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DEVELOPING IDEAS

Integration Server 1.2

User Manual

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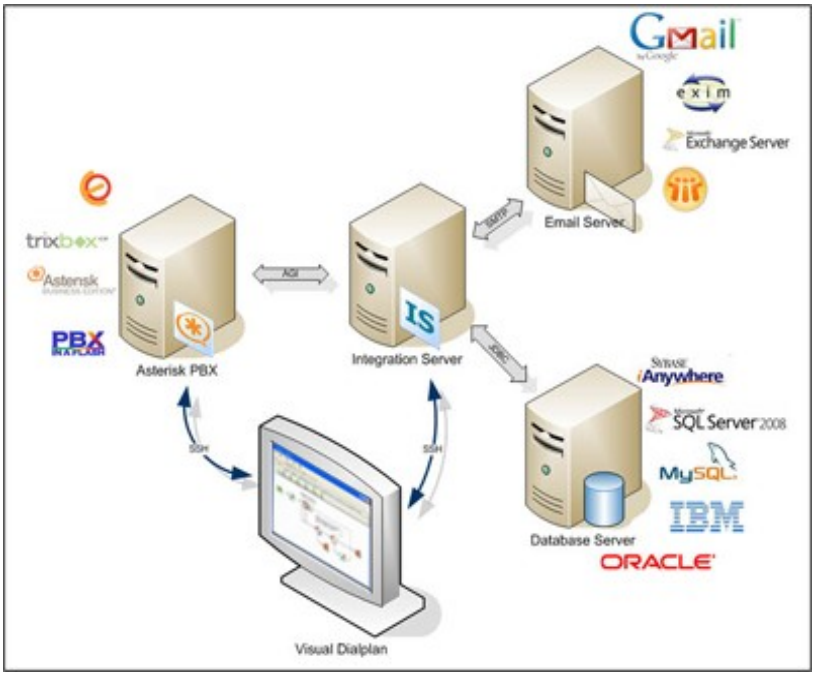
1

Introduction

Welcome to Integration Server.

The Integration Server (IS) is powerful application server that extends Asterisk dial plan functionality. It is specially designed to simplify working with third party servers (database servers, email servers , payment servers etc.) and services from within the Asterisk dial plan.

Integration Server comes with support for Visual Dialplan building blocks that provide intuitive interface to easily access those third party servers and service, like execute SQL queries on a remote database server (MS SQL, MySQL, Postgres etc.), send emails, process payment and more, directly from within the dial plan. It also extends Visual Dialplan with fully featured SQL query editor. email editor and payment editor.



Now you can easily test and execute SQL queries, send emails, process credit card and do much more with Visual Dialplan.

Note: Integration Server is supported by Integration Server professional version only. If you purchased Integration Server standard version you will not have support for Integration Server.

Intended audience

This manual is intended for all users involved in planning, developing and maintaining Asterisk dialplan, including Asterisk professionals, consultants, ordinary Asterisk users and Asterisk administrators. The manual assumes that you have a basic understanding of Asterisk software PBX, its dialplan configuration files and Integration Server software.

Chapter summaries

This manual provides information on how to install and use Integration Server. It also provides comprehensive reference manual of Integration Server components related to Integration Server. The manual contains the following chapters:

- **Chapter 1**, "Introduction" provides an overview of Integration Server and this manual, and identifies the intended audience.
- **Chapter 2**, "Integration Server", provides information about system requirements, gives instructions on how to download, install and get started using Integration Server, and about Integration Server licensing. It also describes Integration Server functionality in more details and gives instructions on how to use Integration Server with Integration Server.
- **Chapter 3**, "Integration Server Components", lists and provides comprehensive description for each Integration Server component.

Chapter

2

Integration Server

System Requirements

Current version of Integration Server is available for Microsoft Windows and Linux operating systems.

Integration Server requires Java Runtime Environment (JRE) 6.0 which is bundled with the Integration Server downloadable package and should not be downloaded and installed separately.

Downloading and installing Integration Server

Currently there are two ways to download Integration Server.

1. Integration Server comes bundled with Integration Server Professional and can be installed together with Integration Server Professional, at the same box. This type of installation is usually used for testing and development purposes.

2. Integration Server can be downloaded and installed separately. This type of installation is usually used for deployment purposes.

It can be also installed at the same box where Asterisk server is installed or on a separate server.

No matter what type of download package you choose, the installation process is easy and straightforward. After starting the installation executable, a standard installation user interface will appear. Just follow the instructions and the Integration Server will be installed in seconds.

How does it work - technical view

Integration Server (IS) is standalone server application that communicates with Asterisk server through AGI (Asterisk Gateway Interface) and acts as an AGI server that completes AGI requests initiated from Asterisk dial plan. These AGI calls can be simple database queries (database IS module) but also quite complex billing and credit card processing requests (additional IS modules are required) or other advanced functionalities depending on the modules loaded in the Integration Server.

An Asterisk Manager user is required in order to execute AGI calls.
Visual Dialplan automatically creates an Asterisk Manager user named is_user with a randomly generated password for this purpose. You can later modify both the Asterisk Manager username and password, if required.

