

# The Call<sup>2</sup>Prayer System

A technologically advanced and highly accurate automated Call-To-Prayer Solution for Audio, Video Control, and Building Management Systems

*A fully automated prayer call calculation and management solution that identifies its current location through reading GPS coordinates, precisely calculates prayer times adhering to approved methods of Islamic Fiqah (Islamic Law), Seamlessly integrates with venue's existing Audio, Video, Control and even a BMS systems; is the topic of discussion. The solution has been presented by LC Acoustics to their prospective clients backed with robust on-line and off-line support plans to solve real-life problems of errors in calculations, missing out invoke prayer calls manually, tedious tasks of manually logging prayer times, and monitoring the moon's sighting, geo-positioning while adjusting the Islamic calendar dates accordingly, thus allowing the venue operations teams to invest their efforts and resources undertaking other essential operational and management activities and focus their energies on more productive aspects of their business.*

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## Introduction

Prayer and rendering call-to-prayer is one of the most important daily activities in all countries and cultures that follow the religion of Islam and Islamic Shari'a. Adhan (*Call-to-Prayer*) is delivered five times during a day to announce the proceedings of Salaat (*a prescribed method for Muslims to render their prayers to Allah Al Mighty*) and as an invitation to join the religious congregation.

At specific time slots during the day the Adha'an is usually delivered through the Minaret of a mosque (*which is the highest position of the religious building*) however, in today's modern world it is delivered throughout the public and private venues such as malls, stations, markets, office spaces, retail outlets, Hospitality venues, and this list goes on...

The prime intent of broadcasting Adha'an at a business place is two-fold, first is to announce the proceedings of a Sala'at (*prayer congregation*), and second, concerning Muslims and abiding regulations of the Islamic state's shari'a law, observe silence (such as mute or suspend any music and/or video activity at least for the duration of that Adha'an (*the Call-to-Prayer*)).

The importance of Adha'an in an Islamic state has great significance and cannot be ignored since it is mandatory to follow the ethics described in the

## Essential and cannot be ignored!

A Call-To-Prayer in the Islamic world has great significance. It is **essential and cannot be ignored!**

Delivered **5-times during the course of a day** a call-to-prayer must be announced at precisely calculated times according to the Islamic Sharia'a law.

The challenge is to precisely calculate the time for a call-to-prayer since it is directly related to the **geographic coordinates** of the location and the **position of the Sun** at a specific time-zone. Moreover, the significance of time precision takes even greater prominence during the holy month of **Ramadan** when start and break of fast becomes directly related to a "Call-To-Prayer"

Islamic Shari'a law. It is important to relate a saying of Prophet Mohammad (May Allah's Blessings and Peace be upon him)...

Hazrat Abdullah bin `Amr bin Al-`As (May Allah be pleased with them) reported,

*I heard the Messenger of Allah (PBUH) saying:*

**When you hear the Adha'an (a call-to-prayer), repeat what the Mu'adhdhin (the deliverer of the call-to-prayer) says. Then ask Allah to exalt my mention because everyone who does so will receive in return ten rewards from Allah. Then beseech Allah to grant me Al-Wasilah, which is a high rank in Jannah, fitting for only one of Allah's slaves; and I hope that I will be that man. If anyone asks Al-Wasilah for me, it becomes incumbent upon me to intercede for him."**

[Muslim]

Most importantly in the holy Qura'an Allah Subha'a O Taa'la says;

**"O you who believe! Respond to (the call of) Allah and His Messenger when he calls you to that which gives you life."**

[Al Qura'an 8:24]

LC Acoustics presents the Call<sup>2</sup>Prayer solution that takes away the hassle of scripting, programming and periodically updating the prayer schedule manually. It offers an elegant and extremely easy way to automate the integration with existing control systems and with a variety of digital and analog devices. Accurate calculation of prayer times is based on Geo-specific location coordinates. These coordinates are applied in calculation algorithms and formulae that are published as authentic Islamic methods for calculating daily prayer times.

## How It Is Done Today...

For an Islamic territory, the Islamic Affairs department (Awqaf) issues a list of predicted prayer times. A venue operator would periodically acquire this list either by physically visiting the Islamic Affairs office or if it is published online, extracting it from an online portal.

A typical web portal may offer daily data and no option to extract as text or delimited data to be used by scripting languages of system controllers (such as AMX, Creston, Extron, Control-4, and other similar system controllers)\*<sup>1</sup>. Some websites may extend their data to monthly lists and a provision to download a print-friendly view. But, in all situations, a script needs to be written to extract the data from the webpage otherwise the data must be fed manually!



