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Implementation of Blockchain-based technique to a Hostel Room Booking System: Practical Aspects

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Abstract: ***The hospitality industry is an emerging employment generator in any Economy. Hostel management is an important part of hospitality in towns, villages and tier3 cities in India. With the broadband penetration in remote places and mobile Hostel room booking in real-time is possible today. Blockchain being web3.0 is a promising technology that has made many real-time applications in this decade. Hostel room booking fairly and transparently manner is important for many organizations and institutions. A blockchain-based booking system would provide such a solution. This paper explores the potentials and proposes one basic contract for the booking system.***

Keywords: Blockchain; Distributed ledger; digital booking; hostel room; Ethereum, booking system; hostel management; smart contract.

I. INTRODUCTION

The hospitality industry is an emerging service industry in various Economies. The hospitality industry is closely related to the tourism sector. The hospitality industry from Boomer to Gen Z has been evolving from the hostel, hotel rooms to Airbnb,
Oyo room rental service at an affordable price in a large number of cities is available. Hospitality 3.0 is evolving from negotiation price to personalize app-based with a fixed price and various details via augmented reality to virtual reality tours of rooms with mobile/ PC. The various Hospitality start-ups follow the mantra of being local with the best-personalized experience to its consumers. Blockchain is the technology that launched the bitcoin digital money in 2009 by Satoshi Nakamoto.
The Blockchain being transparent, immutable records with distributed ledger-based on the consensus algorithm without third party verification is attractive qualities of this technology [1-11]. Hostel management is an important part of hospitality in towns, villages etc. and in developing county.

II. BACKGROUND

Blockchain has application in many industries and sectors of the economy. The global blockchain equipment industry estimated in 2030 to be $ 23 billion from the market in more than $ 296 million in 2019.
Blockchain promotes trust, security and transparency. It offers the ability to spot data shared across the business network and save costs with a new experience. Blockchain technology allows for verification without having to be enthusiastic about a third- parties. The information structure during a blockchain is append-only. Therefore, the info cannot be altered or deleted.

Table1.
The units of Ethereum crypto currency

Ether Denominations		
Unit	Wei Value	Number to Make 1 ether
wei	1	10^{18}
Kwei (babbage)	10^{3}	10^{15}
Mwei (lovelace)	10^{5}	10^{12}
Gwei (shannon)	10^{9}	10^{9}
microether (szabo)	10^{12}	10^{6}
milliether (finney)	10^{15}	10^{3}
ether	10^{18}	10^{0}

The unit map of crypto currency ethereum is shown in Table 1. The WEI is the smallest unit of ethereum. Ether is the basis used in the normal transaction of payment. Gwei is used when calculating the gas value.

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III.BLOCKCHAIN BASED HOSTEL ROOM BOOKING

Ram is going to Kanpur for his job work. He wants to book a hostel on the same day and wants to pay via ethereum crypto currency for the availed room if available to him in Kanpur.