Visual Dialplan deploys traditional extensions.conf code to the Asterisk server. In case the Integration Server functionality is required this code will contain AGI calls to Integration Server. At the same time, Visual Dialplan deploys resources to Integration Server required for those AGI calls.

When new call arrives at the Asterisk server the extensions.conf code (call flow) is executed and AGI request are sent to the IS. IS executes appropriate module (execute queries, send emails, process credit cards etc.) and returns resulting value and control back to the Asterisk dial plan.

How does it work - user view

Visual Dialplan comes with an Integration Server view, this is where the connection to the IS should be defined. Open this view and define a connection to the IS. Once the IS node is created, you can expand it and define connection to other servers and services supported by IS (DB server for example). Now you are ready to use the appropriate building blocks to call that particular IS functionality from within the dial plan (DB building block from IS sheet in this case). It is that simple.

Integration Server web interface

Integration Server comes with integrated web interface. It is the main interface to set up Integration Server access parameters, to maintain the server and manage the licenses.

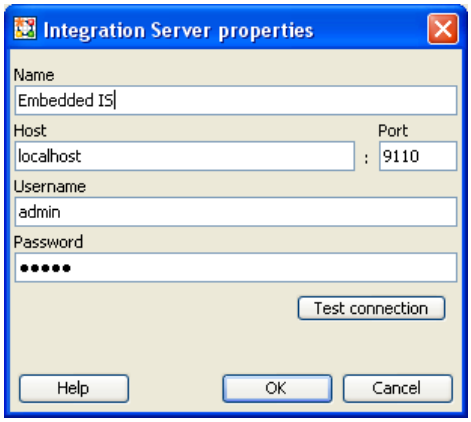
Default parameters to access Integration Server are:
Username: **admin**
Password: **admin**
Web interface port: **9111**

NOTE: For the security purposes it is our strong recommendation to change the web interface username, password and port immediately after the server installation.

Integration Server properties

Integration Server can be accessed via HTTP and directly from Visual Dialplan.

Username and password to access IS are the same in both cases.



Field	Description
Name	Internal name for the Integration Server that will be used to reference this particular IS.
Host	The URL or IP of the server where Integration Server is installed.
Port	Port to access Integration Server. Default value is **9110**.
Username	Integration Server user name. Default value is **admin**.
Password	Integration Server password. Default value is **admin**.

Note:
It is our strong recommendation that you change the default username, password and port values immediately after the server installation.

Default values can be changed using the Integration Server administrative web interface which can be accessed at the following URL:

http://<Integration Server Host>:9111

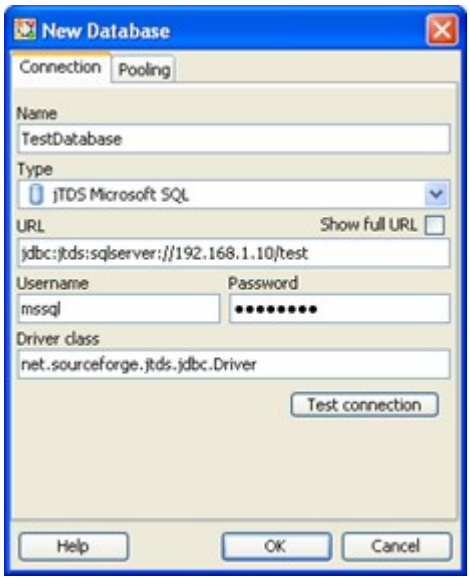
Database module

Executes SQL queries from the dial plan.

Basically this module is designed to simplify SQL query execution from within the dial plan against any database that provides JDBC drivers. The module will handle connection to the database server, execution of SQL query and management of the result set.

To create connection to new database server simply right click on the selected *Database resource* node and choose *New database* from the drop down menu.

Database connection properties



Field	Description
Name	Database connection name.
Type	Database server type. Several database types are supported out of the box while other database types can be supported by adding the JDBC drivers provided by database vendor. Defines the type of the database. Visual Dialplan will list only those databases for which a JDBC driver is available. The following database types will be available out of the box: • MySQL • Sybase • Microsoft SQL • Postgres SQL • JDBC ODBC bridge • Custom database Custom database drive that can be used to install any other native database driver.
URL	Database connection URL (check particular database server documentation for more

	information). Integration Server provides default URL for each supported database type. Make sure to replace parameters under the '<>' with adequate values (hostname, dbname, alias etc.).
Username	Database username used to connect to the database.
Password	Database password used to connect to the database.
Driver class	Driver that will be used by Integration Server to work with particular database type.

Note: Integration Server and connection to database server should be configured properly in order to use DbQuery component. Make sure to set database remote access privileges properly in order to access database server from Integration server

Integration Server resources (database connection, SQL queries etc.) are stored in the VDP file together with other call flow related information.