The screenshot shows a web portal for the Ministry of Islamic Affairs, Endowments, Da'wah and Guidance. The main content area is titled 'Main Page > Prayer Times' and displays prayer times for four locations: Riyadh, Madina, Makkah, and Dammam. The left sidebar contains 'E- Services' with links for Personnel, Ministry Employees, Business Sector, and Public Sector. The prayer times are listed for Fajr, Sunrise, Dhuhr, Asr, Maghrib, and Isha.

Location	Fajr	Sunrise	Dhuhr	Asr	Maghrib	Isha
Riyadh	4:13	5:32	11:55	3:24	6:16	7:46
Madina	4:41	6:01	12:23	3:52	6:44	8:14
Makkah	4:45	6:02	12:22	3:47	6:41	8:11
Dammam	3:56	5:17	11:41	3:12	6:04	7:34

Screen-grab of a website showing daily prayer time a specific day.

The accuracy of data depends on when the data was published on a website. Usually, the published data is for general reference to be used as an indication without any mention of specific GEO-Coordinates. Above all the data on the website may be updated without any notification hence, a monthly or yearly list that a facility operator has downloaded today may become inaccurate or invalid if new data was uploaded by the publisher later on.

Moreover, if there was a change in moon sighting or revision in calculations due to Daylight Saving the facility operator once again needs to go through the process of extracting the latest published data!

Another way could be the use of generic prayer time prediction apps available in the market but, those would not offer any monitoring, control, and integration with Audio, Video, Control, and BMS systems of the venue.

The Call<sup>2</sup>Prayer system offers a complete platform that caters to all levels of integration possibilities with a robust prayer calculation algorithm and flexibility to accommodate all local norms. Seamless integration with existing Audio, Video, Control, and BMS systems for automatic operation without any need for human interaction is one of the many salient and remarkable features of the Call<sup>2</sup>Prayer system.

## How LC Acoustics Makes It So Simple...

A simple software application is the core engine of the Call<sup>2</sup>Prayer system. The core engine has been developed utilizing the latest and best-in-class functional libraries in digital computer programming.

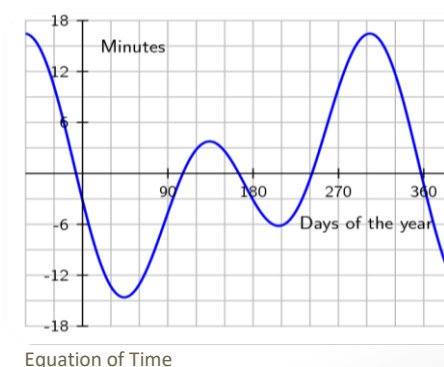
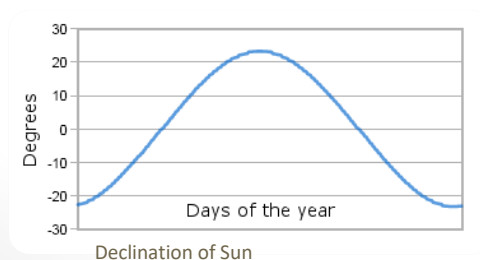
There are two main segments of the Call<sup>2</sup>Prayer system one is called the **Salaat Server** and the other is the **Adha'an Console App**. A one-time setup of the Sala'at Serve requires a live internet connection where it gathers data from a GPS database based on a Local IP gateway. Next, it receives relevant technical information from the Almanac database for the position of the Sun and the moon. If there is local Awqa'af site data available, it can also be directed to view and retrieve information as a secondary source and use to refine the calculations based on local fiqh regulations. After the quick run of setup, the Sala'at Server starts operating seamlessly while regularly monitoring the Almanac data of the location for precise calculation of prayer time.

The Call<sup>2</sup>Prayer system can also work in an offline mode without the need for the internet. In offline mode, the GPS coordinates and other related information are applied manually during the one-time setup of parameters and the application takes care of the rest of the configurations automatically.