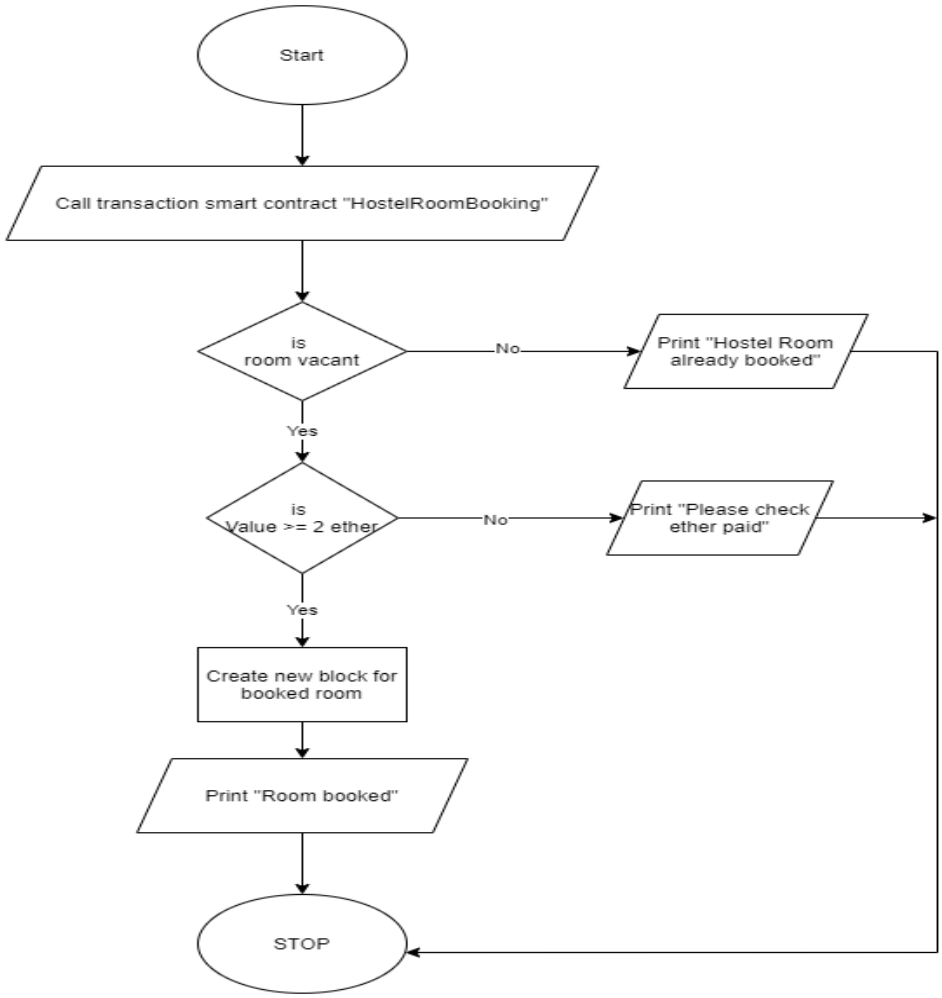

Figure 1: Flowchart for hostel room booking

The flowchart for room-booking logic is shown in figure 1. Also, below is given the code formulation for finding room occupancy.

The code for Blockchain-based hostel room booking is provided below section.

```
pragma solidity ^0.6.4;
contract HostelRoomBooking{
enum Hostel_Statuses {Available, Occupied}
Hostel_Statuses currentStatus;
event RoomOccupy(address _bookerAddr, uint value);
address payable public roomowner;
constructor() public{
roomowner = msg.sender;
currentStatus = Hostel_Statuses.Available;
}
modifier onlyWhileVacant{
require(currentStatus == Hostel_Statuses.Available, "Hostel Room already booked");
_;
```

```
}
modifier costs(uint _amount){
require(msg.value >= _amount, "Please check ether paid.");
_;
}
receive() external payable onlyWhileVacant costs(2 ether){
currentStatus = Hostel_Statuses.Occupied;
roomowner.transfer(msg.value);
emit RoomOccupy(msg.sender,msg.value);
}
}
```

Figure 2 shows the implementation of a room booking system using solidity-programming language. A contract named "HostelRoomBooking" is written with receive function. It books the hostel room using this function.

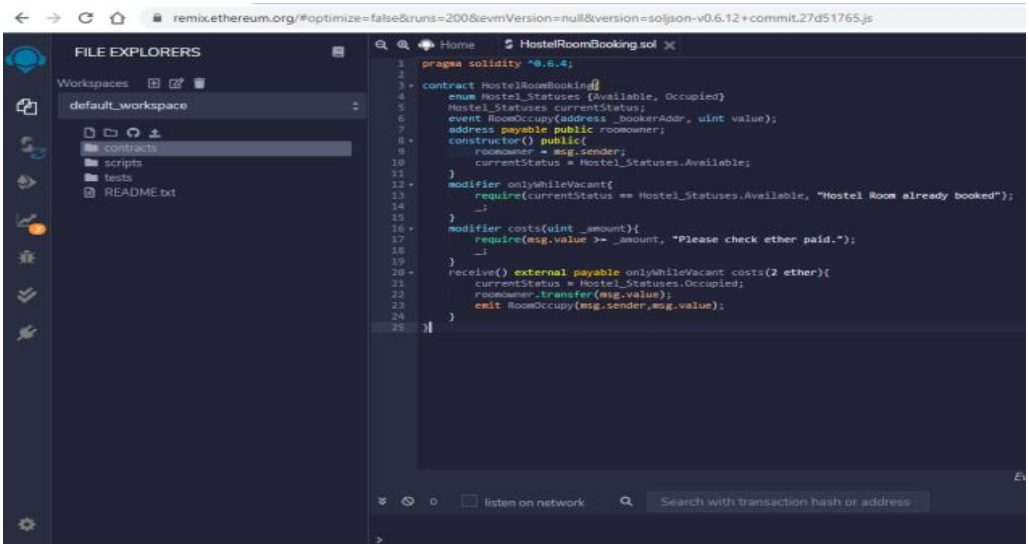

Figure 2: Implementation of room booking system in Remix IDE using solidity

The Solidity Compiler version 0.6.4 is used for the room booking system in Remix IDE. This contract could easily integrate with any front-end program. This compiled contract is deployed using ethereum and is dubbed as a "smart contract".

The frontend can be developed using JSON RPC and web3 library. Basic architecture shall be JavaScript program would invoke EVM client using JSON RPC within Web3 Interface. Further, EVM client shall update the local Blockchain copy. The local copy would spread the updating on Etherum blockchain network using a pre-defined mechanism.

