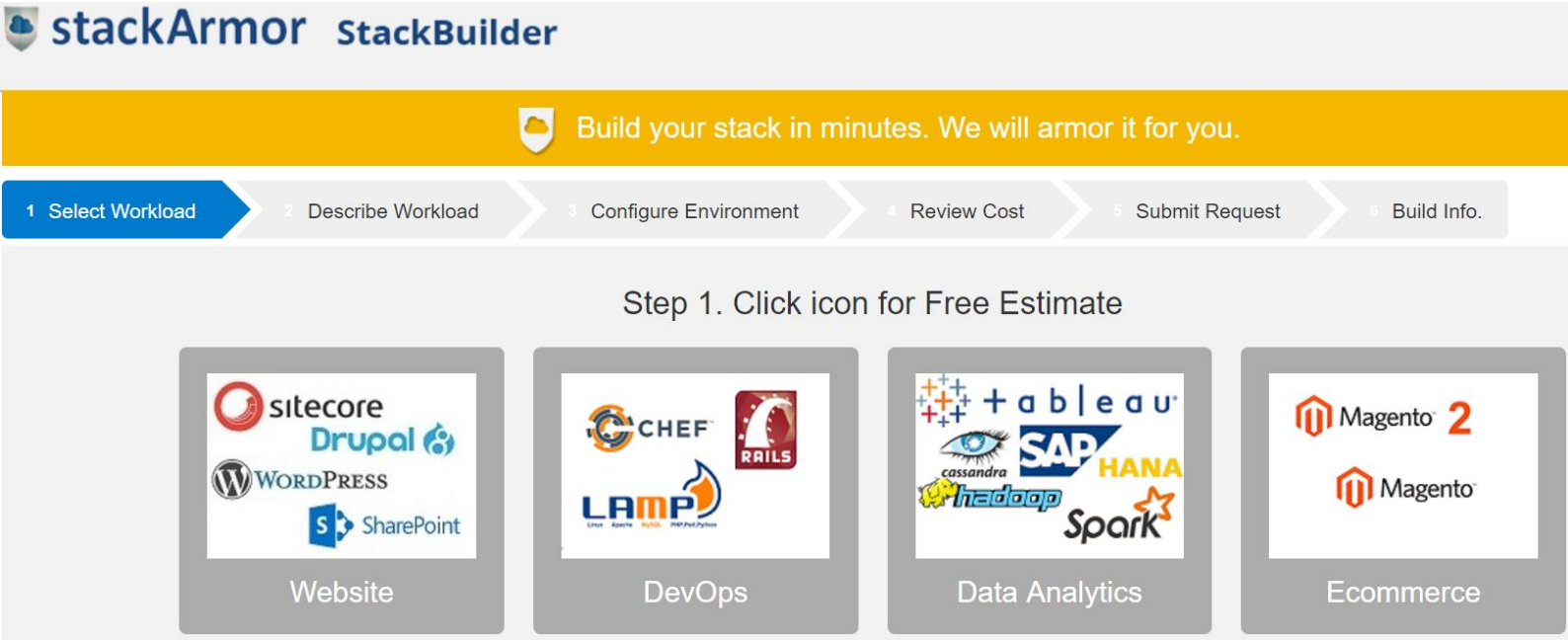

VISUALIZING NOSQL DATA WITH TABLEAU AND MONGODB

White Paper

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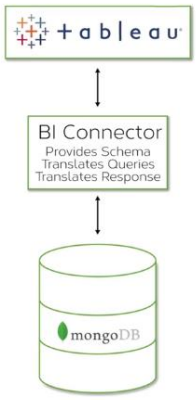
Abstract

Present day IT systems are generating data, in the unstructured format at a very rapid phase, due to the popularity of web applications, mobile devices, IoT and Social media. It has been observed that nearly 80% of this unstructured data is being stored in the JSON format. Considering the complexity of analysing documents, Tableau and MongoDB have partnered to make it easy for companies to visually analyse rich JSON like data structures directly in MongoDB. The connector created by MongoDB creates a relational view of JSON data. Then, it either converts a SQL statement to a MongoDB aggregation pipeline query or a straight find operation based on the query. This white paper provides an overview of how Tableau and NoSQL database MongoDB can work together using the MongoDB BI connector.



What is Tableau?

Tableau is business intelligence software that allows to easily connect to a data source and then visualize and create interactive and sharable dashboards. The Tableau software is designed in such a way that even somebody with basic Excel knowledge will be able to use. However, the system is efficient enough to solve even the most complex analytical problems. It allows the user to create dashboards and securely share the data within minutes.