Field	Description
Connection pool	Initial Size - The initial number of connections that are created when the pool is started. Max Active - The maximum number of active connections that can be allocated from this pool at the same time, or -1 for no limit. Max idle - The maximum number of connections that can remain idle in the pool, without extra ones being released, or -1 for no limit. Min idle - The minimum number of connections that can remain idle in the pool, without extra ones being

	created, or zero to create none. Max wait - The maximum number of milliseconds that the pool will wait (when there are no available connections) for a connection to be returned before throwing an exception, or -1 to wait indefinitely.
Transactions	Read only - The read-only state of this connection created by this pool. Transaction isolation - The default TransactionIsolation state of connections created by this pool.
Validation	Validation query - The SQL query that will be used to validate connections from this pool before returning them to the caller. If specified, this query MUST be an SQL SELECT statement that returns at least one row. Test on borrow - Indication of whether connections will be validated before being borrowed from the pool. The Validation Query must be set. Test on return - Indication of whether connections will be validated before being returned to the pool. The Validation Query must be set.

Database pooling parameters shouldn't be modified unless you really know what you are doing.

Adding additional database drivers

Integration server and Visual Dialplan are shipped with JDBC drivers for the following databases:

- MySQL
- Sybase
- Microsoft SQL
- Postgres SQL
- JDBC ODBC bridge

Those drivers are stored in the /jdbc subfolder in the Integration Server and Visual Dialplan installation folders.

If you need to access a database for which Integration Server and Visual Dialplan does not have JDBC drivers for, you will have to copy JDBC drivers for your database in the /jdbc subfolder in the Integration Server and Visual Dialplan installation folders. Both Integration Server and Visual Dialplan need to be restarted after the drivers are copied in the /jdbc subfolder.

Note:

Some of the out of the box JDBC drivers shipped with Integration Server and Visual Dialplan are open source versions and are not recommended for production systems. It is recommended to replace them with the JDBC drivers provided by your database vendor.

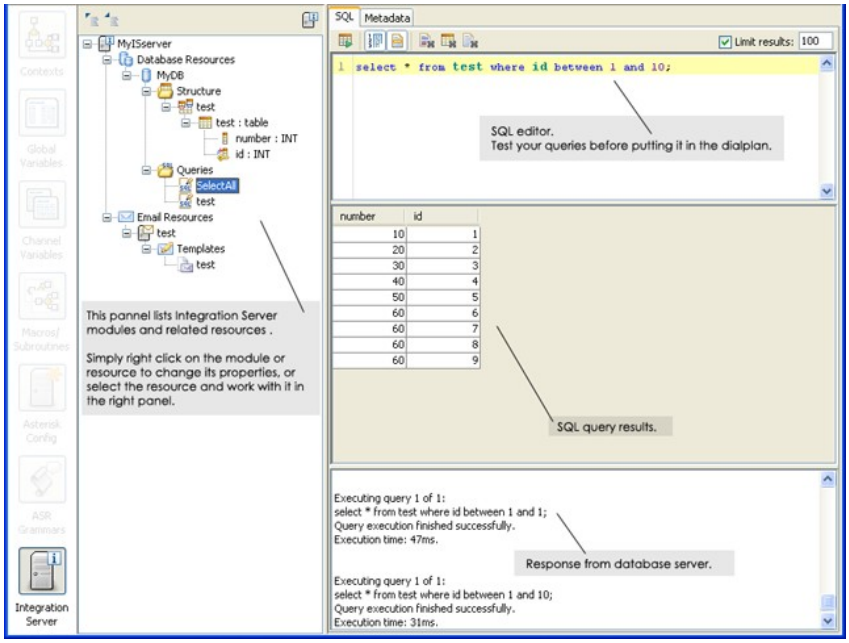
Embedded database

Integration Server is shipped with embedded HSQL database (http://hsqldb.org/). To create a connection to the embedded database select **IS Embedded Database** from the Type drop down in the Database Properties panel.
Default port that this embedded database listens on for the JDBC connections is **9112**. The name of the database is **isdb**.
Username and password used to access the embedded database are the same as the ones for Integration Server; **admin**/**admin** by default.

Database module view

The Database module view consists of the following panels:

- SQL query editor
- SQL query result panel
- Database response panel
- Metadata panel

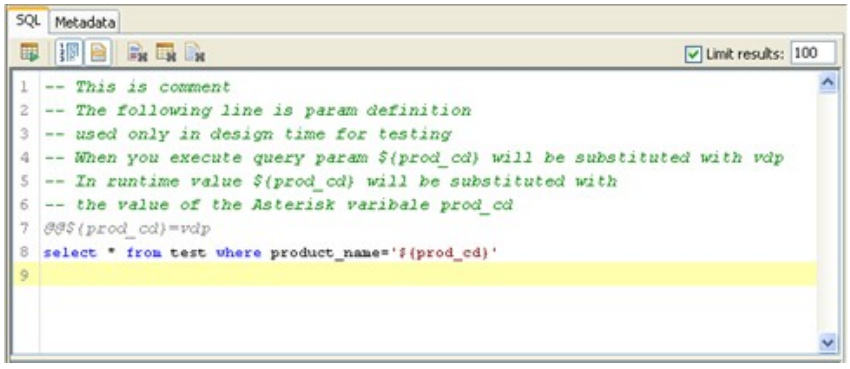


SQL query editor

This is the place to type and test SQL queries before using them in the dial plan.
Simply type in the SQL query, click on the Execute query button (ctrl+Enter) and the query will be executed.
The result set will be displayed as well as the database server log records related to this query.