IV. ADVANTAGES OF BOOKING SYSTEM BASED ON BLOCKCHAIN

The blockchain-based booking system is easy to use and transparent with errorless auditable records in real-time. This type of booking system is fixed price. This type of booking system can be done with mobile via mobile application.

The hostel booking system is implemented with ethereum crypto currency with a smart contract on solidity language. It is easy to find the status of room availability in a hostel with blockchain-based booking.

V. DISADVANTAGES OF BOOKING SYSTEM BASED ON BLOCKCHAIN

Blockchain-based booking system being distributed ledger record is electricity consuming maintenance. This type of booking system is not negotiable rather fixed price room booking. It requires 24hours x 7days internet connectivity.

VI. CONCLUSION

The Hostel room booking system based on Blockchain is transparent and is real-time with immutable records. This Blockchain booking system will be improving the quality of Housekeeping in the Hostel environment in small cities and villages in developing countries.

VII. ACKNOWLEDGMENT

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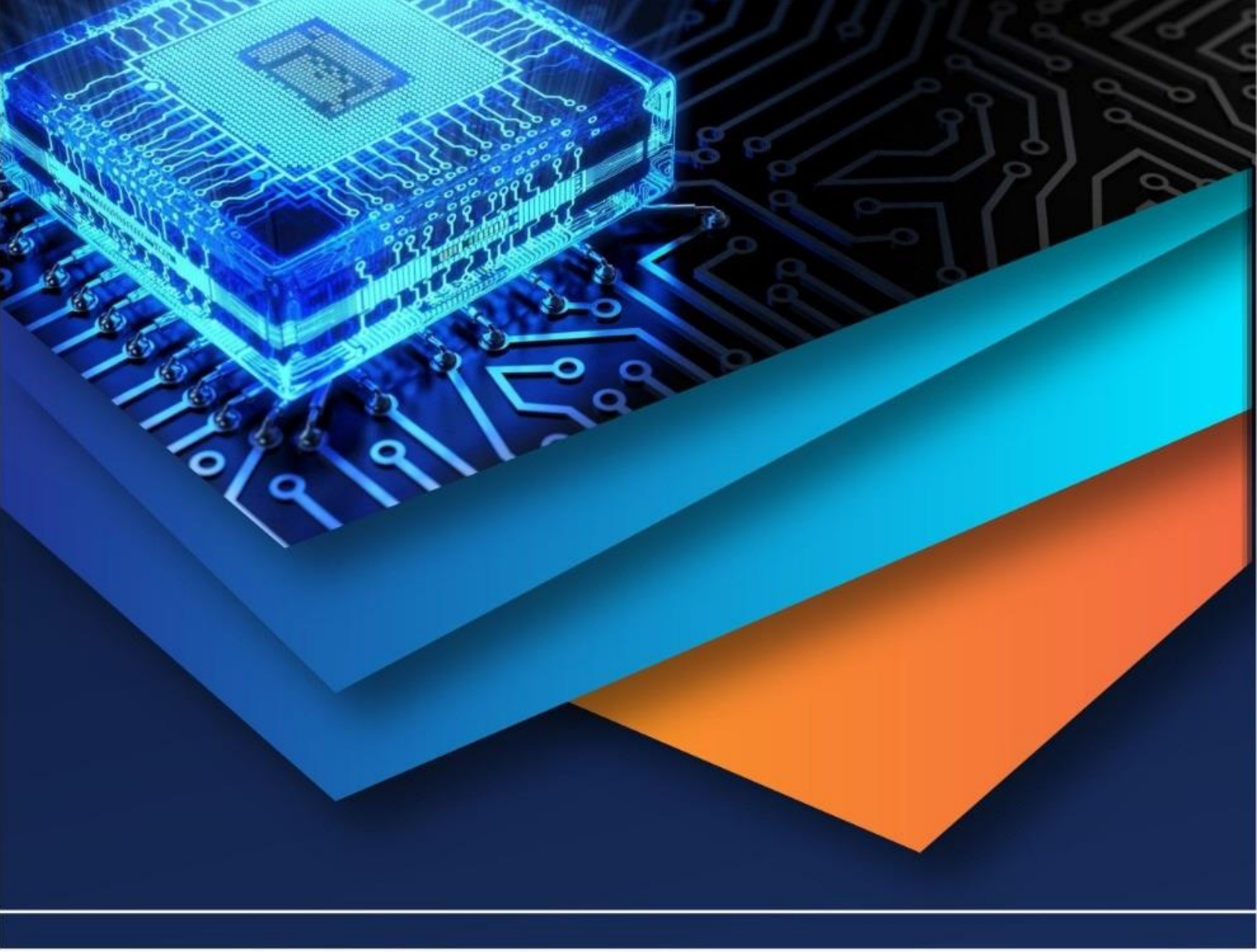

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