



Isabel Camacho &lt;isabel.camacho@gsa.guam.gov&gt;

---

**gsa bid#004-10**

2 messages

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**Isabel Camacho <isabel.camacho@gsa.guam.gov>**  
To: John@pdsguam.com

Tue, Dec 22, 2009 at 9:27 AM

Good Morning Mr. John Day,

Just following up with the specifications for the telephone equipment that we needed you to clarify. Here is my email: [isabel.camacho@gsa.guam.gov](mailto:isabel.camacho@gsa.guam.gov) this is my new email address.

Thank you  
Isabel Camacho

---

**john@pdsguam.com <john@pdsguam.com>**  
To: Isabel Camacho <isabel.camacho@gsa.guam.gov>  
Cc: bencamac@teleguam.net

Tue, Dec 22, 2009 at 10:57 AM

Hello Becky,

Here is a copy of the ShoreTel Call Manager Datasheet. We have recommended two versions of the ShoreTel Call Managers; Personal Call Manager and Operator Call Manager. Details on both Call Managers are contained in the attached worksheet along with other Call Managers that ShoreTel provides (Professional Call Manager, Mobile Call Manager, Agent Call Manager, Supervisor Call Manager, etc).

Please note that the Call Managers are data applications that runs on the user's PC and communicates with the ShoreTel switches to allow call control and additional features like Unified Messaging. These applications are not VOIP based, but use standard Microsoft Windows extensions (like TAPI) to work within the Windows operating system and to interface with MS Outlook.

I would be glad to setup a demo of the system using the configuration that we have recommended under this procurement.

Regards,

John Day

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**From:** Isabel Camacho [mailto:isabel.camacho@gsa.guam.gov]  
**Sent:** Tuesday, December 22, 2009 9:28 AM  
**To:** John@pdsguam.com  
**Subject:** gsa bid#004-10

[Quoted text hidden]

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 **ShoreTel Datasheet Call manager.pdf**  
930K

*Telephonic spoke w/ Ben Camacho  
11:07am 1/4/10 per Ben he will  
take a look at it.*

# Google images

Aastra 480i with personal call manager  
SafeSearch: [Off](#) ▾

[Search images](#) [Advanced Image Search](#)

Images [Show options...](#)

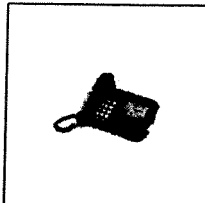
Results 1 - 20 of about 275 (0.05 seconds)



**aastra 480i.** Up to 300 x 300 - 24k - jpg  
click4pbx.com



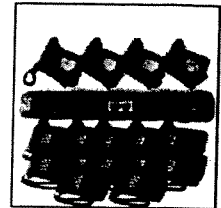
The Model 480i is 442 x 295 - 19k - jpg  
digicommhome.com



**Aastra 480i,** 250 x 250 - 7k - jpg  
sangomacards.com



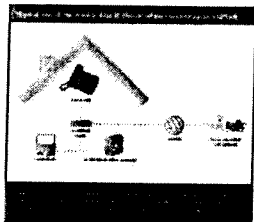
The **Aastra 480i CT** 300 x 300 - 20k - jpg  
icsgp.com



System with 12 **Aastra** 250 x 250 - 21k - jpg  
neobits.com



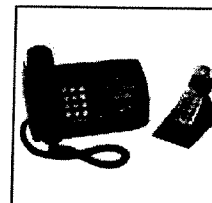
**Aastra 480i** 333 x 236 - 36k - jpg  
digiumcards.com



**Aastra 480i VoIP** 565 x 510 - 32k - gif  
voiptalk.org



The **Aastra 9480i** 270 x 270 - 25k - jpg  
virtualpbx.ca



The **Aastra 9480i** 270 x 270 - 29k - jpg  
virtualpbx.ca



**Aastra 480i IP** 100 x 71 - 4k - jpg  
myshopping.com.au



**Aastra 480i** 150 x 150 - 14k - jpg  
voip.bluewirecs.com



**Aastra 480i-CT IP** 300 x 197 - 42k - jpg  
pbxselect.com



**Aastra 480i IP** 150 x 150 - 5k - jpg  
pbxselect.com



Other products by 250 x 250 - 13k - jpg  
phonethings.biz



**Aastra 480i-CT IP** 150 x 150 - 6k - jpg  
voiplink.com



**Aastra PoE Adaptor** 200 x 129 - 6k - jpg  
siracom.com



**Aastra 480i SIP** 150 x 105 - 33k - jpg  
syntagma.com



**Aastra 480i IP** 150 x 120 - 4k - jpg  
voiptalk.org



型号: **Aastra 480i CT** 200 x 164 - 7k - jpg  
socitone.com



Product Features Enhanced 200 x 180 - 24k - jpg  
voipuzzle.com

1 2 3 4 5 6 7 8 9 10 [Next](#)

