



Integrating your Magento[®] store with backend ERP systems

This whitepaper helps you understand how to improve operational efficiency by integrating Magento with an external application with the help of APIs.

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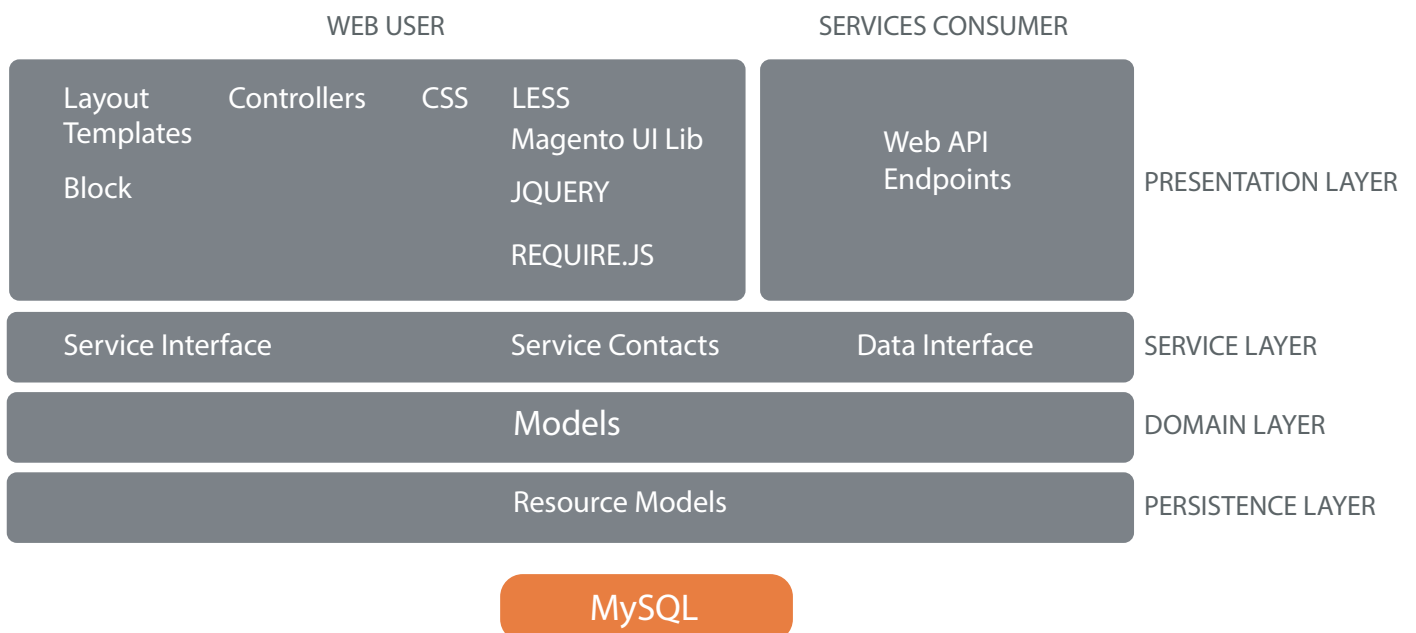
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New Platform Capabilities (Magento)



Integration is a complex business process mapping which requires deep knowledge and experience on the business processes to deliver smooth data interoperability between one or more applications. With the right integration setup, one can gain operational efficiency which may lead to potential revenue growth of the business.

Magento is a flexible platform which supports extensive APIs and off-the-shelf extensions to expose data from the application. The framework that Magento provides is effectively architected in such a way that any external extension installed on top of the application gets automatic benefit of its integration framework. The whole data structure is maintained in EAV models which can expose themselves to the external world easily.



Magento Architecture

consists of four layers:

- Presentation
- Domain
- Service
- Persistence

The Presentation layer is dealing with Web users and Service Consumers. The web users get access to the web pages through this layer. The controllers available through the interface pick the proper layout and template to create the View of a page. Similarly, Web API endpoint is also exposed through the presentation layer in the same way as the pages. Hence, for a developer, the data is exposed through Service Contract in the same way as that of the APIs.

The Service Layer provides an interface for data objects. It provides the data models with proper business logic in place. The data passing through this layer ensures it is properly checked against the business process definition.

The Domain Layer is providing interfaces for persistent data objects. After the persistent data is fetched into the memory, objects are laid into the object hierarchy in the form of business entities. These entities form the Domain layer.

The Persistence layer is the database layer which interacts with the database. This layer transforms the models into queries to save and retrieve data.

Advantages of a Magento Store

Community : The main advantage of Magento is its community. It is big, talented and growing very fast.

Architecture : Even though Magento seems to be over-architected, there are a very small number of eCommerce open source platforms available that meet most of the business requirements. Magento is built to scale from 1 to a million, avoiding common pitfalls for developers. Code re-use, maintainability, debugging, support, etc. are all huge, expensive problems that eCommerce solutions providers must tackle. Magento makes them all a breeze.

Out-of-the-box feature set : Magento handles concepts properly and in an organized manner. Stock Magento comes with Simple, Configurable, Grouped, Bundled, Virtual and Digital Products. You can use it to sell amusement park tickets and digital music at the same time, without any extensions.

