



How to setup DID Management System



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ABSTRACT

The whitepaper targets the users who want detailed information regarding DID (Direct Inward Dialing) and want to establish a DID Setup for their business models. Whitepaper precisely describes the emerging technology of today's era i.e. DID. It convincingly provides different reasons to use DID and also elaborates its working in detail.

This whitepaper also provides main list of equipments, required for the establishment of a DID (Direct Inward Dialing) Setup and also suggests the most preferred hardware for it.

Prior to all that, whitepaper also provides a current market review and introduces the companies that have already established a DID setup and are now growing day by day in their business.

INTRODUCTION

Internet industry is intensifying day by day as internet has become the basis of communication for every business. By the introduction of VoIP, cost of communication has greatly been reduced and industry is enjoying benefits of VoIP flexibility by introducing variant services to the consumers that were not even thought before, with the traditional infrastructure of TDM (Time Division Multiplexing). Hence, **DID (Direct Inward Dialing)** or virtual phone is one of the emerging idea that has opened new business opportunity for service providers.

WHY DIRECT INWARD DIALING (DID)?

Consider many people living abroad, far from their families, either for business or for study. They get socially disconnected from their relatives & friends in home-country. For some regions, voice-calls are still expensive and communication is not very smooth. In modern era, through MSN, Yahoo and Skype like software, communication is lot cheaper than phone lines but there are problems of voice-quality and sustained/dedicated bandwidth. Also, both communicating parties must have same software installed, if they want to enjoy free-calling.

A loving mother wants to talk to her son, who has gone abroad for studying. It's highly desirable, if she can call him on some local number, charging him rates of local call only. It's much more convenient then setting up computer with broadband internet connection, install Skype and wait for him to appear online.

A trader, who has setup his office in Europe and buys products directly from Pakistan, needs a virtual number of Pakistan in Europe to better communicate with people in Pakistan.

DID or virtual phone service is another emerging concept for breaking these communication barriers that have been created either due to cost or some technical reasons. Recently, small companies targeting customers worldwide have purchased US and Europe numbers to attract customers. To cut down cost of technical assistance, companies established in US, Europe have either outsourced or have setup their own call-centers in countries like India and Pakistan. Customers call them on US number and call-center technical assistant answers from remote call center.

Convincingly, DID/virtual phone service allows a customer to send/receive calls using virtual number. Till now, people wanted to have US/Europe numbers available in their town but recently, demand of local phone number usable abroad is increasing.

DID: HOW IT WAS ORIGINATED?

DID stands for **Direct Inward Dialing**, it is also known as DDI in Europe. It was developed by AT&T (American Telephone and Telegraph Company) that is renowned for providing data (voice and video) services, internet telecommunication services and some professional services for different business models and is now the largest telephone company that has developed a monopoly in the world.