The following table shows the calculations that the Call<sup>2</sup>Prayer system performs

Time	Definition
Imsak	The time to stop eating Sahur (for fasting), is slightly before Fajr. <i>[Important in Ramadan]</i>
Fajr	When the sky begins to lighten (dawn). <i>[The First prayer of the Day]</i>
Sunrise	The time at which the first part of the Sun appears above the horizon. <i>[Conclusion of Fajr]</i>
Dhuhr	When the Sun begins to decline after reaching its highest point in the sky. <i>[Second prayer of the day]</i>
Asr	The time when the length of any object's shadow reaches a factor (usually 1 or 2) of the length of the object itself plus the length of that object's shadow at noon. <i>[Third prayer of the day]</i>
Sunset	The time at which the Sun disappears below the horizon.
Maghrib	Soon after sunset. <i>[Fourth prayer of the day]</i>
Isha	The time at which darkness falls and there is no scattered light in the sky. <i>[Fifth and Final prayer of the day]</i>
Midnight	The mean-time from sunset to sunrise (or from Maghrib to Fajr, in some schools of thought).

Two astronomical measures are essential for computing prayer times. These two measures are the equation of time and the declination of the Sun. Using critical information, the algorithm of the core engine calculates the time for the prayers as mentioned in the above table.



The Call<sup>2</sup>Prayer system offers implementation of the following widely used conventions currently in use by various regions;

Method	Region where used
Muslim World League	Europe, the Far East, parts of the US
Islamic Society of North America	North America (US and Canada)
Egyptian General Authority of Survey	Africa, Syria, Lebanon, Malaysia
Umm al-Qura University, Makkah	Arabian Peninsula
University of Islamic Sciences, Karachi	Pakistan, Afghanistan, Bangladesh, India

The Adha'an Client constantly listens to the Sala'at Server while the server synchronizes itself with the Atomic Clock time server. Once the time of prayer approaches the server instructs the client to initiate the Call-Sequence.

It is the Call-Sequence where things become very interesting for the local site operations team. Simple functions such as [Pre-Adha'an], [While-Adha'an], and [Post-Adha'an] (*defined during the installation setup*) are used to initiate a sequence of actions that the Adha'an Client can transmit to the 3<sup>rd</sup>-party devices such as Audio DSP, Video switchers or Matrix, Repeaters, System Controllers and BMS interface systems. The instruction set transmission could be either on the serial port, over IP, and/or via typical GPO (logic dry contact closure). In essence, the Adha'an Client becomes the interfacing bridge residing over the existing A/V and control system and invokes actions only at the time of the prayer call.



A typical block schematic showing some of the various possibilities of seamless integration

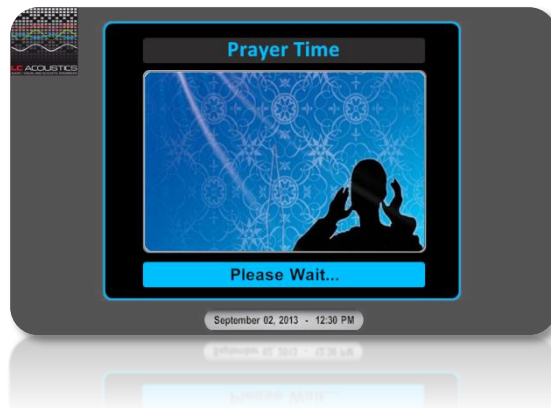


## ... Endless Possibilities!

The Adhan Client has an integrated and calibrated audio player that runs a prayer call. There is a variety of Adhan files available in the application's library of renowned reciters. Businesses can choose their preferred file to broadcast throughout their venues. Additional prayer files can also be developed on request for the system to playback.

Besides the above-described features and benefits the core engine has been designed to take a host of plug-ins and add-ons. Plug-ins can be developed to address specific client and project requirements.

For example, a plug-in could be applied to stream video messages during the call to prayer directly from the Adha'an Client. This could eliminate the need for a video image or a media player hence saving money! Another example would be the integration with digital signage systems (such as Scala, Four Winds, and others)<sup>\*1</sup>.



Integration with devices using conventional (IR) InfraRED control, UDP, and other methods of M2M (Machine-To-Machine) integration can also be customized and exclusively developed to meet specific project requirements.

The latest version of the Call2Prayer system incorporates an alert by-email service that broadcast emails regarding critical system status and failures. The alerting services can also be expanded to SMS service or even to What's App messages.

The Call2Prayer system offers 100% software and hardware redundancy and automates switchover and hot-swap between consecutive services and hardware components.

## The Real Value...

To summarize, The Call<sup>2</sup>Prayer system is a sophisticated software-based product and hardware-agnostic solution that has been designed to offer automation with the building's existing Audio, Video, Control, and BMS systems to seamlessly integrate and work as a constituent component without any real need for human interaction. A host of expansion possibilities are available and for specific needs and requirements, LC Acoustics can undertake development requests to meet the project's demands.