- Gartner top rated Data Analysis and Visualization software
- Provides the ability aggregate and connect multiple data sources
- Easier way to create and share analytics charts with ad-hoc drill down and reports as well as Dashboards
- Enterprise grade solution with role-based access and security

Tableau offers the following features

- Simple User Interface – Tableau Server makes it easy to find, explore, and interact with analytic dashboards for every type of user. Powerful search capabilities and intuitive navigation controls makes discovering content, users, and data sources straightforward.
- Interactive Data Visualization widgets- The tool offers an easy way to create and share charts and graphs with ad-hoc drill down and interactive features including maps.
- Flexible data architecture – Depending on the speed of the database connection, Tableau Server can leverage faster speed by maintaining live query connections to that database. Alternatively, Tableau Server can take in-memory snapshots of a data source (called extracts) and physically host the extracts on the Tableau Server platform.
- Automatic data and content updates – Tableau Server can refresh in-memory data extracts based on a set schedule, at specified intervals, or at incremental levels. The user can also set alerts

when data connections fail or use subscriptions to receive regularly scheduled emails about dashboards and reports.

- Embedded analytics – With Tableau Server, the user can rapidly embed interactive dashboards within the organization's existing web portals. Built-In sharing capabilities quickly provide HTML snippets that can be uses to place Tableau Server views directly into webpages, SharePoint portals, intranet wikis, and so on.
- Scalable – Tableau Server scales with both hardware and memory to support a growing organization. Flexible content management, user permissions, and detailed administrative capabilities makes managing a growing Tableau Server platform a straightforward process.
- Secure – Tableau Server provides security permissions at any level. With multi-tenancy, a user can create multiple sites on the server to separate users and content. Users can set individual permissions for projects, dashboards. Tableau also offers enterprise security features such as role-based access and SAML integration for single sign on capability
- Mobile – Users can view a dashboard from anywhere, on any device. All dashboards are automatically optimized for mobile tablets with touch sensitive UI without requiring any additional authoring or configuration.

What is MongoDB?

MongoDB is an open source database which uses a NoSQL document oriented model. Unlike the conventional relational databases, MongoDB was built on an architecture of collections and documents. The architecture is built in such a way that it takes the best of relational databases with the innovations of NoSQL.

Following are some of the features of MongoDB:

- Expressive Query language and Secondary Indexes – provides access and manipulation capacity to the data in highly structured and sophisticated ways.
- Strong Consistency– allows applications to access primary and secondary replicas. In situations where latency is more important than consistency, applications can access the closest copy of the data.
- Flexibility – the architecture is highly flexible and has been designed to accommodate different types of data formats that are being generated by modern applications
- Enterprise Management and Integration– this database can be easily integrated with modern enterprise management systems. The database can be easily secured, monitored, automated and integrated with the company's existing IT infrastructure.
- Scalability and performance – designed to deliver high performance even after massive horizontal scaling.
- Mission critical – designed to provide consistent highly quality experience to users across the world by synchronizing data across servers, racks and datacenters.

Visualizing JSON data with MongoDB BI Connector and Tableau

MongoDB BI connector is an independent service that allows users to visualize and analyse JSON like data structures without transformation and ETL. This connector allows the user to directly connect to and visualize their data. The MongoDB BI connector connects to the BI tools, translates the SQL statements issued by the BI tool into equivalent MongoDB queries, sends those queries to MongoDB. The result set is again sent back to the BI tool through the connector for analysis and visualization.