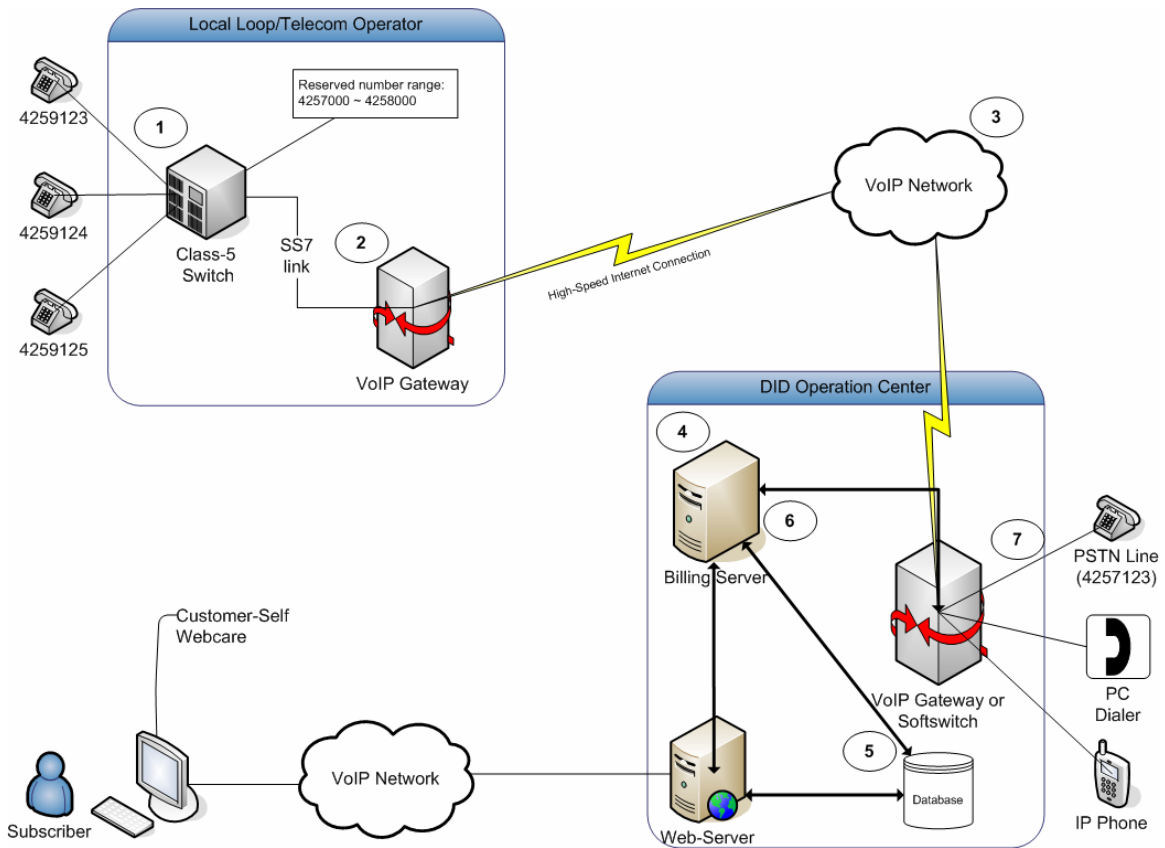
The basic purpose of DID was to build a corporate setup that is less costly, yet faster and reliable. A corporate-setup required a large number of phone-line extensions but it was very costly to have a dedicated phone-line for every employee in the company. Therefore, Telephone Service Providers offers a range of numbers to an organization's PBX (Private Branch Exchange, a private telephone exchange that is owned by an organization). The range of numbers is less than the number of phone-lines required to the company. Every number in the PBX range has a number of extensions attached and PBX can decide on every call that where to route the call.

This concept has been emerged and a DID is now considered to be a virtual number. A number that may be available anywhere and have no location restrictions.

HOW IT WORKS?

There is Local Loop Operator/Telecom Operator in particular regions that transfer the calls to their required destinations. These operators are assigned certain range of phone numbers (like 4251000 ~ 4259999) and from these numbers, Telecom Operator reserve some numbers for DID (Direct Inward Dialing) service/ Virtual Phone Service such as 4257000 ~ 4258000. Any subscriber, from anywhere can call on these virtual numbers. Following diagram illustrates the working of DID:

Figure 01: Working of Direct Inward Dialing (DID)



1. A call is originated from a PSTN (Public Switched Telephone Network) number i.e. 4259123 for a number 4257123.
2. Call is received by the Class-5 Switch located at the premises of Local Loop Operator/Telecom Operator that checks the destination number i.e. 4257123 and as this number lies in the range reserved for DID, therefore, the call is redirected to the VoIP gateway via SS7 link.
3. From the VoIP Gateway, the call is transmitted via VoIP network to the DID Operation Center that is received by another VoIP Gateway or Softswitch (preferably, Asterisk) situated at the premises of DID Operation Center.
4. The VoIP Gateway then verifies from the billing server that either the destination number has been subscribed and has positive balance.

5. Billing server validates the subscriber from its local billing database.
6. After validating, the billing server pass success/failure signal to gateway to transfer the call.
7. Upon success-signal from billing, gateway transmits the call to desired destination i.e. 4257123.

Subscriber can also set some preferences via Customer-Self Web care that are stored in the database. Gateway uses these preferences while transferring the call to its destination.

ESTABLISHING DID SETUP

To establish a DID Setup, following steps are required:

1) Virtual Number Allocation

First of all, get some numbers from telephone-service provider. This can be any kind of LL/WLL or GSM service provider who is authorized to operate in the region. To guarantee Quality of Service for DID operator, telephony operator reserves some E1/T1 lines and/or some dedicated internet connection. A T1-line has capacity of 24 concurrent calls whereas an E1 line can have 30 calls. T1 lines are operational in Japan and North-America. In other regions, E1 standard is used.