Aastra 480i with personal call manager

[Search images](#)





Isabel Camacho <isabel.camacho@gsa.guam.gov>

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**FW: gsa bid#004-10**

1 message

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**Ben Camacho** <bencamac@teleguam.net>  
To: Isabel Camacho <isabel.camacho@gsa.guam.gov>  
Cc: Anita Cruz <anita.cruz@gsa.guam.gov>

Thu, Dec 31, 2009 at 8:55 PM

Becky,

I received the technical datasheet provided by PDS, this is a software that must be install and setup on a workstation. This will provide the workstation the feature on a phone. This is a feature on the phone PBX system, item 1.

This does not make the phone unit digital.

Ben

---

**From:** john@pdsguam.com [mailto:john@pdsguam.com]  
**Sent:** Monday, December 21, 2009 4:58 PM  
**To:** 'Isabel Camacho'  
**Cc:** bencamac@teleguam.net  
**Subject:** RE: gsa bid#004-10

Hello Becky,

Here is a copy of the ShoreTel Call Manager Datasheet. We have recommended two versions of the ShoreTel Call Managers; Personal Call Manager and Operator Call Manager. Details on both Call Managers are contained in the attached worksheet along with other Call Managers that ShoreTel provides (Professional Call Manager, Mobile Call Manager, Agent Call Manager, Supervisor Call Manager, etc).

Please note that the Call Managers are data applications that runs on the user's PC and communicates with the ShoreTel switches to allow call control and additional features like Unified Messaging. These applications are not VOIP based, but use standard Microsoft Windows extensions (like TAPI) to work within the Windows operating system and to interface with MS Outlook.

I would be glad to setup a demo of the system using the configuration that we have recommended under this procurement.

Regards,

John Day

---

**From:** Isabel Camacho [mailto:[isabel.camacho@gsa.guam.gov](mailto:isabel.camacho@gsa.guam.gov)]  
**Sent:** Tuesday, December 22, 2009 9:28 AM  
**To:** [John@pdsguam.com](mailto:John@pdsguam.com)  
**Subject:** gsa bid#004-10

Good Morning Mr. John Day,

Just following up with the specifications for the telephone equipment that we needed you to clarify.

Here is my email: [isabel.camacho@gsa.guam.gov](mailto:isabel.camacho@gsa.guam.gov) this is my new email address.

Thank you

Isabel Camacho

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 **ShoreTel Datasheet Call manager.pdf**  
930K



Isabel Camacho <isabel.camacho@gsa.guam.gov>

**FW: DOA Access Control**

3 messages

**Ben Camacho <bencamac@teleguam.net>**  
To: Isabel Camacho <isabel.camacho@gsa.guam.gov>

Sat, Dec 19, 2009 at 6:33 AM

Ben

Letter from PacAir. The Access Control at DOA could only be upgraded by PacAir.

Ben

 **Guam Dirs 8-9-05.pdf**  
70K

**Isabel Camacho <isabel.camacho@gsa.guam.gov>**  
To: Ben Camacho <bencamac@teleguam.net>

Tue, Dec 22, 2009 at 8:56 AM

Good Morning Ben

This is just a reminder as per our telephone conversation yesterday regarding the email from pacair I was not able to print the letter from the vendor please help me with this also did you rec'd the informations from John Day. If you could email me and cc copy to Anita & Chief.