Extensions : Magento is gifted with a whole bunch of big marketplace where you can find any feature which you might virtually think of, readily available as an extension. The extensions are mostly highly performant because of community while being very affordable.

Why is Integration Necessary?

With the current growth of data and the online marketplace, Magento is handy in gaining access to most of the features existing in the market. , However, it is not entirely equipped with all the features a business might require. With the growing trend of online businesses, there is a need for an external system to handle other departments of the business such as manufacturing, vendor management, shipment etc. To deal with the same, every business installs their Backend ERP system and also a set of other applications which are capable of handling their specific business requirements. The free flow of data between these applications is very much necessary because of following benefits:

Saving the end-user client personnel costs

By using iPaaS solution, industrial clients save the cost of hiring, personnel evaluation, continuous education, time to stay current on technology, and so on. Additionally, it is difficult for a non-system integration company to select the right people, and bad hires are an expensive mistake. However, it is advisable to have a small internal team to manage projects that are contracted to service providers. The size of that team depends on the magnitude of projects that are performed.

Improving the quality and reliability of the integration project

No one person or company knows everything. The integration solution provider often brings to the table, an understanding of mechanical, process and business intelligence issues and knows how to integrate those disciplines into a working system.

Accountability for time and resources

System integrators must remain on a budget to maintain a sustainable business. Whether contracts are fixed or variable, costs, labor and materials must be managed based on the upfront plan and contract. In short, system integrators are accountable for time and resources.

Knowing and applying current industry standards

The software industry is growing fast and rapidly changing. With new techniques in place, the external vulnerabilities to the systems are also increasing. If you are not an expert in the domain and not up to date to the current technological advancements, you are also exposed to these vulnerabilities.

Bringing innovation and experience from industry

A large majority of system integrators work in multiple vertical industries. Their inherent exposure to different industries results in a breadth of knowledge that can't be learnt at a show, through training or from a magazine. It comes from doing projects. System integrators learn to recognize when the experience gained in one application and industry can be applied in another. This capacity allows system integrators to bring innovative solutions to resolve an end-user client's challenges.

Having the right skill set for project management and execution

Project management and execution skills are very different skill sets. A good system integrator has both. An indication of the importance of these skills to the success of a project is that three of the nine sections of the CSIA Business Best Practices and Benchmarks Manual focus on project management and execution. Those skills are included in a good iPaaS service provider's best practices and make the difference in project success or failure.

Knowing how to manage project risks

Risk is the most significant enemy of a system integrator, so it is taken seriously. Recognizing project risks comes with experience and is a natural process for integrators. Risk management begins at the planning phase of a project and emphasizes once again on what was mentioned in the second reason above, namely the importance of a system integrator being involved in the early stages of a project. It stands to reason that good risk management is in the best interest of the end-user clients even though a client-integrator risk discussion can be uncomfortable.

Providing proper documentation for future reference

It is common for internal staff to move onto the next project and not properly provide drawings, software code and operation manuals. The staff often has good intentions of doing the documentation but it just gets pushed to the background with hopes of doing it later, but later never comes. Since final documentation is typically included in the contracted scope of supply for the system integrator, the integrator is held accountable for providing it and the end-user client can be assured of getting it. Proper documentation is important for maintenance, support and scalability.

Choosing the best hardware and software for an application

Knowing what products are available for an automation solution is important. And knowing which ones are the best solutions is equally important. Independent system integrators are not tethered to any one automation supplier, so they act in the best interest of the end-user client when making selections. As system integrators, they know how to integrate – how to make best-in-class products from multiple suppliers work in tandem. Some product suppliers also engage in system integration work, but they are biased towards their own products. Therefore, even if those products are not the best solution and don't deliver the highest value, they are used anyway. Thereby, the full potential of a project may not be recognized.

Providing expert technical staff on demand

End-user clients sometimes have a temporary need for additional staff to assist internal staff when there are too many concurrent projects. Most system integrators can provide engineers, designers, programmers and so on during those busy periods. Coming from a system integration company, the personnel is effective immediately after safety orientation. When the project load diminishes, they simply return the integrator. There are personnel staffing companies but those from system integrators are inherently more efficient. Moreover, equally capable backup is available, if necessary.

Integration is basically about getting two IT Systems to interoperate, where data and /or logic in one system is needed in the other system. One of the major challenges is to create a solution which helps you achieve the data integration challenges more efficiently following best practices.

How does Magento help in Integration?

As mentioned earlier, Magento has built its architecture in such a way that every business object that you define inside your code can either be exposed through Web interfaces or a Web API interface. In case of Web interfaces, the consumers use the data in form of GUI, while in case of Web API, it is in the form of data only.

Magento supports both REST (Representational State Transfer) and SOAP (Simple Object Access Protocol) based application integration. The Access layers of are available in Magento, properly architected such that it is consistent throughout the data endpoints irrespective of protocols used or authentication type provided. There are three types of user access permissions available for Magento API:

Guest User Access: They have access to resources only which are explicitly exposed for anonymous access.