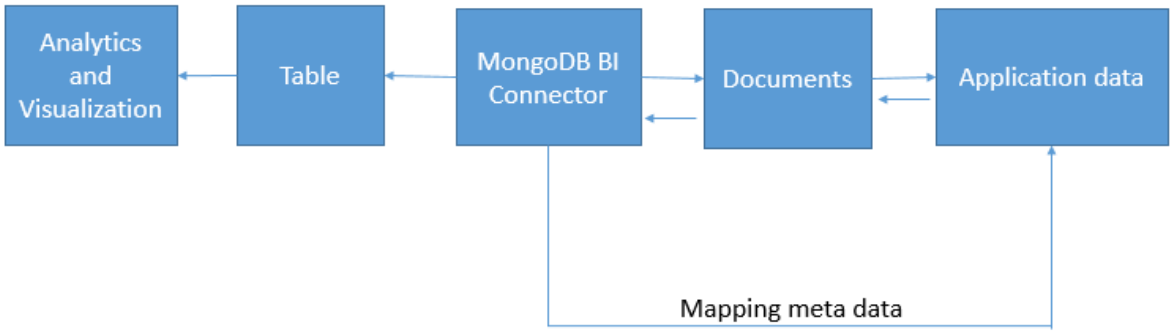
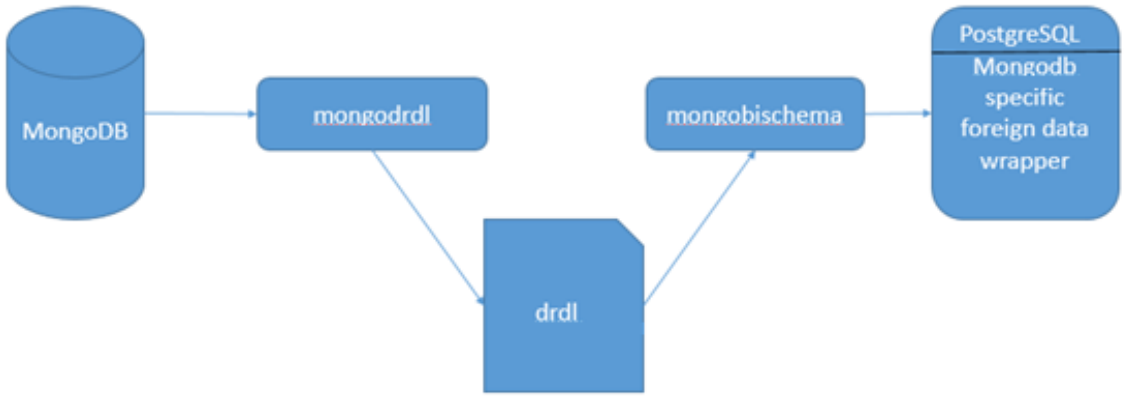


Illustration to show how MongoDB BI connector helps to integrate NoSQL Database with BI Tools

Data Mapping in MongoDB

The MongoDB BI connector uses a foreign data wrapper with PostgreSQL. In this way the BI Connector does not store any data. The BI Connector acts as a layer between Tableau and MongoDB. The following illustration depicts the flow of data between MongoDB and BI Tools through the Document Relational Definition Language (DRDL) files.



Hosting Tableau Server and MongoDB on AWS

AWS offers multiple choices of instance types to host Tableau and MongoDB. The software components for Tableau Server required for operating systems you can use Microsoft Windows 64-bit operating systems:

- Windows Server 2008/Windows Server 2008 R2
- Windows Server 2012/Windows Server 2012 R2

The instance sizing requirements for the Tableau Server infrastructure requirements are based on the number of users likely to access the portal:

Users	CPU	RAM	Instance Type
<25	4-core	8GiB	C3.xlarge
<100	8-core	32GiB	M4.2xlarge
>100	16-core	64GiB	M4.4xlarge

AWS enables you to set up the infrastructure to support MongoDB deployment in a flexible, scalable, and cost-effective manner on the AWS cloud. The available instance types optimized for MongoDB are listed below.

Instance Type	vCPU	Memory (GiB)	Workload Type
c3.4xlarge	16	55	Compute-optimized
c3.8xlarge	32	60	Compute-optimized
c4.8xlarge	36	60	Compute-optimized
r3.4xlarge	16	122	Memory-optimized
r3.2xlarge	8	61	Memory-optimized
r3.8xlarge	32	244	Memory-optimized