Thanks  
Becky

[Quoted text hidden]

**Isabel Camacho <isabel.camacho@gsa.guam.gov>**  
To: Ben Camacho <bencamac@teleguam.net>

Wed, Dec 30, 2009 at 3:00 PM

Hi Ben,

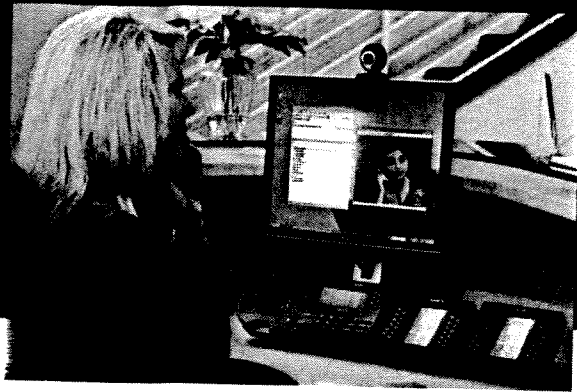
As per our telephone conversation on Dec. 29, 2009 I'm following up with the letter regarding your findings on GSA-004-10 per your review on the specifications on the telephone & equipment. Please provide the letter to GSA we need to move forward.

Also Ben just to let you know I did mention to you that the specification was email to me, from Pacific Data, John Day but I cannot print can you please provide me a copy.

Thanks  
becky

[Quoted text hidden]

# ShoreWare Call Manager



Improving productivity  
through efficient unified  
communications



## BENEFITS

- Streamline business communications
- Enhance overall end user productivity
- Reduce travel and meeting expenses
- Improve customer satisfaction with faster response
- Greater flexibility for more effective mobile communications
- Customizable, flexible and effective controls with a single interface

### *Maximize your unified communications investment*

With increasingly busy schedules and workers located around the world, it's not always easy to reach the right people at the right time. We play phone tag, interrupt important meetings to take calls, and fly all over the world, all the while continuing to wrestle with an endless list of voicemails, e-mails, missed calls and more. To avoid the delays in projects, incomplete decisions, and reduced employee performance resulting from this communications chaos, organizations need to simplify operations with solutions that connect people and information more quickly and efficiently. This is the role of unified communications (UC).

A successful UC solution delivers significant benefits to most organizations and helps turn communication challenges into competitive advantages. When people know the most effective way to contact colleagues, they can quickly obtain information and get the work done, rather than wasting time tracking down the right person. This is one of the benefits of "presence"—knowing instantly whether someone is available to communicate, and how.

With all that in mind, ShoreWare® Call Manager was created; a UC application suite—ShoreWare Personal Call Manager, ShoreWare Professional Call Manager, ShoreWare Operator Call Manager and ShoreWare Mobile Call Manager, were each tailored for specific needs in your organization. This unique communications suite offers your organization a way to empower all of your users to communicate any way they choose via video, voice (wired or wireless) or instant messaging (IM). ShoreWare Call Manager helps streamline business communications, improves communication accuracy, and enhances overall end user productivity.

Although phone and conference calls have been a communication staple for ages, video conferencing is rapidly moving from the boardroom to the desktop and becoming a key capability for enterprise communications. What was once viewed as a

complex, niche technology is becoming an easy to use, productive communications tool, nearly as ubiquitous as IM. Desktop video enhances inter-office communication and helps reduce travel and meeting expenses.

By leveraging ShoreWare Call Manager as part of an end-to-end UC solution, you can achieve better communications, a reduction in travel costs, improved customer service, and better utilization of your equipment and infrastructure.

### *Communications with impact*

Consider the positive impact if telecommuters were fully integrated into your business communications. You could recruit based purely on skill set rather than location and reduce your worries over office space and costs. Your telecommuters can dial everyone by extension, know who is on the phone and who is not, and communicate seamless with every other location and every other teleworker. People back at the office can enjoy the simplified access to the remote experts, ensuring that customers get a timely, correct response to any question. The flexibility of the ShoreTel® UC system solution with ShoreWare Call Manager can also improve job satisfaction for all your employees, leading to better staff retention. With better communications across your enterprise, teleworkers become a more integral part of the team, employees are happier and customers get faster answers, which leads to improved customer satisfaction as well.

By integrating communications management into innovative solution offerings, ShoreTel is leading the way to remove the distance barrier throughout organizations. People who stay connected have access to the people, resources and real-time information they need to make decisions faster and, ultimately, perform better. As part of a whole system with switches, phones and exceptional customer support, ShoreTel stands alone in its ability to provide a comprehensive UC solution.



## The ShoreWare Call Manager application suite

Intuitive communications management tools designed for the way you work today.

### Eliminate information silos

ShoreWare Call Manager is transforming the way employees communicate, regardless of their role or location, with productivity features such as quick access to directories, availability and location, making it easier to choose the right communication mode at the right time.