Integration Access: They have access to resources which are authorized by configuration.

Customer: They have access to resource with self or anonymous permission.

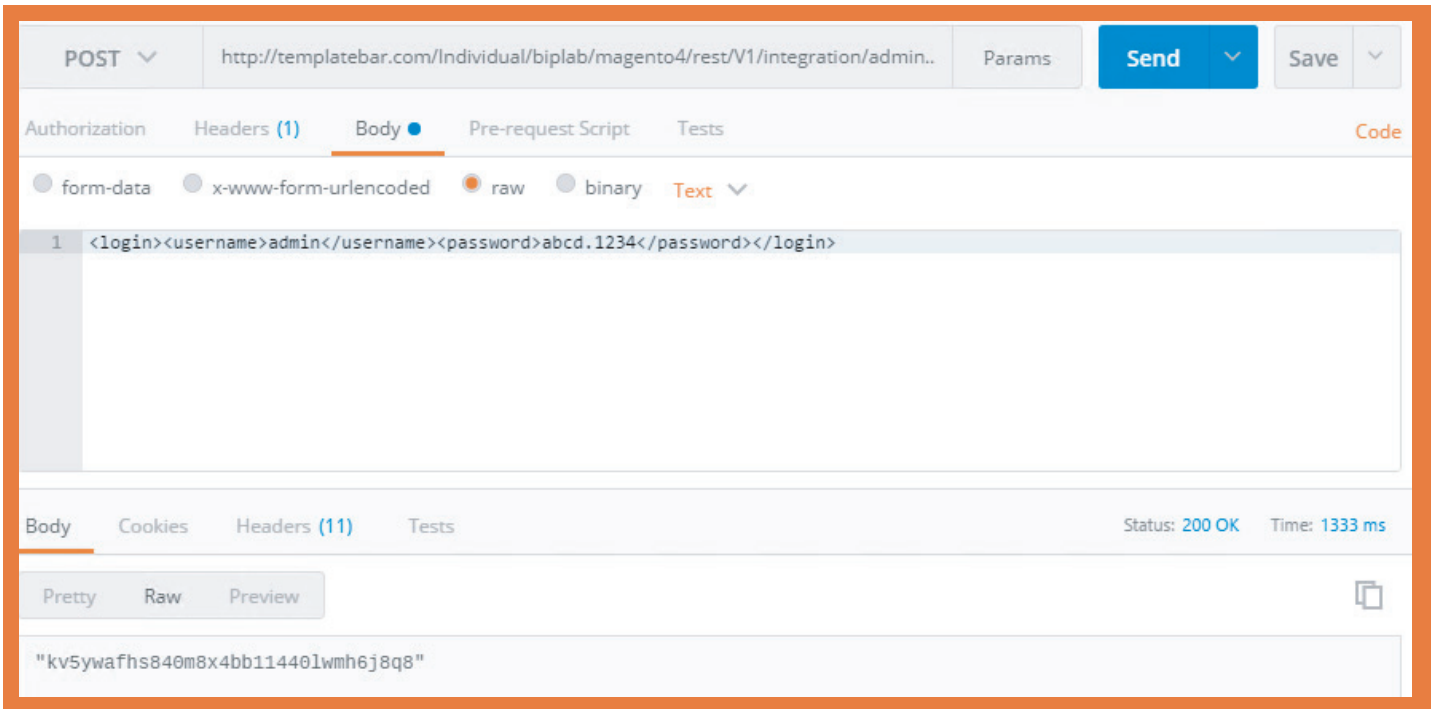
Based on the permission of a session for accessing data, proper authentication will be automatically applied by the service engine of Magento. There are three types of authentication supported for Magento:

Token based authentication

Here the user provides the username and password during the initial connection and receives an authentication token in response. This authentication token needs to be used for every request to follow until the token expires.

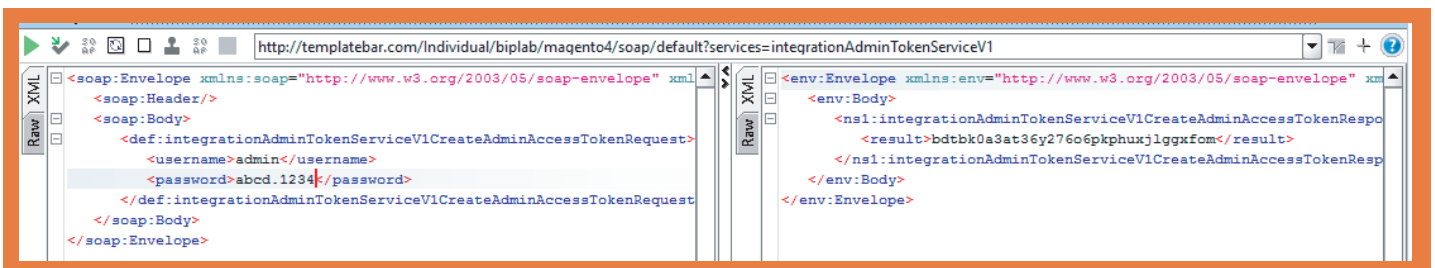
Here is an example of a request made through Postman:

Using REST Protocol



From the above image, we have called our Magento using Postman to get the authentication token. The Token is correctly generated and returned as a response in XML or JSON format which can be used for all requests that follow.