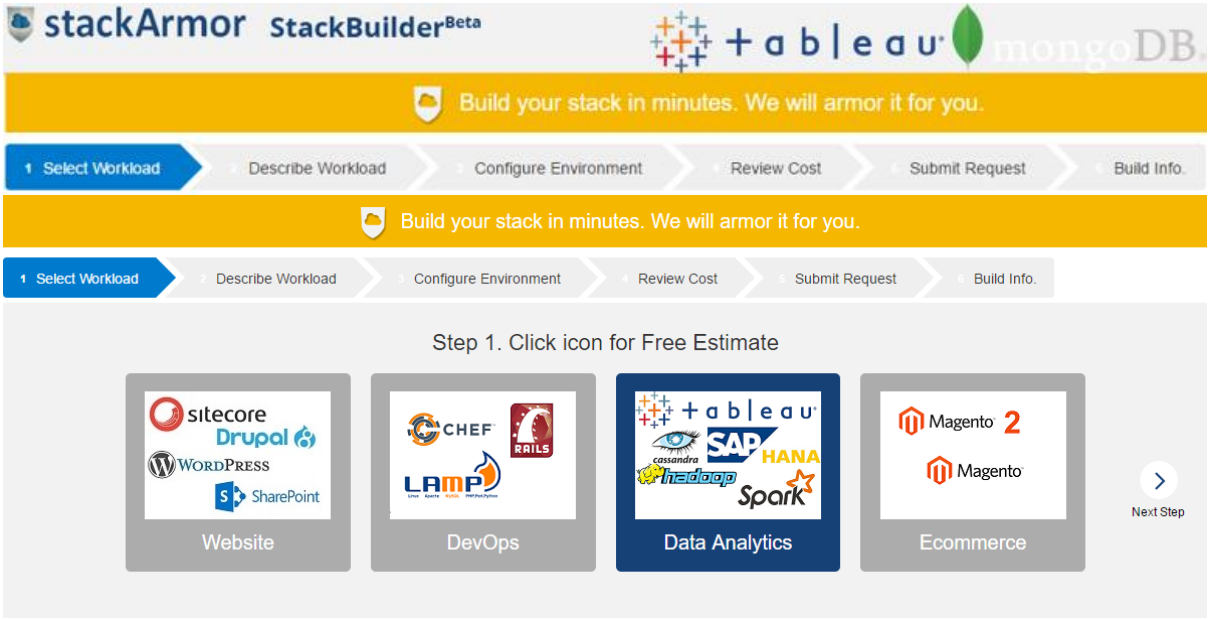
AWS provides a rich set of resources to help design and implement a Tableau and MongoDB server deployment. Please see the references section for details.

Jumpstart your Tableau and MongoDB BI project on AWS

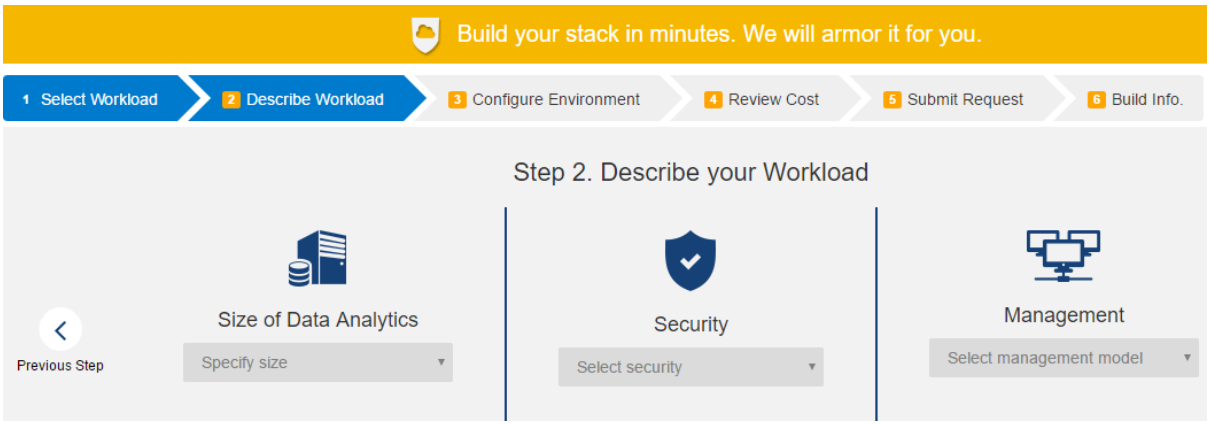
In the event you don't have access to certified and qualified AWS Solution Architects, StackBuilder™ is an easy option to jumpstart your Tableau Server and MongoDB project through pre-integrated deployment profiles. The StackBuilder™ cloud app store allows users to quickly deploy and use their Tableau server and MongoDB NoSQL hosted on AWS. StackBuilder's intelligent cloud deployment engine takes care of instance selection, AWS VPC configuration and software installation.