### Free IT resources

One single interface reduces training efforts as well as capital and operating expenditures. With one installation process, a single application to support and no additional servers to deploy and maintain, the IT workload is reduced.

### Turn any phone call into a Web conference

ShoreWare Call Manager simplifies operations by connecting people and information more efficiently. Users can easily transform a phone call into a Web sharing session on the fly to work on a document with the caller and speed collaboration.

### Boost productivity with quick access

With QuickDialer, users enjoy rapid access to directories or their personal Outlook® contacts. Users can quickly find and connect to the person they need. When a phone call isn't right, QuickDialer also provides a quick and easy way to contact them using an IM or an e-mail. Productivity is improved when users can reach their party faster, with the most appropriate communication modes of the moment.

### Add intelligence to your calls

Users can define how they would like to have incoming calls routed, based on who is calling, when they're calling, and their active call handling mode. Calls can be sent to voicemail, a specific phone number, Announced Find Me, Find Me, or even play a specific ringtone so users can manage their time to become more efficient.

### Save time with Microsoft Outlook

With Microsoft Outlook integration, users can manage voicemail and contacts with features that allow them to:

- Listen, replay, forward and save voicemail right from the inbox
- Call contacts right from the Microsoft Outlook application
- Define call handling from a meeting/appointment request

### Build teamwork

ShoreWare Call Manager's unique blend of phone and IM presence lets users add a contact and see their phone and IM status either in one combined, simple view or an expanded view for power users. Intuitive IM and Presence Control makes communication quick and easy, saving time and money by resolving issues faster. For group interactions, users can access the

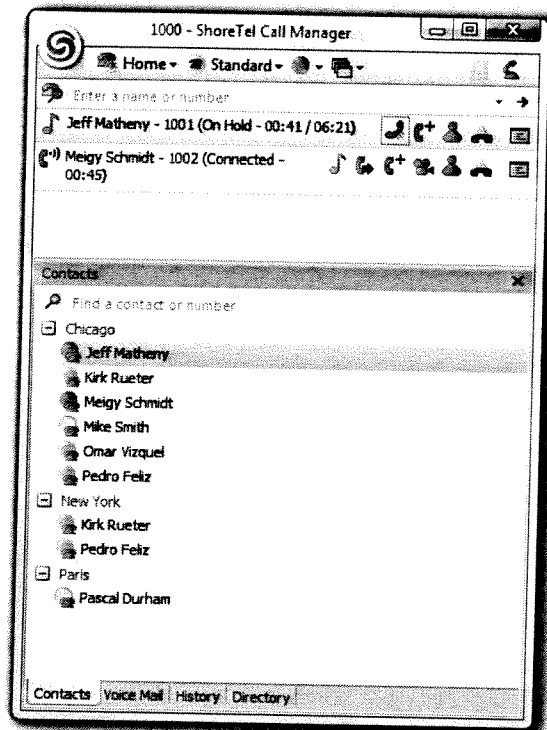


Figure 1: Manage multiple calls at once

optional Converged Conferencing Console to initiate a collaboration session.

### Communicate immediately with IM

Choose the IM option and open up more opportunities to communicate. Through IM users can:

- Contact people in remote locations
- Communicate when a voice call is too intrusive
- Have sidebar conversations
- Save and archive chat conversations
- Enjoy a worry-free, secure IM infrastructure
- Escalate a chat to a phone call in one step
- Bring multiple experts into a conversation

### Reduce travel with video

Video makes remote meetings easier, reduces travel expenses, improves collaboration, builds stronger relationships and makes remote workers feel part of the team. With affordable off-the-shelf webcams, placing clear, crisp person-to-person video calls is as easy as a phone call.