You can also use parameters (dial plan variables) within SQL query. Simply define the parameter and use it in the query. The parameter will be used at design time only and replaced with Asterisk variable value at run time. Here is an example.

```
-- This is the comment.
-- The following line is parameter definition used only in the design time.
@@${ID}=123
-- When you execute the query in the SQL query editor
-- the parameter ${ID} will be replaced with number 123.
-- In runtime ${ID} will be replaced with Asterisk variable ${ID} value.
select * from lic_info where product_id = '${ID}'
```

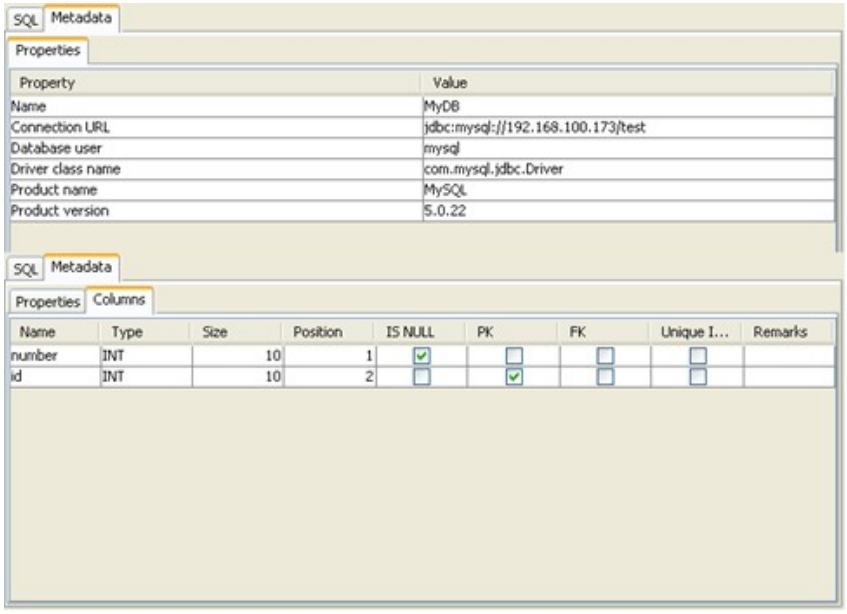


You can also limit the maximum number of returned rows (default value is 100).

SQL query result panel
Returned result set will be displayed here.

Database response panel
Database server log records related to executed query will be displayed here.

Metadata panel
Under this panel you can check the database connection parameters like Connection URL, database user name, database server version, table names, column names and properties and similar.

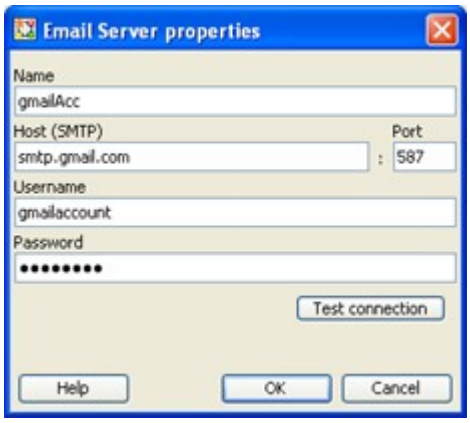


Email module

Send emails from the dial plan

Basically this module is designed to simplify email sending from within the dial plan. The module will handle connection to the SMTP server and send plain text or HTML emails.

To create a connection to the SMTP server simply right click on the selected *Email resource node* and choose *New email server* from the drop down menu.



Field	Description
Name	Email server connection name.
Host (SMTP)	URL or the SMTP server (for example smtp.gmail.com).
Port	The port that SMTP server declares for email clients (the same port that your email client use). For plain text authentication it is usually port number 25 but it may vary depending on the authentication type and SMTP server. For example, gmail usually uses port number 587.
Username	Email account username (the username you type to login to your email account).
Password	Email account password (the password you type to login to your email account).

Note:

Integration Server and connection to SMTP server should be configured properly in order to use SendEmail component

Embedded email server

Integration Server is shipped with embedded JES email server (http://www.ericdaugherty.com/java/mailserver/). To create a connection to the embedded email server use the port **9113**.
Username and password used to access the embedded SMTP email server are the same as the ones for Integration Server; **admin**/**admin** by default.

Email module view

This is the place where email templates should be defined. Once the email template is defined it can be used to send emails from the dial plan using SendEmail component.

All dial plan variables used in the email template, ${variable}, will be replaced with its corresponding values at runtime.

For example, the HTML email template, with *name* variable, and a predefined value of *Michael* , for the email preview/test purpose only (at runtime the variable *name* will be replaced with the value of the *name* dial plan channel variable), an will look like this:

