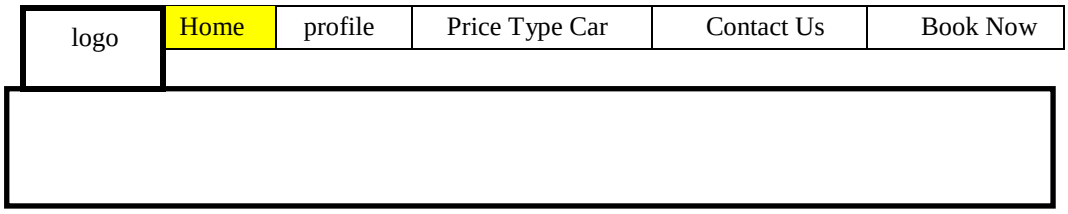


Figure 5. Background Rental Car

2) Profile Page Display Design

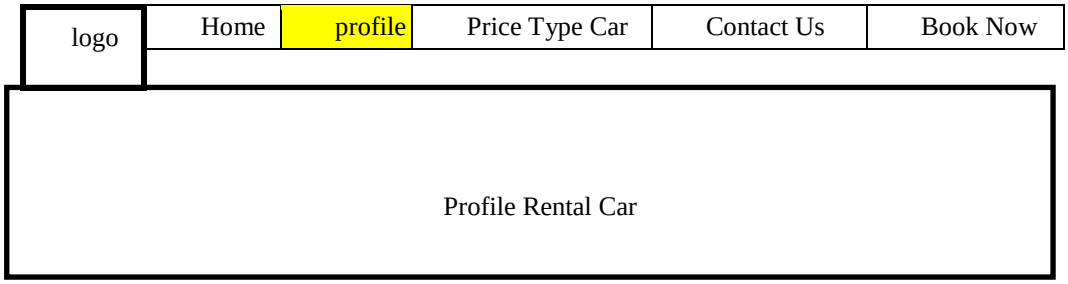


Figure 6. Profile Page Display Design

3) Page View Design Price type of car

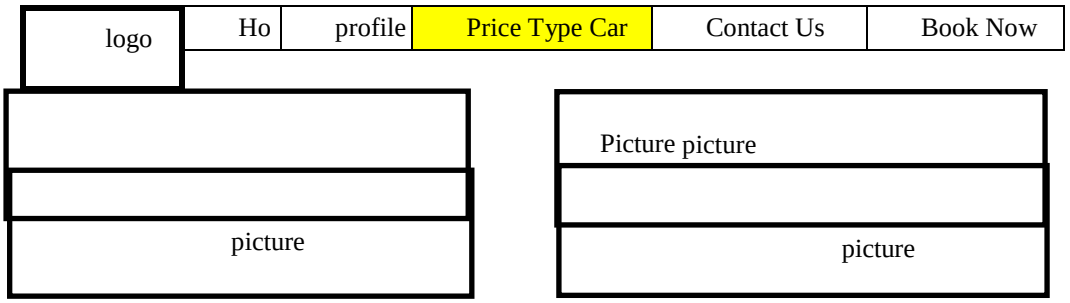


Figure 7. Page View Design Price type of car

4) Contact Us Page Display Design

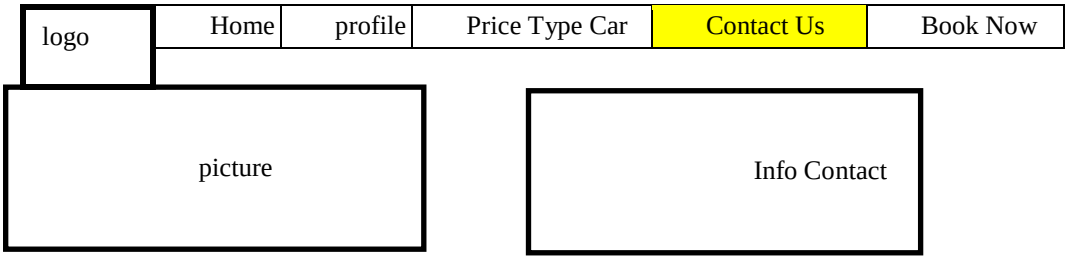


Figure 8. Contact Us Page Display Design

5) Book Now Page Display Design

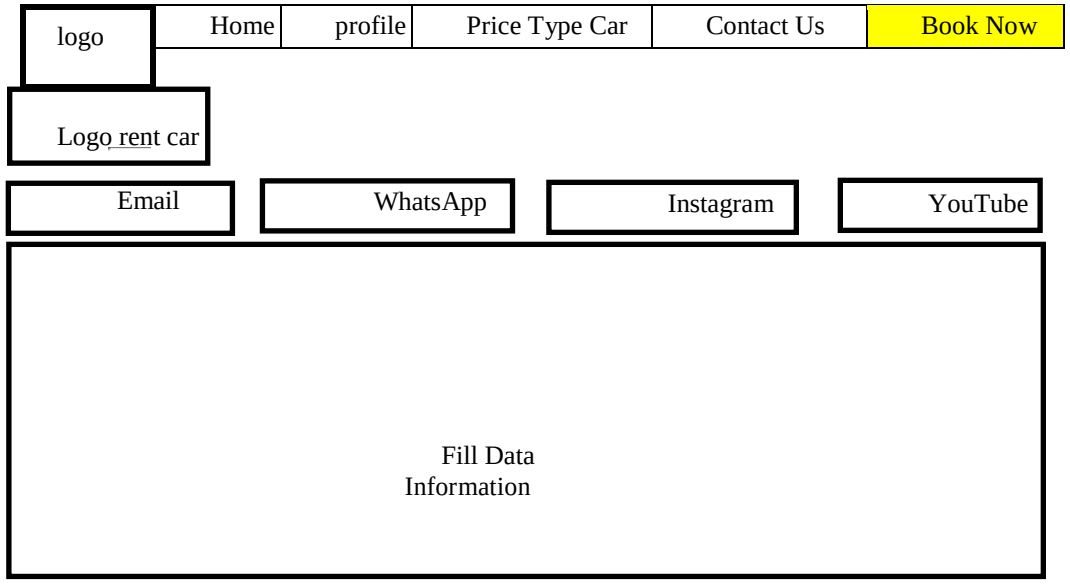


Figure 9. Book Now Page Display Design

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