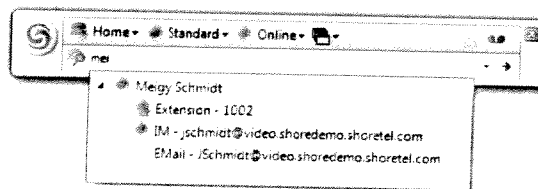


Figure 2: Easily locate people and communicate via voice, E-mail or IM

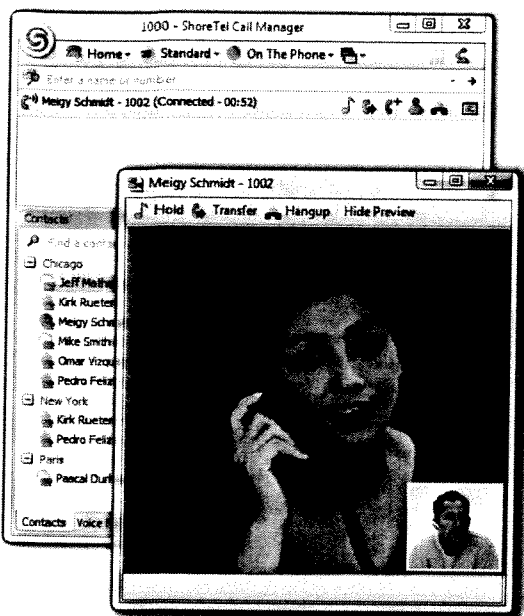


Figure 3: Conduct face-to-face video meetings

Call Manager takes advantage of the most recent enhancement to the H.264 standard for video compression: Scalable Video Coding (SVC). Thanks to SVC, ShoreTel can provide desktop video quality (resolution up to 1024 x 768 with minimal latency) and network resiliency to all the users.

#### A graphical interface works the way you do

ShoreWare Call Manager allows users to customize the information view for the way they work, not the other way around. Tabbed contents allows access to all key features in one window and let users arrange the view based on their work style. For an unobtrusive snapshot, the window can be docked on any side of the screen so it doesn't interfere with other desktop applications.

#### Handle high call volumes with ShoreWare Operator Call Manager

ShoreWare Operator Call Manager desktop client allows businesses to cost-effectively provide callers with a high level of personalized, professional service. For corporate operators, executive administrators and departmental receptionists, it is a flexible tool for managing enterprise UC call coverage features, such as Busy Call Appearance and Call Pick-up, speed connections to your employees. And with IM and presence information operators can consult a target user via IM before transferring a call.

#### Keep mobile workers reachable, anytime, anywhere

ShoreWare Call Manager seamlessly connects customers to mobile workers and mobile workers to the corporate offices more efficiently, instantly creating satisfied customers and staff. The Find Me capability helps callers connect with users even when they are not at their regular extension. Users can have all calls ring first at their extension, then any two other phones they assign. ShoreWare Mobile Call Manager is an integral part of ShoreTel's UC solutions and is transforming the way people communicate. ShoreWare Mobile Call Manager offers users access to familiar functions such as QuickDialer access to corporate and address book contacts, visual voicemail and allows making your mobile phone the enterprise extension on the fly. Mobile users can also change their settings via ShoreWare Web Access.

In a world where communication technology is no longer an afterthought, but a strategic driver in business productivity, ShoreWare Call Manager is one of the most versatile, real-time communication application suites available today. With superior availability and reliability, more flexible features, a greater breadth of telephony and IM control, quality desktop video, and the most customizable interface, nobody delivers better communications services and management than ShoreTel.

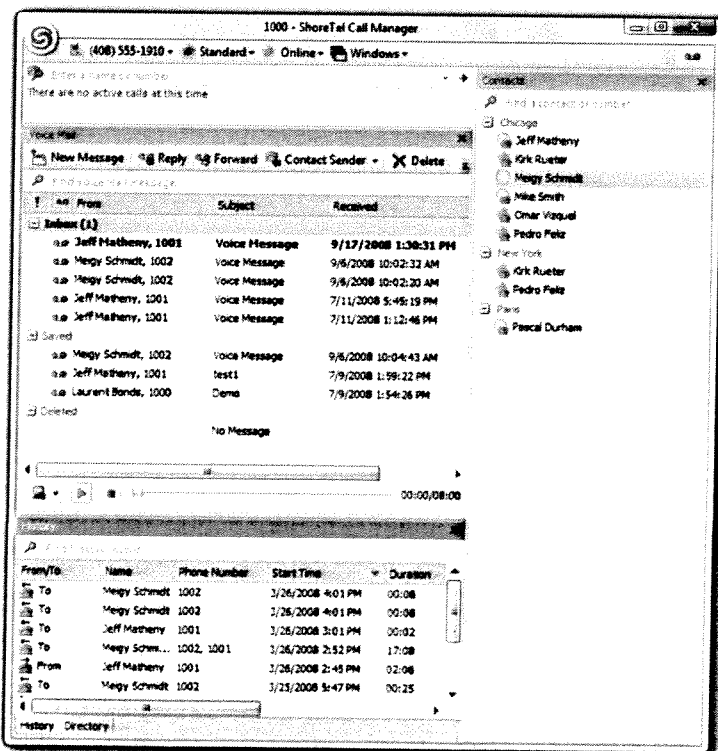


Figure 4: Customizable interface for your users

## FEATURES

### Advanced call management

- Intercom
- Park
- Page
- Pick-up
- Pick-up night bell
- Silent monitor
- Barge in
- Whisper transfer
- Whisper page
- Telephony presence change alert