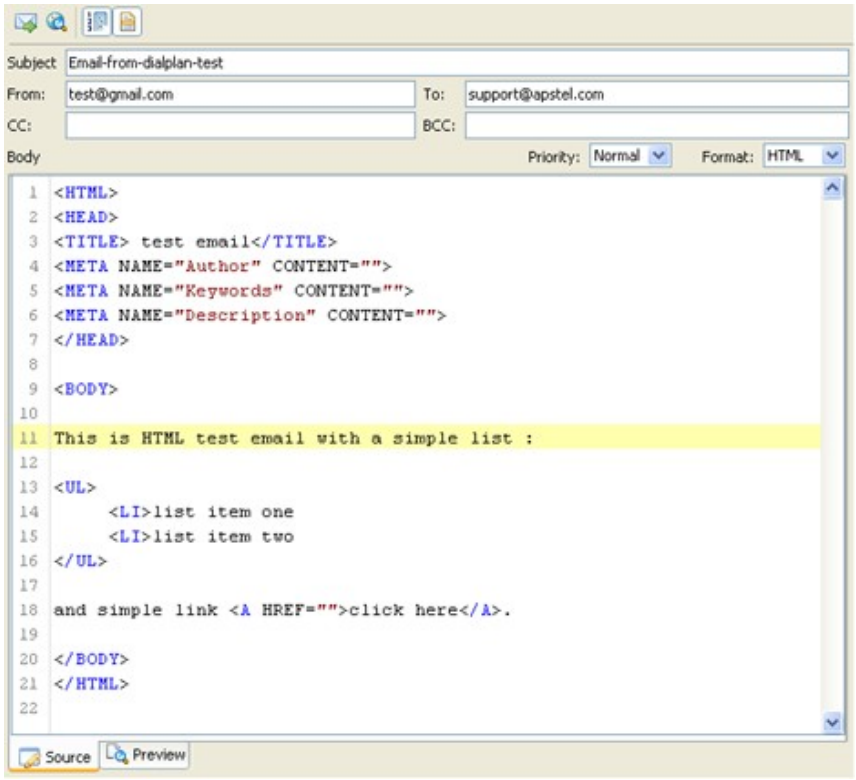
<!@@ ${name}=Michael>

<h1>Test Mail</h1>

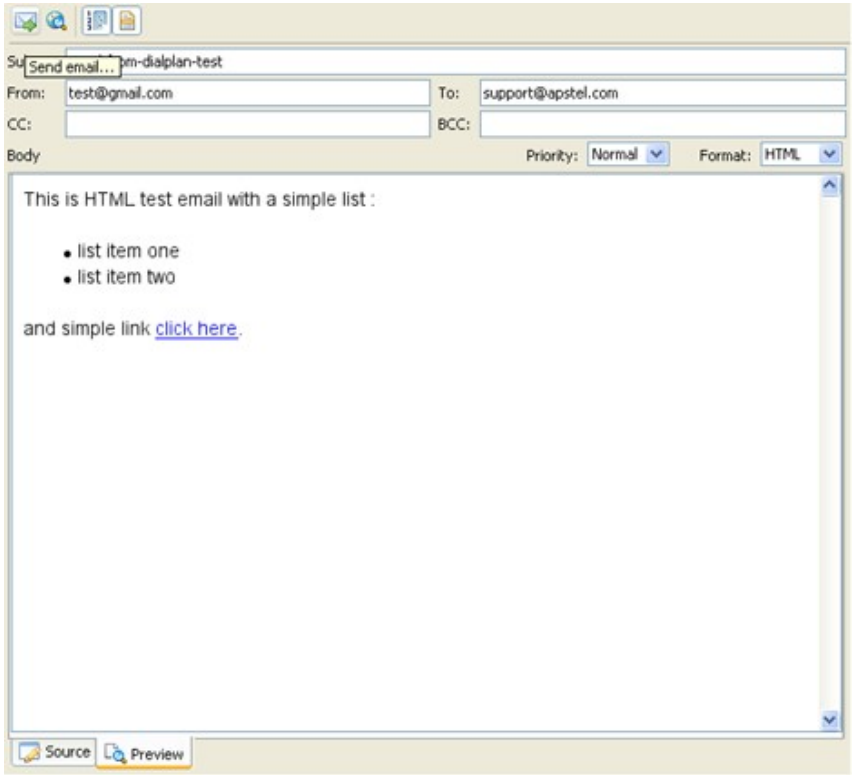
Hello ${name},

Thank you

Besides standard email parameters like Subject, From, To, CC and BCC fields there is also ability to set email priority (Low, Normal, High) and email type (HTML or plain text).



Before using the email template make sure to preview it in Visual Dialplan using the Preview panel, and preview it in your default web browser by clicking on the Preview in browser button, or send a test email by manually clicking on the Send email button.

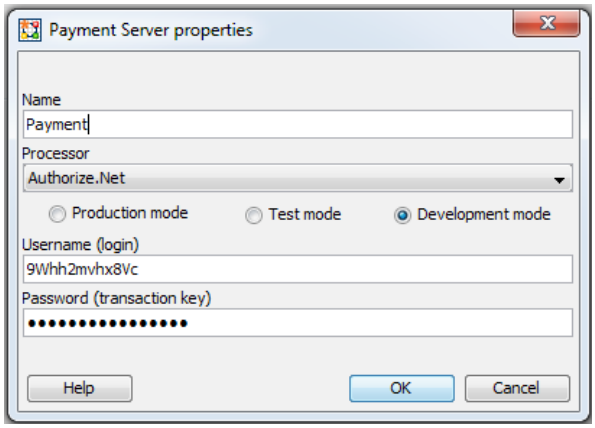


Payment module

Process payments from the dial plan

This module is designed to process credit card payments from within the dial plan. The module will handle connection to the payment server and will process payments.