Using SOAP Protocol



The same token can also be generated using SOAP UI for SOAP requests to the same instance of the Magento store, the basic response is returned in SOAP format with proper envelope structure maintained for SOAP-based requests.

Session – based authentication

Here the Magento API framework uses your session in order to authorize access to a resource. As a Magento user, if you have login and point, try to access the link :

<http://templatebar.com/abhishek/magento/rest/v1/customers/me>

It will give you a proper response of your own user data.

```
<response>
  <id>2</id>
  <group_id>1</group_id>
  <created_at>2016-08-17 08:48:00</created_at>
  <updated_at>2016-08-17 09:32:42</updated_at>
  <created_in>Default Store View</created_in>
  <email>abhishek.s@insync.co.in</email>
  <firstname>Abhishek</firstname>
  <lastname>Sur</lastname>
  <store_id>1</store_id>
  <website_id>1</website_id>
  <addresses/>
  <disable_auto_group_change>0</disable_auto_group_change>
</response>
```

As a customer, you will be automatically authorized to access resources with self and anonymous permission. It also works for admin accounts if you try to access resource for which your admin account has permission.

OAuth-based authentication

For 3rd party authentication, Magento also allows Open Auth Standards OAuth 1.0a. With this authentication technique, your Magento API acts as a service that allows access to a resource only after authentication is gotten from resource owner. To enable, you need to go to System Integrations and add new integration without "Identity link URL" and "Callback UR:". After you do this, you can use Consumer key, Consumer Secret, Access Token and Access Token Secret to access the desired resource. You can see the action in Postman:

The screenshot shows the Postman interface for configuring an OAuth 1.0a authentication request. The URL is `http://templatebar.com/Individual/biplab/magento4/index.php/rest/V1/customers/2?oauth_consumer_key=gqcrenjfecv6ud...`. The request type is GET. The configuration is as follows:

Field	Value	Notes
Type	OAuth 1.0	
Consumer Key	gqcrenjfecv6udom10gqilrpouieiq1	
Consumer Secret	fnlmnenkoa3t78a8tkk98ji5npvvi6	
Token	knshu36hurtakb3ln3t2y41k4qvc0yo	
Token Secret	dkqwoxine83911tfjsavt7k8rotunq7	
Signature Method	HMAC-SHA1	
Timestamp	1492496194	
Nonce	abXxCV	
Version	1.0	
Realm	Optional	

Additional settings on the right:

- Add params to header
- Add empty params to signature
- Encode OAuth signature
- Save helper data to request

Postman will auto-generate the timestamp and nonce values if left blank.

In the above figure, you can see that we have provided all information about OAuth 1.0a using Postman. Now if we authenticate using these details, you will get the requested data after doing the authentication.

When I call the Customer data with OAuth implemented through postman, I can get the data as mentioned above.

OAuth is an open standard for token-based authentication and authorization on the internet. There are a large number of applications which openly support OAuth and with the support in Magento, your eCommerce sites can avail huge benefit from these apps as well and also your API will be exposed safely.

```
1  {
2  "id": 2,
3  "group_id": 1,
4  "default_billing": "5",
5  "default_shipping": "5",
6  "created_at": "2016-12-28 09:34:02",
7  "updated_at": "2016-12-28 10:03:29",
8  "created_in": "Default Store View",
9  "email": "karun@.com",
10 "firstname": "karun",
11 "lastname": "nair",
12 "store_id": 1,
13 "website_id": 1,
14 "addresses": [
15 {
16 "id": 5,
17 "customer_id": 2,
18 "region": {
19 "region_code": null,
20 "region": null,
21 "region_id": 0
22 },
23 "region_id": 0,
24 "country_id": "BS",
25 "street": [
26 "alley"
27 ],
28 "telephone": "98365256",
29 "postcode": "12345",
30 "city": "new arc",
31 "firstname": "karun",
32 "lastname": "nair",
33 "default_shipping": true,
34 "default_billing": true
35 }
36 ],
37 "disable_auto_group_change": 0,
38 "custom_attributes": [
39 {
40 "attribute_code": "customer_type",
41 "value": "1"
```

Magento® 1.9 Magento® 2.0

One of the greatest news of recent times is the release of completely revamped Magento 2.0. While working with the all new Magento, you will notice there are subtle differences between the two platforms. Let us discuss some of the improvements on Magento 2.0 over 1.9.

Use of modern technologies:

Magento 2.0 is built using most recent technology that is prevalent in the market. The website is built using PHP 5.4 and 5.5 with HTML5 and CSS 3.3. The latest version of jQuery is used as well. A lot of other components like RequireJS, CSS pre-processors, Full page caching, etc. are also used to build the website.

Simple customization:

If you are a technical person, Magento 2 offers straightforward layout manipulation techniques better than that of its predecessor. The features are easy to use, “drag and drop” interface, will permit every merchant to modify blocks and containers with no substantial effort.