### Audio conferencing

- Up to six parties on conference
- Add-on conference
- Join a conference

### Bridge call appearance

- Multiple viewing options
- Multiple docking options
- Call appearance name, number
- Call state
- Calling name, number
- Call duration
- Call pick-up
- Call notes
- Call properties

### Advanced voicemail playback

- Caller ID name and number
- Date, time and duration
- Call back
- Compose
- Delete
- Forward
- Forward via e-mail
- Move backward, forward
- Play
- Reply, reply all
- Save
- Sort with folders
- Play on phone or play on PC

### Advanced voicemail management

- Matching contact name display
- Move backwards, forwards
- Play
- Date, time and duration

### Personalized Call Handling, based on

- who is calling
- when the call arrives
- the user's call handling mode

### Office Anywhere

- Assign number to internal numbers
- Assign number to external telephones (cell, home, etc.)

### Workgroup agent functions

- Display of calls in your queue
- Call pick-up from queue
- Call information display
- Previous call log display

### SoftPhone

- Number pad for DTMF entry
- Swift change from phone to SoftPhone
- G.711 codec
- G.722 codec

### High quality, low latency video

- H.264/SVC protocol
- 640 x 480 (VGA)
- Up to 30 frames per second

About ShoreTel

ShoreTel is a leading provider of Pure IP unified communications solutions that enable companies of any size to seamlessly integrate voice, video, messaging and data with their business processes. Independent of device or location, ShoreTel's unique distributed software architecture eliminates the traditional costs, complexity and reliability issues inherent in other solutions. Founded in 1996, ShoreTel has achieved broad industry recognition for this proven technology, and continues to deliver the highest levels of customer satisfaction, ease of use and manageability while driving down the overall total cost of ownership. For more information, visit [www.shoretel.com](http://www.shoretel.com).



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	PERSONAL CALL MANAGER	PROFESSIONAL CALL MANAGER	OPERATOR CALL MANAGER	MOBILE CALL MANAGER	WEB ACCESS
<b>System</b>					
QuickDialer	•	•	•	•	Limited
Standard call management	•	•	•		
Advanced call management	•	•	•		
Personalized Call Handling		•	•		
Call history, redial history	•	•	•	•	
Call handling modes	•	•	•	•	•
Audio conferencing	•	•	•		
Audio recording	•	•	•		
Bridge call appearance			•		
Call drag and drop to Contact Viewer			•		
Programmable buttons	•	•	•		
<b>Visual Voicemail</b>					
Standard integrated voicemail				•	
Advanced voicemail playback	•	•	•		
Advanced voicemail management	•	•	•		•
Voicemail preview					•
Message notification and escalation	•	•	•	Device dependent	•
<b>Outlook Integration</b>					
Voicemail as attachment				Device dependent	
Voicemail inbox	•	•	•		
Contact integration	•	•	•	•	
Calendar call routing	•	•	•	•	•
<b>Contact Viewer (Extension Monitor)</b>					
Telephony presence		•	•		
Detailed telephony presence			•		
Instant messaging presence		•	•		
Instant messaging presence change alert		•	•		
Presence privacy management		•	•		
Person to person and multiparty IM		•	•		
Client side IM logging		•	•		
<b>Mobility</b>					
Office Anywhere	•	•	•	•	•
Find Me	•	•	•	•	•
SoftPhone		•	•		
<b>Video</b>					
High quality, low latency video		•	•		
Network congestion resiliency		•	•		
<b>Audio and Web Conferencing</b>					
Launch of the Converged Conferencing Console	•	•	•		
Ad-hoc web conferencing	•	•	•		
<b>Workgroup</b>					
Workgroup queue monitoring			•		
Workgroup agent functions			•		
<b>REQUIREMENTS</b>					
<b>Software Requirements</b>					
Microsoft® Windows® OS	XP Pro SP2, Vista Business & Enterprise (32 bit), Windows 2003, Terminal Server R2 (32&64 bit)	XP Pro SP2, Vista Business & Enterprise (32 bit), Windows 2003, Terminal Server R2 (32&64 bit)	XP Pro SP2, Vista Business & Enterprise (32 bit), Windows 2003, Terminal Server R2 (32&64 bit)		NA
Microsoft Outlook	Outlook 2003 SP2, Outlook 2007	Outlook 2003 SP2, Outlook 2007	Outlook 2003 SP2, Outlook 2007	NA	NA
Citrix® ready	XenApp 4.5 (limited support)	XenApp 4.5 (limited support)	XenApp 4.5 (limited support)	NA	NA
<b>Hardware Requirements</b>					
Processor	Pentium 3-800 MHz	Pentium 4-2.0 GHz, Pentium 4-3.0 GHz with up to 500 monitored contacts, dual core 1.6 GHz for video	Pentium 4-2.0 GHz, Pentium 4-3.0 GHz with up to 500 monitored contacts, dual core 1.6 GHz for video		NA
Available RAM	100 MB *	150 MB *	150 MB *		NA
Disk space	1 GB **	1 GB **	1 GB **		NA
<b>Bandwidth Requirements</b>					
Standard traffic	0.2 kbps	0.2 kbps	0.2 kbps		
High quality video		Up to 600 kbps	Up to 600 kbps		
<b>Others</b>					
		ShoreTel Converged Conferencing 7.1 or Microsoft OCS 2007 for IM and Presence	ShoreTel Converged Conferencing 7.1 or Microsoft OCS 2007 for IM and Presence	Refer to ShoreTel Mobile Call Manager datasheet for details	