In order to get started with your Tableau server with MongoDB BI Connector on AWS go to https://stackbuilder.stackarmor.com

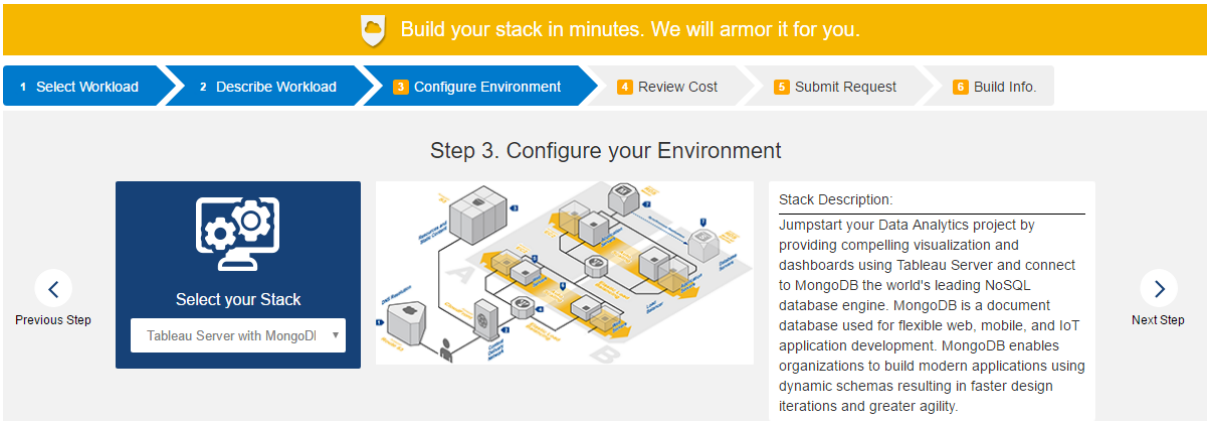
Step 1: Select Data Analytics for the Workload and click Next



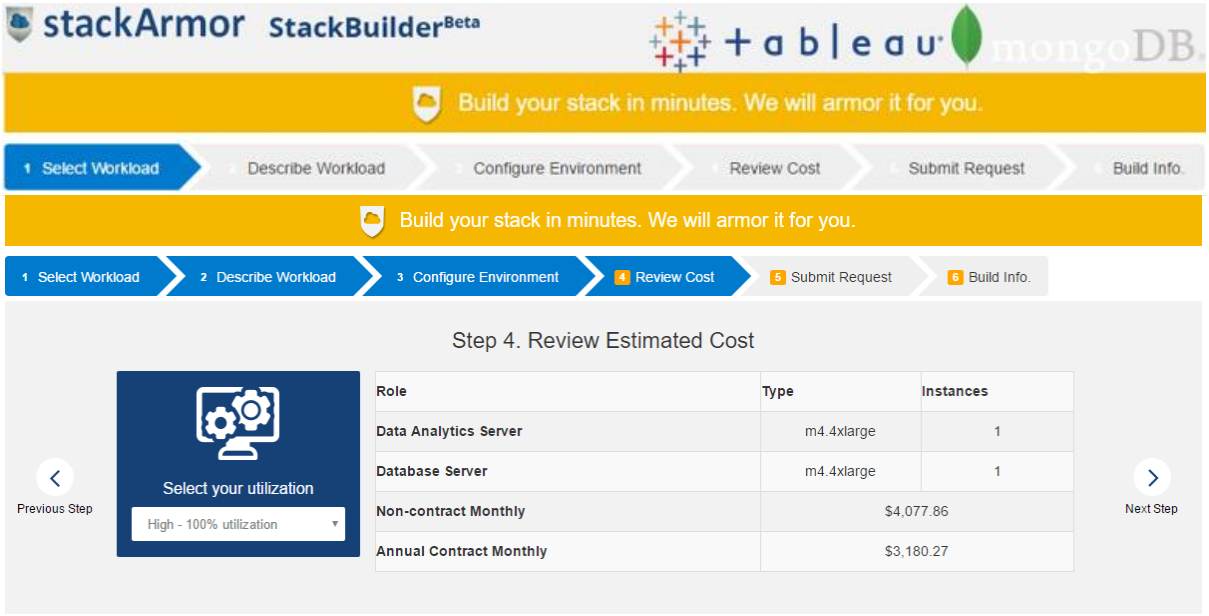
Step 2: Describe the workload environment in terms of size, security by industry and management model