Component oriented modules:

Magento 2 is built with strong decoupling and very less direct dependencies between modules. This allows components to be designed and developed such that customers can easily enable, disable, replace component per the need.

Proper file structure:

Even though Magento has always been good in creating a proper file structure for the useful files, with Magento 2 the structure is even more polished. The “media”, “error”, “skin”, “js” are some of the examples of folders.

Pre-Architected API framework:

With Magento 2.0, the API framework built within the application is pre-architected from its inception. Magento 1.X APIs were delivered on Ad hoc basis and there were a lot of pitfalls in terms of performance and maintainability. Magento 2.0 ships with both SOAP and REST based API and discards the very old XML – RPC based APIs. In addition to this, Magento also provides a set of generic interfaces for programmers to programmatically interact with a single freestanding Magento instance without writing native Magento/PHP code. The Magento 2 REST API is designed to allow client side Javascript code to interact efficiently. The Magento 2 SOAP and REST APIs are versioned. This implies but does not guarantee, that old API calls will continue to work identically in future versions of Magento. If a new functionality is needed, the API call will be presumably versioned. Since Magento 2 is such a young platform, it's hard to know how stable the business logic in these methods will remain.

WSDL is refactored out:

With Magento 2, the WSDL schema is no longer a single file, according to newer constructs; the Magento 2 WSDLs are factored out into multiple files which in turn improves the performance of the APIs. New modules will join the WSDL seamlessly without altering much of source code.

Persistent data schema improvements:

When you are dealing with an e-Commerce store and your business grows, one of the major concerns is the database operations that your application does and you always want to improve its performance. With Magento 2, the persistent storage layer is considerably improved which helps in the overall performance of the site as well as the APIs. The Magento 2.0 also allows multiple databases for storing data separately, for example, you can have a separate database to store information regarding checkout process while the category and products remain on another instance of the database. This also helps in improving the overall performance of the application.



APPS eCONNECT

as a Use Case for Premium iPaaS Solution

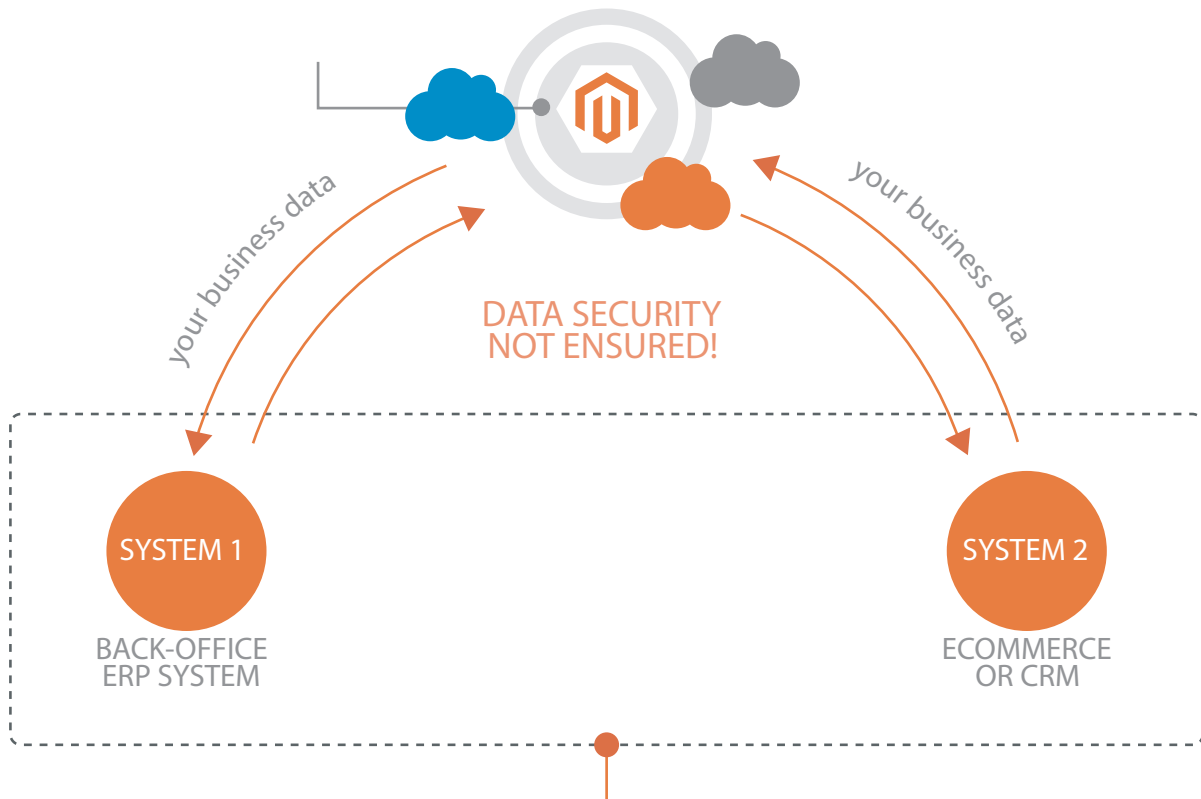
APPS eCONNECT is an iPaaS (Integration Platform as a Service) solution provider which provides integration between Magento 1.9 and/or Magento 2.x solutions with a huge internet of apps. It provides end to end business process integration between two or more applications such that they can seamlessly talk to each other and thereby as an end user, you can choose among a huge number of applications which suits best for you.