LC Acoustics is a locally established Engineering and Design Services Company that allows us to connect directly with our valued clients and work with their technical and operations teams to develop custom solutions that meet specific requirements.

All Software development happens at LC Acoustics LAB based in Dubai, UAE which enables us to offer best-in-class support to our valued customers.

<sup>\*1.</sup>: Brands / product names mentioned in this document are for reference purpose only. The Call<sup>2</sup>Prayer system has no direct association with these names. For information on these products please visit their respective websites.

## External References...

GULF NEWS  
online edition

### Burj Khalifa residents told to fast longer during Ramadan

**Muslims residing above the 80th floor must delay their iftar by two to three minutes**

Reported by GlufNews WAM (Published: 23:21 August 6, 2011)

Dubai: Muslims residing above the 80th floor in Dubai's Burj Khalifa must delay their iftar meal during Ramadan by two to three minutes as they see the sunset later, according to the Dubai Islamic Affairs Department.

Those residents should also start their daily fasting two minutes earlier on the grounds that dawn descends on them before those living on lower levels, the Department said in a Fatwa (edict).

"Residents in Burj Khalifa should observe varied timings for iftar, sunset and dawn prayers depending on the level where live," the paper said, quoting Ahmad Abdul Aziz Al Haddad, head of the Fatwa division at the department.

He said Muslims living on the 80-150 floors in the tower, the world's tallest structure, should delay their iftar meal by two minutes while those on the 151-160 floors should break their fasting three minutes late.

"Residents on 80-150 floors should also perform evening and night prayers two minutes late and dawn prayers two minutes earlier while those above the 150th level should delay their evening and night prayers by three minutes and bring forward dawn prayers by three minutes," he said.

"This difference in timing on the 160-storey building is because sun sets later for residents on top floors while these residents are the first to see the sun at dawn."



Link: <http://gulfnews.com/in-focus/ramadan/burj-khalifa-residents-told-to-fast-longer-during-ramadan-1.848316>



## Fatwa means late iftar on top Burj Khalifa floors

**Dubai// Muslims who live high up in the Burj Khalifa will have to wait a little longer than everyone else to break their fast during Ramadan, according to a new religious edict.**

Reported by GlufNews Rym Ghazal (Published: August 8, 2011)

In a fatwa released over the weekend, the Grand Mufti of Dubai called upon Muslims living in skyscrapers, particularly those in the world's tallest tower, to adjust their fasting and prayer times according to what floor they call home.

Dr Ahmed Al Haddad, who is also the head of the Ifta centre at the Islamic Affairs and Charitable Activities Department, said the Burj Khalifa, at more than 828 metres tall with 160 storeys, must be divided into three different times for iftar, or the breaking of the fast. He said the three segments are based on when the actual sun set is "visible" to a tenant.



"Regardless of where you are, you need to pay attention to the actual sun set," Dr Al Haddad said. "You are not to break your fast until the sun sets, and you can actually see that sun set."

Those living on the lower floors of the Burj Khalifa, 80 and below, are to break their fast at the same time as everyone else — when the call for Maghreb prayers at sunset is broadcast across the Dubai mosques on TV, or can be heard from the nearest mosque in the neighbourhood.

For those living on floors between 80 and 150, starting at about 414 metres high, the iftar time is delayed two minutes after the muezzin calls for Maghreb prayer. These residents are also to start praying the following Esha prayer two minutes after the call for that prayer, and two minutes before the call for Fajr prayers at dawn.

For those living on floor 150 and above, or from 800 metres and above, residents must delay their iftar by three minutes, as well as their Esha prayer. The rule applies to Fajr prayers also, which are to begin three minutes earlier than the call for prayers.

These rules should also be a guide during Suhoor time, when Muslims stay up at night to pray, and when they eat their last meals before they start their Imsak, withholding, and begin their fast with sun rise.

The ruling is based on the basic premise that the higher you are, the longer it takes for you to see the sun set because your field of vision is farther the higher you go.

The religious edict also applies to locations even higher up than any built structures.

"Even if you are on a plane, you should break the fast according to when the actual sun sets over the area you are flying," said Dr Al Haddad. "You shouldn't break it if the sun is shining brightly where you are and hasn't set."