To create a connection to the payment server simply right click on the selected *Payment resource* node and choose New payment server from the drop down menu.



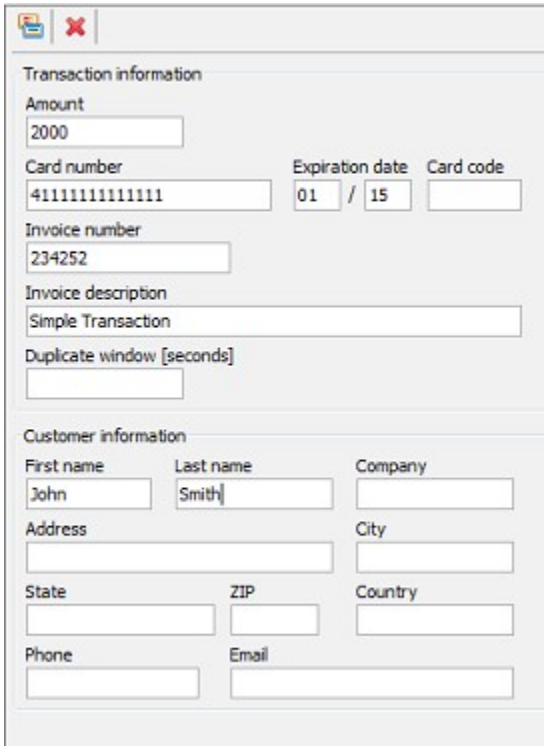
Field	Description
Name	Payment server connection name.
Processor	Choose credit card processor (for example Authorize.NET). Pick one of the following options: 1, Production mode 2. Test mode 3. Development mode
Username	Merchant login ID.
Password	Merchant transaction key.

Note:

Integration Server and connection to Payment server should be configured properly in order to use ProcessPayment component.

Payment module view

This is the place where payment transaction should be tested.



Click on the "send payment" button to initiate payment transaction.

Integration Server Licensing

Integration Server (IS) is licensed per channel (simultaneous call) per IS module, and comes bundled with several free licenses:

- 1 free channel license for database module (one simultaneous call with database query)
- 1 free channel license for email module (one simultaneous call with email initiation)
- 1 free channel license for payment module (one simultaneous call with payment initiation)

This means you can test and develop database, email and payment driven Asterisk dial plans for free, without purchasing an additional Integration Server license.

In case you anticipate more than one simultaneous call with database query, email or payment initiation you may consider purchasing additional channel licenses. For example, if you anticipate five simultaneous calls with database query and three simultaneous calls with email initiation (send emails from the dial plan) you should purchase 5 - 1 = 4 channel licenses for database module and 3 - 1 = 2 channel licenses for email module.

Integration Server licenses can be purchased directly from the Integration Server web interface on the Licenses page. A Registration Code issued to you by Apstel, after purchasing, should be entered on Licenses page (IS web interface) in order to activate channel license(s).

When the Integration Server is registered on a computer, the registration code is tied to the computer Network Interface Card (NIC).
The Integration Server license allows software installation on one computer only.

In case you need to change or replace the computer where you installed the software due to the hardware failures, upgrade to new hardware or similar, you can contact us via email (support@apstel.com) and we'll release the license associated with old/broken hardware so you can reuse the same license with your new hardware.

In case you need to run more than one Integration Server instance you would need to purchase additional licenses.

Under the terms and limitations of the License Agreement, Apstel grants you a nonexclusive, nontransferable license, without rights to sublicense, to:

- Make backup copies of the Integration Server for the purpose of reinstalling Integration Sarver in case of hardware failure, upgrade to new hardware or similar
- Re-register the Integration Server on a computer after the change of the NIC
- Re-register the Integration Server on a computer in case of the computer hardware failure, upgrade to new hardware or similar
- Use the Registration Code to activate channel licenses to the extent permitted by your payment of applicable license fees under an Apstel approved licensing model
- Use the documentation accompanying the Integration Server in connection with permitted uses of the Integration Server

For the full license description please refer to the LICENSE.TXT document located in the application installation directory.

Chapter

3

Integration Server Components

Integration Server components are places on IS sheet in Visual Dialplan. This category contains components responsible for communication with Integration Server.

DbQuery

Connects to the database server, executes query, returns result set back and disconnects from the database server

This is extremely powerful component that enables access to the database from the dial plan.
The component requires Integration Server (IS) and can be used to execute SQL statements against any databases that provides JDBC driver. Integration Server out of the box supports the following database servers: MySQL, Microsoft SQL, Sybase, Postgres and JDBC ODBC Bridge.

Here is how it works.

Integration Server (IS) is standalone server application that communicates with Asterisk server through AGI (Asterisk Gateway Interface) and acts as an AGI server that completes AGI requests initiated from the Asterisk dial plan.