Cloud technology is a mainstream part of IT today. All of us are aware of the value proposition of cloud technology – easy provisioning, scalability and cost saving. But even with the myriad benefits, security concerns have always posed a barrier to adoption for many organizations.

Security of any business - critical information in a cloud infrastructure has always been a concern. Although the most reputable cloud providers are certified with some of the big names in the industry and have top-of-the-line security to protect user data, various incidents have proved that there is no such thing as a completely safe cloud system. Despite the stringent security measures, we often hear stories of data hacking with some of the most secured systems and that shakes our belief!

APPS eCONNECT provides a unique value proposition to the customers by giving a hybrid solution which uses the best of both breeds, taking the power of cloud to store configuration while security of business through on-premise data sync. Let us take an example of how a full cloud solution can be laid out. The solutions, which inspired us in the integration space, were taking customer's business critical data on their cloud and then processing it to sync with other systems, which always kept the customer's data at risk. By interconnecting systems over cloud, their customers were sacrificing security for efficiency.

OTHER INTEGRATION SOLUTIONS IN THE MARKET



YOUR SECURE NETWORK

With growth in business, bandwidth consumption is mostly likely to increase, which many customers cite as a barrier in terms of cost. Also, if both of your Ecommerce and Backend ERP system is hosted on your own network, with cloud to cloud synchronization, the transformation will take place in cloud and it will eventually come to the same network again, and thereby you are losing a lot of network bandwidth without any such benefit as such.



APPSeCONNECT

APPSeCONNECT provides a hybrid iPaaS solution which ensures the data is safe on your own secure network and all the transactional data is kept intact inside your premises while the configuration and business related logic is stored securely in our cloud server.

APPS^eCONNECT A hybrid approach

Best of both cloud and on-premise integration



APPSECONNECT CLOUD PORTAL

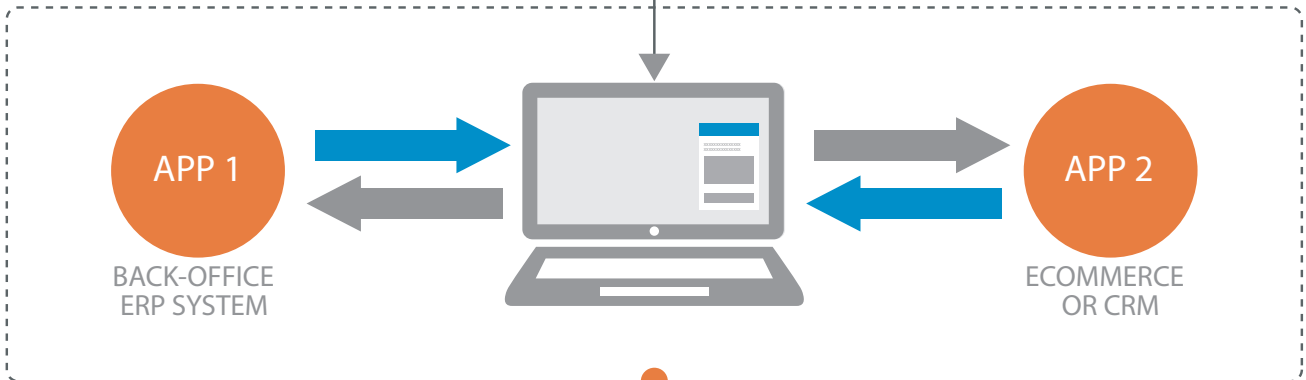
- Configure your connector
- Access from anywhere
- Store settings only
- No data sync through cloud

Direct **data sync** between your systems

Download configuration

APPSECONNECT AGENT APP

- Downloaded from cloud
- Installed in your server
- Connects your systems directly



YOUR SECURE NETWORK

We provide all the functionality, like creating transformation rule, business data mapping, custom function integration, API endpoint declaration, Visual workflow etc. in cloud which will help you to define your business which is securely stored on our cloud servers and is readily available to the environment running on the premise. You can consider our cloud portal as a remote to the 'Agent' application, which can be accessed over the web from multiple devices. That cloud will also give you live stats of all the data synchronization, which is taking place between your integrated systems.

Extending the capabilities of Magento with **B2B Mage** Extension

For APPSeCONNECT, Magento has been one of the premium offerings as always because of long term expertise and developing solutions for more than a decade. We have come up with an extension that can be installed as Magento Extension to enable a gamut of new B2B features. Let us explain some of the feature details that Magento provides when you integrate using APPSeCONNECT.