Mohammed Badr, who lives on the 61st floor of the Burj Khalifa, said he was "surprised" that elevation made a difference.

"It would never cross my mind that where someone lives in a high-rise building would make a difference in fasting," said the 37-year-old from Egypt.

Since he lives below the 80th floor, he will break his fast with everyone else.

"The last two minutes before breaking a fast are tough, so I do feel bad for those living higher up," he said.

Other fatwas released this Ramadan include allowing women to use pills that delay menstruation for the duration of Ramadan so they can fast the entire month without having to make up for missing days.

"As long as there is no hazardous effect on the body itself, women are allowed to use this pill to help them fast the whole month without interruptions," said the fatwa.

Women are exempted from fasting on the days they menstruate, but then they have to make up for those days after Ramadan.

Another fatwa ruled in previous Ramadans reiterated that using specialised nicotine patches is allowed for fasting smokers, as it doesn't break a fast.

Both these fatwas mention the importance of "the intention" behind any decision taken during Ramadan.

Besides fasting-related rulings, there are rulings related to charity, with the latest reminding Muslims of their "duty" to help other Muslim nations that may be struggling, with Somalia named specifically. The ruling encourages donations through trusted agencies, like the Red Crescent.

The religious edicts are issued through the official Ifta or Fatwa centres in Abu Dhabi and Dubai, in response to people's questions about what is permissible under Sharia law. The questions are either submitted online, via text or over the phone.

Link: <http://www.thenational.ae/news/uae-news/fatwa-means-late-iftar-on-top-burj-khalifa-floors>

## Reduce volume of music during call to prayer, Abu Dhabi hotels told

**ABU DHABI // Hotels in the capital have been asked to pause background music and instruct live bands to down instruments during the call to prayer following complaints from members of the public.**

Reported by Thamer Al Subaihi (Published: March 23, 2014 Updated: March 24, 2014 07:48:00)

The Abu Dhabi Tourism and Culture Authority sent out a circular to all hotels asking them to reduce the volume of music played in public areas during Adhan (call to prayer).

"This is the first time I have seen such a request by the authorities," said Mohammed Hussain, director of sales and marketing at Al Ain Palace Hotel.

Having worked in the UAE's hospitality industry for more than 42 years, Mr Hussain said he had never known music being played during the call to prayer to be an issue in the past and he had never received complaints.



"Since the circular we check the prayer times daily and stop all music for about five minutes."

Whether it be a pause in the background music or a live band stepping away from the stage briefly, the unexpected moment of silence has raised a few questions from guests.

"The type of people who go to these places are not the ones who usually worry about prayer times," Mr Hussain said. "When we explain to guests why we stop the music they usually understand and accept it."

The ruling is nothing new to Reema Baroudi, who works at the InterContinental Hotel, who said the live band that performs at the Brazilian restaurant Chamas always stops playing during prayer times.

"Since I started working at the InterContinental eight years ago we have always turned off recorded and live music during prayer times," said the director of PR and communications.

"For us the circular was just a reminder of something we already do out of respect."

Pianist Stoyan Stoyanov said his musician wife was recently asked to stop playing during Adhan.

## TheNational

"She had to stop in the middle of a set while performing at Etihad Towers recently after a guest complained and has since been instructed not to play during the call to prayer."

Mr Stoyanov, 31, who moved to the Emirates from Bulgaria more than four years ago, said he has become accustomed to pausing his set when it coincides with prayer timings.

"I respect the culture and don't mind pausing, as long as it is something pre-determined."

The jazz musician said that as long as he was told in advance and not told to stop abruptly, he did not mind stepping away from his piano for a moment.

"You have to alter the song or play a dramatic ending," Mr Stoyanov said. "This is not fair to the music, musicians and listeners, who have to be respected as well."

Singer Jae Franklin, 32, said being asked to pause for Adhan was something she was more conscious of in Abu Dhabi as opposed to Dubai.

The American jazz artist had to stop performing at 8pm last Wednesday at an event in the capital.

"I wasn't sure why we had to end our set just an hour after starting but it made sense when I heard the call to prayer minutes after we stopped."

Ms Franklin said no stops were required while she was singing during Friday brunch, held from 1pm to 4pm at the Jumeirah Zabeel Saray on The Palm, Dubai.

"It is part of the culture and I am much more aware of it in Abu Dhabi, where I am more mindful of the local customs."

**CALL<sup>2</sup>PRAYER<sup>®</sup>**  
Advanced Automation Solution