\* Memory used by the ShoreTel application exclusively; A minimal of 1 GB of total memory on the PC is recommended when using other office applications under Windows XP or 2 GB under Windows Vista

\*\* Disk space requirement is for installation on a system without Windows.NET Framework installed previously. Once installed, Call Manager requires less than 100MB of disk space



Isabel Camacho &lt;isabel.camacho@gsa.guam.gov&gt;

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**telephone equipment specification**

2 messages

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**Isabel Camacho <isabel.camacho@gsa.guam.gov>****Wed, Jan 20, 2010 at 7:31 AM**

To: jim.lacson@bit.guam.gov

Good Morning Jim,

Just a reminder about our meeting this morning at GSA at 8:00am, this is regarding the specification for the Bureau of Statistic and plans on the telephone equipment.

Thanks

Becky

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**Jim Lacson <jim.lacson@bit.guam.gov>****Tue, Jan 26, 2010 at 10:45 AM**

Reply-To: jim.lacson@bit.guam.gov

To: Isabel Camacho &lt;isabel.camacho@gsa.guam.gov&gt;

Cc: robert kono &lt;bobkono@yahoo.com&gt;

Becky

GSA requested that I evaluate the PDS vendor response. In my opinion the phones proposed by PDS meet the requirements. However, the bid documents did not clearly define what a 'digital phone' is. The proposed phones have capabilities beyond those of analog phones. If they are not analog phones then one could argue they are digital.

I am not an expert on telecom technologies so my opinion should be taken in this context.

--

Jim Lacson

Chief Information Officer

Government of Guam

Bureau of Information Technology

<http://bit.guam.gov>

Tel: 671.475.1229

Fax: 671.472.9508

Mobile: 671.483.0592

[jim.lacson@bit.guam.gov](mailto:jim.lacson@bit.guam.gov)

[Quoted text hidden]



Isabel Camacho &lt;isabel.camacho@gsa.guam.gov&gt;

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**Bureau of Statistics & Plans - BID - Telephonic**

1 message

**Michael S. Cruz** <Michael.Cruz@doa.guam.gov>

Sat, Jan 23, 2010 at 7:25 AM

To: Isabel Camacho &lt;isabel.camacho@gsa.guam.gov&gt;

Cc: "Claudia Acfalle (CPO)" &lt;claudia.acfalle@gsa.guam.gov&gt;, Anita Cruz &lt;anita.cruz@gsa.guam.gov&gt;, Robert Kono &lt;bobkono@yahoo.com&gt;

Hi Becky.