Dynamic rules for pricing

Pricing rule defines what prices should be applied on products based on certain conditions during price rule creation. After price rule creation one can assign these pricing rules to the B2B customers only and can add as many rules based on the requirements. Pricing rules are maintained in Magento as

- 
- a. **Pricelist**
 - b. **Tier Price**
 - c. **Special Price**
 - d. **Category discount**

Discount Priority

There are specific configurations available with Magento which allow you to prioritize discounts. Once the discounts priority is set up, it will be applied to all websites, but our extension also gives an option to choose separately which websites to apply.

Category visibility

As an admin, he/she can manage category visibility customer group wise. If a category is set to a General customer group, then that group of customers can only view that category. If a category has a parent, then that category should also be set to that group.

Multiple Account Types

With B2B Mage we support maintaining B2B Customer contact person and sales representative where a contact person represents an organization and does various business processes on behalf of his/her organization and a Sales representative work with customers to find what they want, create solutions and ensure a smooth sales process.

Quick order

Quick Order is a feature which allows adding bulk items to an order. It is important to save time, and this feature which automates most of the things can considerably save your time and hence money.

Approval process

With the new B2B extension you can set up a minimum order value for which the orders will be automatically picked for approval. The approval process also allows the administrator to edit orders.

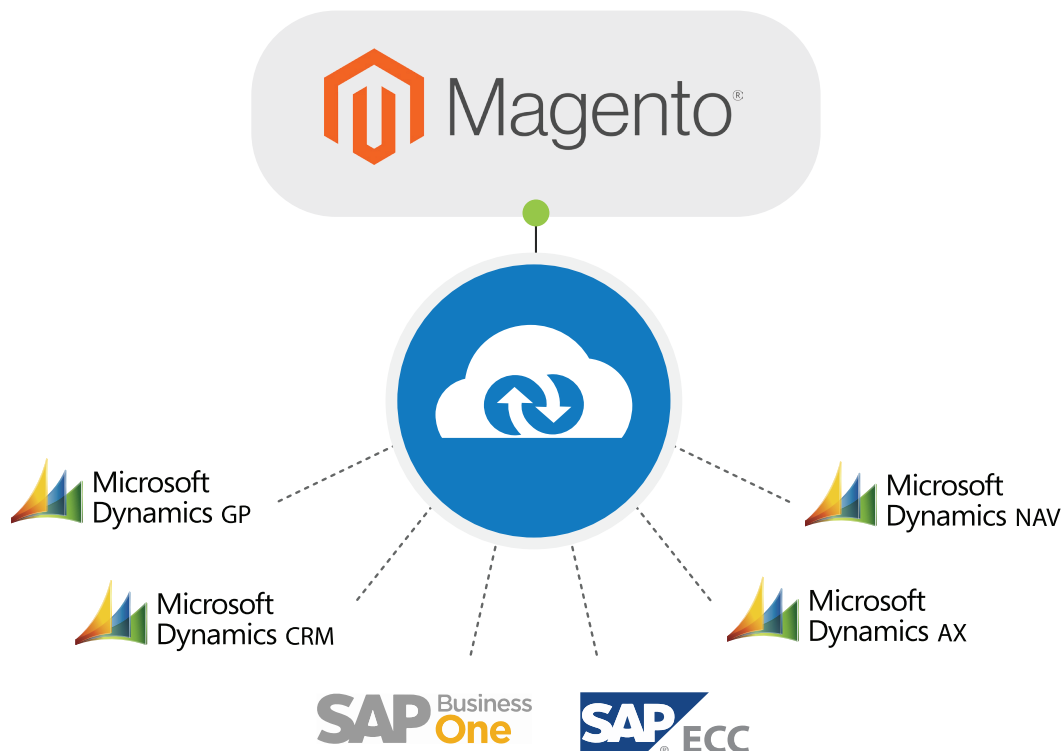
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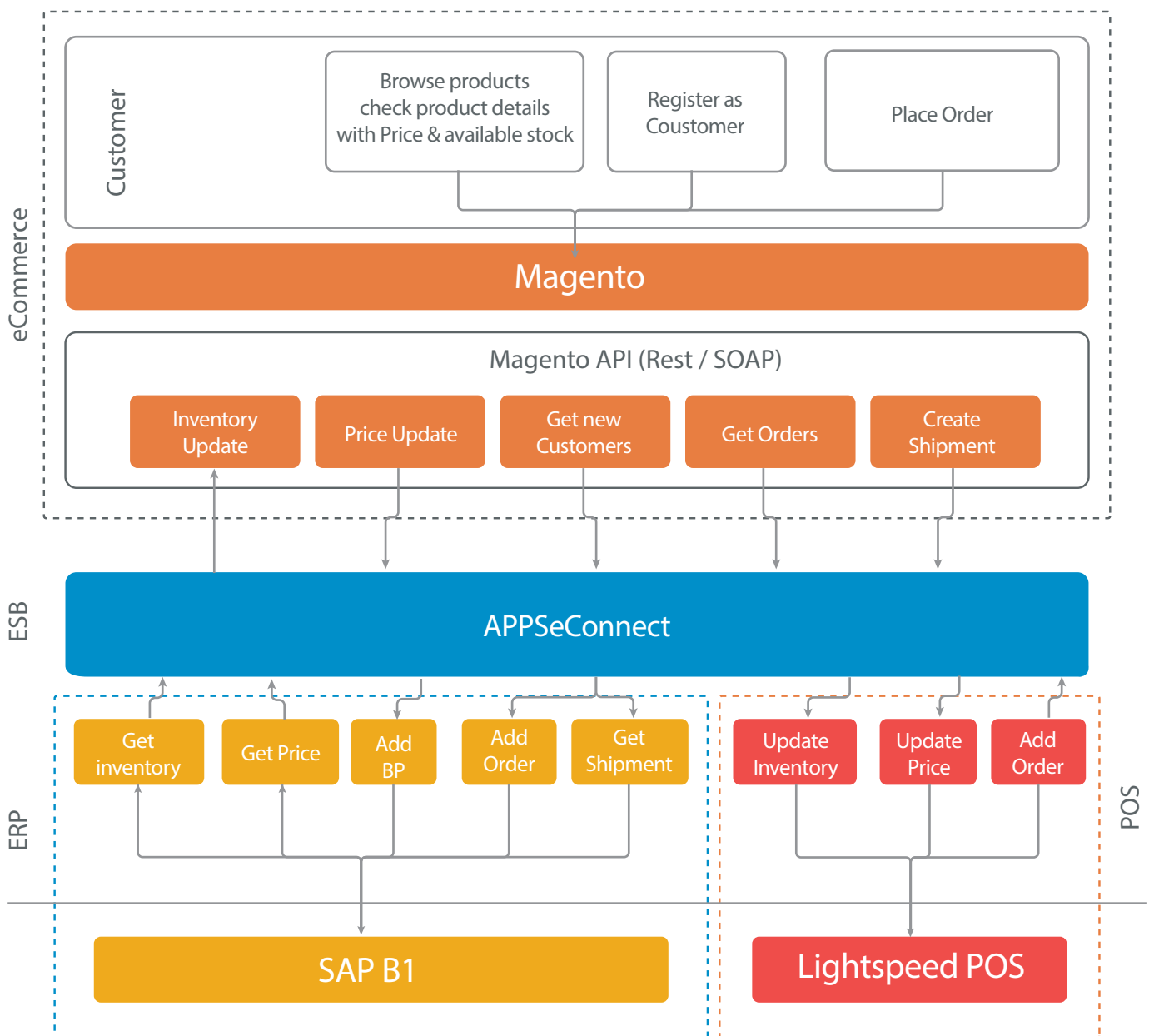
Credit Limit