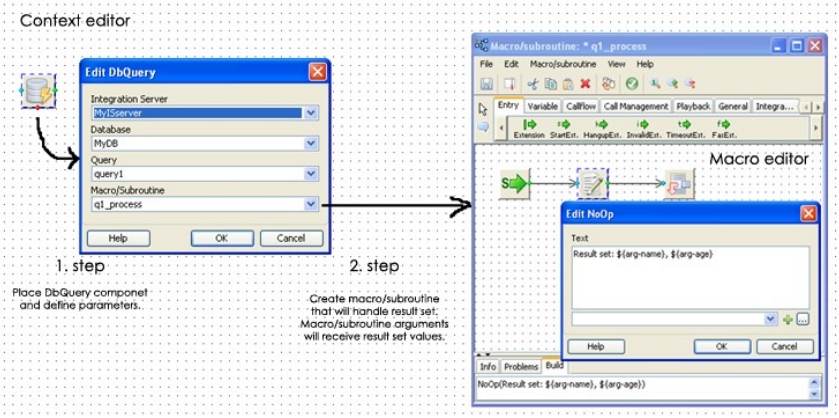
An Asterisk Manager user is required in order to execute AGI calls. Visual Dialplan automatically creates an Asterisk Manager user named is_user with randomly generated password for this purpose. You can later modify both, the Asterisk Manager username and password, if required.

Visual Dialplan deploys traditional extensions.conf code to the Asterisk server. In case the Integration Server functionality is required this code will contain AGI calls to Integration Server. At the same time, Visual Dialplan deploys resources to Integration Server required for those AGI calls.

When new call arrives at the Asterisk server the extensions.conf code (call flow) is executed and AGI request are sent to the IS. IS connects to remote database server, executes SQL queries, returns result set (result of SQL query execution) back to the dial plan and then disconnects from the database server.

More precisely, depending on the selection in the DbQuery component the result set will be stored in the variables (useful in case the result set is one row), processed with the subroutine/macro (in case more than one row is returned from the database) or the result set will not be processed (in case of the update or insert SQL statement).

In case the result set contains several rows the macro/subroutine will be calls several times, as many times as there are returned rows in the result set.



Make sure to define macro/subroutine arguments that will accept SQL query result set values. For example, if you execute the following SQL query:

select name, age from employees

the macro/subroutine should have at least two arguments, one to accept return value for name and the other to accept return value for age. If you define the following two arguments *EmployeeName* and *EmployeeAge* you will have two variables in macro/subroutine named

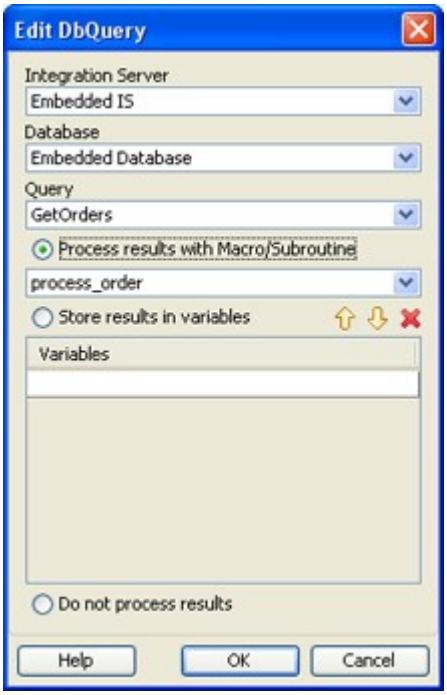
arg-EmployeeName and *arg-EmployeeAge* that will accept return values.

Visual Dialplan automatically creates variables with prefix 'arg-' for entered macro/subroutine parameters.

Note:

- Integration Server and the connection to database server should be configured properly in order to use DbQuery component
- Make sure to set the database remote access privileges properly in order to access the database server from Integration server
- Make sure to define macro/subroutine arguments that will accept SQL query result set values
- Integration Server creates IS_DB_RESULT_INDEX variable and sets its velue to the current number of the row in the result set. For example, if the result set contains 3 rows, the IS_DB_RESULT_INDEX variable will be one when subroutine/macro works with the first row of the result set, then value two when subroutine/macro works with the second row and lastly value three when subroutine/macro works with the third row of the result set.
- When working with update statement, Integration Server creates IS_DB_UPDATE_COUNT variable and sets its value to the current number of updated rows.

Property Editor



Field	Description
Integration Server	Select one of defined Integration Servers at the Integration Server view in Visual Dialplan.
Database	Select one of database server connections (under Database Resources) defied for selected Integration Server.
Query	Select one of defined SQL queries (under Queries) defined for selected database server connection.
Process results with Macro/Subroutine	Select Macro/Subroutine that is responsible for handling SQL query results. Make sure to define macro/subroutine arguments that will accept SQL query result set values. For example, if you execute the following SQL query: select name, age from employees the macro/subroutine should have at least two arguments, one to accept return value for name and the other to accept return value for age. If you define the following two arguments EmployeeName and EmployeeAge you will have two variables in macro/subroutine named arg-EmployeeName and arg-EmployeeAge that will accept return values. In case the SQL query returns one row the macro/subroutine will be called one time, but if SQL query returns 2 or more rows the

	macro/subroutine will be called as many times as the number of return rows is.
Store results in variables	Select variables that will store the SQL query result values. For example, if you execute the following SQL query: select name, age from employees where id = 1 the variable table should have two variables, one to accept return value for name and the other to accept return value for age. Option "Store results in variables" should be used only when SQL query returns only one row of data. If SQL query returns 2 or more rows the macro/subroutine will be called only for the first row of data.
Do not process results	Select this option if results should not be processed (e.g. insert, update or delete SQL statements).