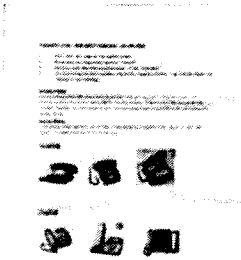
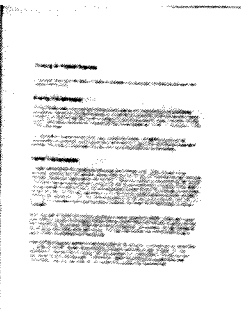
At your request, on Wed Jan 20, 2009, at 3:30pm GSA, I provided to you my opinion on 'Does the PDS proposal meet the requirements of the BSP BID?'

In the GSA Conference Room, I reviewed all the documentation in order to come up with an opinion. In the end, I said 'Yes, the PDS proposal meets the requirements of the BSP Bid.'

Attached are the documents I submitted to you before I began. I made it clear that I am not a telephonic expert, and that I would provide my best opinion to you. I asked that you preserve these documents as part of my opinion.

Si Yuus Maase.

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**2 attachments****Bid\_-\_Submitted\_Documents\_&\_Opinion\_-\_Page\_1\_of\_2.jpg**  
945K**Bid\_-\_Submitted\_Documents\_&\_Opinion\_-\_Page\_2\_of\_2.jpg**  
1145K

**Michael S. Cruz – DOA Data Processing – Jan 20, 2010**

1. What does the requesting agency want?
2. What was the requesting agency's intent?
3. Did they write the Bid specifications? If not, who did?
4. I am providing my best opinion only at the request of GSA. I am not an expert on telephonic terminology.

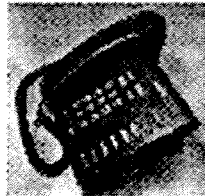
**Analog Phone**

Analog phones are the same kind of phones that you've been using for years. The phones in your house are, quite likely, analog phones. That means they're extremely reliable, familiar and very easy to use. You just plug them in, and they do what they've always done.

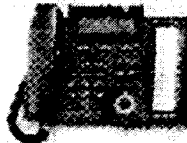
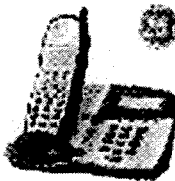
**Digital Phone**

A telephone that converts an analog voice signal to a digital voice signal, so that the signal is in digital format for transmission.

**Analog**



**Digital**



## Analog & Digital Signals

In general, there are two types of telecommunication transmission: Analog transmission and Digital transmission.

### Analog Transmission

Analog transmission uses signals that are exact replicas of a sound wave or picture being transmitted. Signals of varying frequency or amplitude are added to carrier waves with a given frequency or electromagnetic current to produce a continuous electric wave. The term "analog signal" came about because the variations in the carrier waves are similar, or analogous, to that of the voice itself.

For example, in analog transmission, say a telephone system, an electric current or the reproduction of patterned sound waves are transmitted through a wire and into the telephone receiver. Once this is completed, they are then converted back into sound waves.

### Digital Transmission

In digital transmission, the signals are converted into a binary code, which consists of two elements—positive and non-positive. Morse code and the "on" and "off" flashing of a light are basic examples. Positive is expressed as the number 1, while non-positive is expressed as the number 0. Numbers that are expressed as a string of 0s and 1s are called binary numbers. Every digit in a binary number is referred to as a bit and represents a power of two. For example, in the binary number 101, the 1 at the right represents  $1 \times 2^0$ , the 0 in the middle represents  $0 \times 2^1$ , and the 1 to the far left represents  $1 \times 2^2$ . The decimal equivalent of 101 is  $(1 \times 2^2) + (0 \times 2^1) + (1 \times 2^0) = 4 + 0 + 1 = 5$ . In a standard code used by most computers, the letter "A" is expressed in 8 bits as 01000001.

As an example of digital transmission, in a type of digital telephone system, coded light signals produced by a rapidly flashing laser travel through optical fibers (thin strands of glass) and are then decoded by the receiver. When transmitting a telephone conversation, the light flashes on and off about 450 million times per second. This high rate enables two optical fibers to carry about 15,000 conversations simultaneously.

Digital format is ideal for electronic communication as the string of 1s and 0s can be transmitted by a series of "on/off" signals represented by pulses of electricity or light. A pulse "on" can represent a 1, and the lack of a pulse "off" can represent a 0. Information in this form is very much easier to store electronically. Furthermore, digital transmission is usually faster and freckles less noise and disturbances as compared to analog data transmission.