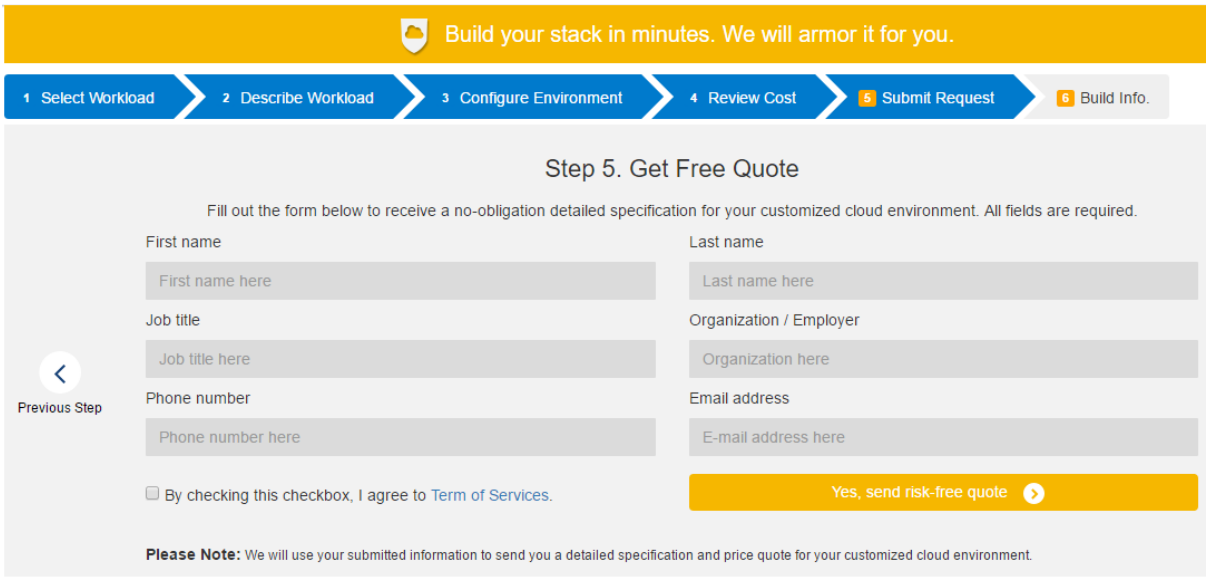
Step 3: Configure environment by selecting stack – Tableau with MongoDB



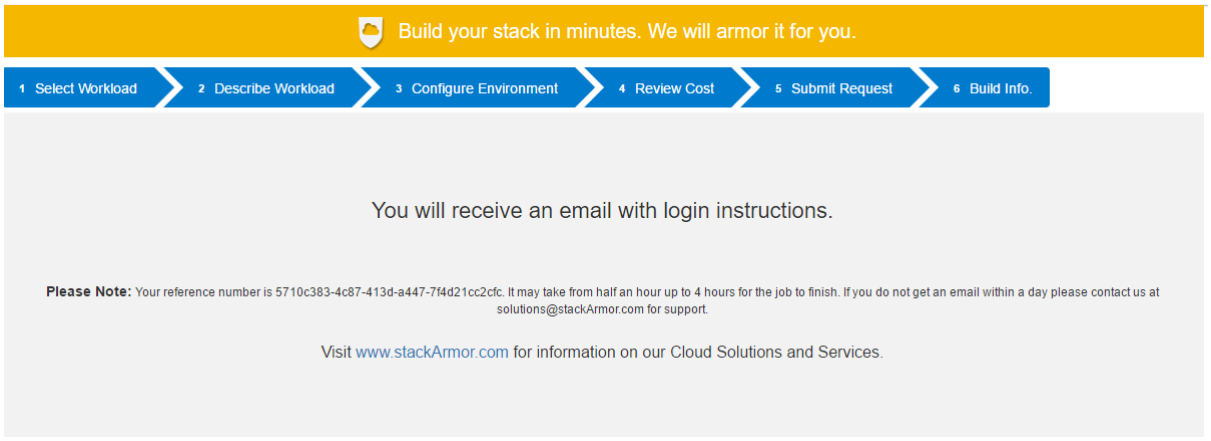
Step 4: Review Hosting Cost inclusive of software and maintenance fees



Step 5: Fill out form and submit request to provision environment. Once, the environment has been provisioned you will get an email with the access URL and a User Name & Password.



Step 6: The login instructions for your Tableau server will be emailed to you. Use the information to Login to your application.



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About stackArmor

stackArmor is staffed with experienced cloud solution architects that have many years of experience in cloud migration and operations, cybersecurity and devops solutions for security focused customers. Jumpstart your Tableau project on AWS by using https://stackBuilder.stackArmor.com. The company's principals have worked with large and small organizations in various sectors including Government, Financial Services, Healthcare, Non-profits and SaaS markets. Learn more by visiting https://www.stackarmor.com or send us an email at solutions@stackarmor.com