Note:

You must create macro/subroutine manually, as well as the macro/subroutine arguments.

SendEmail

Connects to SMTP server and sends email

This is powerful component that work with emails from the dial plan.
The component requires Integration Server (IS).

Here is how it works.
Integration Server is standalone server side application that communicates with Asterisk server through AGI (Asterisk Gateway Interface) and acts as an AGI server that completes AGI requests initiated from an Asterisk dial plan. Visual Dialplan deploys traditional extensions.conf code at Asterisk server and email resources at Integration Server (email template and similar).

When a new call arrives at the Asterisk server the extensions.conf code (call flow) is executed and AGI request is sent to IS. IS connects to remote SMTP (email) server, authenticates and sends email.

Note:

Integration Server and connection to SMTP (email) server should be configured properly in order to use SendMail component.

All variables (e.g. ${variable}) will be replaced with its values.

For example, HTML email template, with *name* variable, and predefined value to *Michael* , for the email preview/test purpose only (in run time variable *name* will be replaced with the value of *name* dial plan channel variable), may look like this:

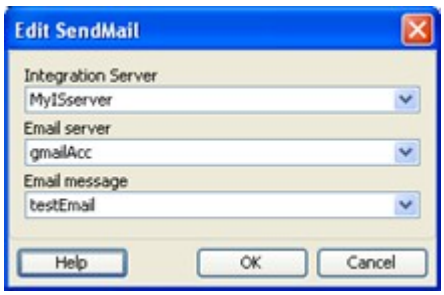
<!@@ ${name}=Michael>
<h1>Test Mail</h1>

Hello ${name},

This is test email.

Thank you

Property Editor



Field	Description
Integration Server	Select one of defined Integration Servers at the Integration Server view in Visual Dialplan.
Email Server	Select one of SMTP (email) server connections (under Email Resources) defied for selected Integration Server.
Email message	Select one of defined email templates (under Templates) defined for selected email server connection.

ProcessPayment

Connects to payment server and process payments.

This is powerful component that process payments from the dial plan. The component requires Integration Server (IS).

Here is how it works.

Integration Server is standalone server application that communicates with Asterisk server through AGI (Asterisk Gateway Interface) and acts as an AGI server that completes AGI requests initiated from an Asterisk dial plan.

Visual Dialplan deploys traditional extensions.conf code at Asterisk server and payment resources at Integration Server.

When a new call arrives at the Asterisk server the extensions.conf code (call flow) is executed and AGI request is sent to IS. IS connects to remote payment server, authenticates and process payment.

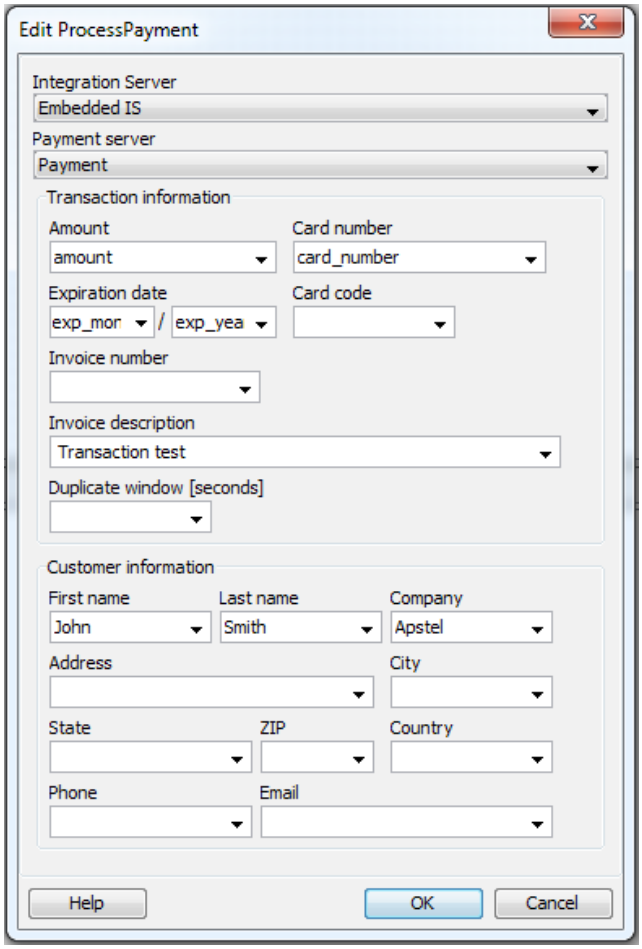
The component is located on the Integration Server sheet.

Note:

Integration Server and connection to processor server should be configured properly in order to use ProcessPayment component.

All variables (e.g. ${variable}) will be replaced with its values.

Property Editor



Field	Description
Integration Server	Select one of defined Integration Servers at the Integration Server view in Visual Dialplan.
Payment Server	Select one of Payment server connections (under Payment Resources) defied for selected Integration Server.
Transaction information	This section takes transaction information such as: Amount, Card number, Expiration date, Card code, Invoice number, Invoice description, Duplicate window
Customer information	This section takes customer information such as: First name, Last name, Company, Address, City, State, ZIP, Country, Phone, Email.