You can also have credit limit setup for a B2B Customer such that they can use the credit limit to order items.

Pre-architected optimized connectors for Magento(with B2B features) and other apps



Magento, one of the premium offerings, has always been one of the major focus areas of the entire APPSeCONNECT Team. At APPSeCONNECT, we provide optimized architected Magento connectors which not only provide integration on various Magento endpoints but also end to end B2B data synchronization. When Magento is integrated with a backend SAP server or any server, the sensitive data which needs to be transferred to the application can flow correctly and according to your own business rules effortlessly and automatically. We provide pre-build solutions for integration of each application which you can start, plug and play. We also enable you to completely change the optimizations based on your own requirements.



From the above architecture diagram, you can see our connector supports integration between any applications and uses full-fledged default APIs to integrate data between Magento with that of other external 3rd party apps.

Let us now discuss some of the integration points which our connector can expose to any 3rd party applications:

- New customer's account, contact information, billing and shipping address etc. will be synchronized to your ERP as Master Data.
- Existing web customer details are downloaded to your ERP automatically in real time.
- As per your own business requirement, the connector can be configured to sync the guest customer's information such as contact and address, to your ERP with a different customer code for easy tracking. Merchants can plan for further marketing activity for these guest customers based on their contact information.
- The items from ERP will automatically be synchronized to your Magento store as simple, configurable, bundled, grouped, downloadable or even virtual type of
- We can upload images with a description for items to Magento store front and vice versa.
- We allow group wise price synchronization.
- Our B2B extension - B2B Mage allows different prices for different websites and the same can be configured and uploaded to your Magento store.
- Real-time synchronization is available to maintain exact inventory level.
- We can sync period and volume discounts.
- Sales orders can be synched from Magento to your backend system.
- Order approval data can also be synchronized for guest customers, and hence if there is an approval process in the backend.
- Payment method synchronization is available with the credit card and payment details.
- We also provide the option to track shipments from your ERP system.
- Some other important aspects like Purchase orders; Customer specific product catalog and much more also exist.

Conclusion

Magento 2.0 is a highly efficient e-Commerce platform that performs better at scale compared to previous Magento versions. Its top-tier performance and scalability, combined with new functionality, powerful business user tools, and unprecedented flexibility to create tailored shopping experiences make it the next generation solution that is right for your business.

APPSeCONNECT being a premium integration product for Magento 2.0 plugs in seamlessly with Magento, and exposes all its data for any 3rd Party app to consume. The iPaaS solution allows you to customize your own integration by selecting what data you want to transmit, orchestrate the process flows, do visual workflows, and take decisions, with data reporting.



**Integrate your Magento store
with your back-office ERP system**

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