A telephone operator issues a range of numbers, and may dedicate some E1 connections to guarantee Quality of service for you customers. In establishing a DID Setup, one more issue arises i.e. "Oversell Ratio" means ratio of physical connections to virtual numbers. Now a days, common ratios are 1-10, 1-20 etc. 1-10 means, offering 10 DID (Virtual Numbers) while having capacity to handle only 1 call at a time. In other words, if you have 10 subscribers, it's expected that only 1 will be using the service at a time.

2) Virtual Number Routing

Once, numbers range has been reserved, DID operator may have to collocate some VoIP-gateway in NOC of telecom-service operator. This VoIP gateway is required to take the call from regular telephony network to Internet Protocol (IP). Recently, most of the telecom-operators have IP-connectivity for interconnection with other telecom-operators. In this case, this step is not necessary. Same bandwidth may be shared by DID operator as well.

3) High Speed Internet Connection

Once range of numbers is reserved, next step is to analyze bandwidth requirements for the call. Preferably, 8 Kbps / active call should be reserved. Therefore, if you are planning to target 3000 subscribers, at least 1.2 Mbps should be reserved considering oversell ratio of 1:20.

4) Oversell Ratio

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5) Soft-switch/Gatekeeper setup

At other end, a soft-switch, H.323 gatekeeper or some SIP-Server is required. One of the best choices in market is Asterisk. Asterisk supports both H.323 and SIP and has excellent PBX features that ensures DID operator to offer a valuable service.

6) Billing and Customer Care

Setup is incomplete without a good billing and customer-care solution. The solution should provide support at least for:

- Register Subscriber and assign DID
- Support for prepaid/postpaid subscribers
- Customer self web-care to register online and configure DID settings
- Online/Real-time usage reporting and service analysis
- Security parameters

RECOMMENDED SETUP

The recommended gateway or softswitch for DID setup is “*Asterisk*”. Asterisk is excellent IP-PBX software that can be used at both ends for this setup functioning as VoIP gateway. Together with salient features of PBX, it provides perfect telephone connectivity as well. You can see detailed feature-list of asterisk at <http://www.asterisk.org/features>.

“*DID Management System*” offered by **AdvancedVoIP.com** is a complete retail-billing and DID management solution, integrated with Asterisk and fulfills requirements of any DID operator.

MARKET REVIEW

There are many companies in market doing the DID business. However, till now the focus was on selling US, UK & Europe DID.

- Vonage™, the market leader in providing broadband phone-service, is also working on the DID setup. The company was started in January 2001 in New Jersey and has reached its subscriber base over 1 million today. The company’s total revenue for this year is \$50.73M. For details, please visit <http://www.vonage.com>
- DIDX (DID Exchange), a wholesale solution that buys and sells DID numbers to/from ITSPs (Internet telephony Service Providers), CLEC (Competitive Local Exchange Carrier), ILEC (Incumbent Local Exchange Carrier), Calling Card Operators and VoIP (Voice over IP) Service Providers. DIDX is the registered service of Super Technologies, Inc. It was launched in 2005 and till now has constructed a vast market opportunities for different telecom operators. For details, please visit <http://www.didx.org>

FUTURE DIRECTIONS

In coming era, it is expected that DID (Direct Inward Dialing) will not only be used to transfer voice calls but it could be used for various other services as well.

For further information regarding DID (Direct Inward Dialing) providers, please view [DID Management System](#).

REFERENCES

- <http://www.asterisk.org/features>
- <http://www.didx.org>
- <http://www.vonage.com>
- <http://www.wikipedia.org>

GLOSSARY

Abbreviation	Meaning
AT&T	American Telephone & Telegraph Company
CLEC	Competitive Local Exchange Carrier
DID	Direct Inward Dialing, also known as DDI
GSM	Global System for Mobile Communications
ILEC	Incumbent Local Exchange Carrier
ITSP	Internet Telephony Service Provider
IP	Internet Protocol
LL	Local Loop
NOC	Network Operation Center
PBX	Private Branch Exchange
PSTN	Public Switched Telephone Network
TDM	Time Division Multiplexing
VoIP	Voice over IP
WLL	Wireless Local Loop