VMware’s Approach to Compliance

Updated July 2015

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1. Introduction

Many organizations have initiatives to virtualize their Information Technology (IT) infrastructure, or to move to a Cloud Computing model. However, these initiatives are often complicated by the increasing number of regulatory compliance requirements, which require protection of data such as PCI, HIPAA, FISMA, DIACAP, FedRAMP, GLBA, and other State and Federal requirements. Organizations are increasingly concerned with the complexity, risk, and impact that a new technology can bring to their existing environment(s).

Historically, most organizations have had to gradually gather solutions from a variety of vendors and best practices in order to create an entire IT architecture that can meet their business compliance needs. While each vendor may have their own specific guidance on how to meet compliance, they often do not have guidance on how to meet controls that were not addressed by their specific solutions. This can lead to a delay in the adoption of cloud and virtualization initiatives as it often requires a significant investment in time, resources, and technical capabilities.

VMware is addressing these challenges by establishing a Compliance Reference Architecture Framework (RAF) that provides a consistent way for VMware, its partners, and organizations to assess and evaluate the impact of regulations on virtual and cloud environments. The intent of the RAF is to provide a single framework for VMware, its partners, and organizations to address a variety of compliance requirements across an IT infrastructure*. The RAF is comprised of four primary components:

1. **Use Case** - Provides a business description of an organization and how it has designed its IT architecture to meet specific regulatory and compliance requirements.

2. **VMware Product Suites** – VMware’s recommended product suites designed to help meet compliance requirements

3. **VMware Partner Products** – Provides a framework for partners to address controls that are not covered by VMware’s product suites.

4. **Organizational Requirements** - Provide guidance on adjacent control requirements not addressed by VMware or Partner solutions such as physical security.

For each Regulation, VMware and its Audit Partners will publish three documents in order to elaborate on the subject of sourcing and deploying a vCloud Architecture to operate in a compliant fashion under the prescribed regulation:
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Product Applicability Guide (PAG) -- This document contains an overview of each regulation as it applies to cloud/virtual environments and the mapping of VMware and partner products to specific compliance controls. The PAG addresses the issues of control, applicability and auditability for the specific regulation.

- A description of the VMware product suites (on a product by product basis) and relevant changes from previous versions
- Specific Partner capabilities
- Industry guidance

Architecture Design Guide (ADG)-- The goal of the Architecture Design Guide is to document design considerations for operating a compliant environment running highly regulated workloads on a VMware vCloud® infrastructure.

- Analysis of VMware Technology and partner product capabilities for integration into the VMware Compliance Reference Architecture.
- Business process, enterprise architecture balanced with audit considerations.
- A recommended approach for organizations and their service providers who are required to complete regular compliance assessments.

Validated Reference Architecture (VRA) -- The goal of this document is to illustrate how the applicable products, coupled with the architecture design and infrastructure component configurations, can be leveraged to provide regulation and governance specific control coverage.

- An analysis of an instance of a vCloud Reference Architecture that is considered to be 'in-situ', e.g. a fully operational point-in-time configuration of both the vCloud Suite or End User Computing software and the regulated application.
- Methods of evaluating controls enabled by the VMware vCloud Suite, EUC products and other third-party graphical or command-line user interfaces through the lens of an auditor.
- Examples that demonstrate alignment with concepts such as “Business-as-Usual” enhanced penetration testing capabilities, etc.

VMware’s goal is to deliver a complete solution that helps our customers meet compliance requirements as they look to migrate their business critical applications to cloud computing.

1. PCI – Payment Card Industry - https://www.pcisecuritystandards.org/
2. Security, Compliance, and Guidelines

The terms security and compliance are often used interchangeably, however they are unique and distinct words. Many IT products are designed to be secure and have several published security features. However, there is substantially less guidance on compliance.

While there are several different definitions of information security, it is commonly defined as a set of technical, physical, and administrative controls that are implemented in order to provide confidentiality, integrity, and availability. Security is not an end state (i.e. you are never completely secure). Rather, organizations make risk based decisions in order to manage security to appropriate levels.

Compliance is a set of requirements necessary to meet the minimum controls established by different regulatory agencies or industry best practices. Compliance frameworks are usually broad frameworks that provide limited guidance on any specific type of technology, vendor, or configuration. However, as technology continues to advance, many compliance entities have issued supplemental guidance to address emerging technological risks and industry trends.

There has been an increasing amount of supplemental guidance and best practices issued specifically for cloud computing and virtualization technologies. These best practices provide a useful guide for organizations and auditors, assessors, and examiners when reviewing the appropriate controls and risks in cloud computing and virtual environments. Some of the recent guidance issued includes:

- **Safeguards Technical Assistance Memorandum Protecting Federal Tax Information (FTI) In Virtual Environments**
  

- **Payment Card Industry Data Security Standard Virtualization Guidelines**
  
  [https://www.pcisecuritystandards.org/documents/Virtualization_InfoS upp_v2.pdf](https://www.pcisecuritystandards.org/documents/Virtualization_InfoS upp_v2.pdf)

- **NIST SP 800-144 Guidelines on Security and Privacy in Cloud Computing**
  
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Cloud Security Alliance, Security Guidance for Critical Areas of Focus in Cloud Computing
https://cloudsecurityalliance.org/

Cloud Computing Security Risk Assessment
3. A View of VMware’s Compliance and Cyber Risk Solutions

VMware has a variety of solutions that are designed to help organizations meet security and compliance requirements. The framework below provides a visual representation of VMware’s products that are designed to address a customer’s compliance requirements. VMware’s products can be grouped into three distinct areas: Products that address the virtualized infrastructure, Applications, and End user computing. Each of these areas provides a standard set of use cases for different regulations.

Figure 1: VMware Products
4. Mapping VMware, Partner Solutions and End User Solutions to Meet Controls

One of the first steps an organization often takes when reviewing compliance initiatives, is to map the compliance requirements (usually control objectives) to their specific organizational needs. As mentioned earlier, this can be a difficult task, requiring a significant amount of time and resources. To streamline the process, VMware has established a single holistic approach that can be used to evaluate the VMware environment, Partner Solutions, and End User tools.

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**Establish Controls**

Organizations establish control objectives in order to meet regulatory, security, and best practice objectives. These controls consist of a series of technical guidance, configuration requirements, policies, procedures, standards, and guidelines that must be satisfied. The controls are then mapped to processes, technology, and people to meet the objectives.

**VMware Solutions**

Organizations can significantly reduce the complexity of compliance, while simultaneously reducing costs and IT manpower by replacing traditional non-integrated solutions with integrated solutions. VMware has mapped its product suites to specific regulatory controls objectives. However, as with any product, no single product from any vendor can meet all of an organization’s needs. This gap (white space) between VMware’s solutions and the customer’s other objectives can be addressed by VMware Partner Solutions.

**Partner Solutions**

By establishing a consistent way of mapping Partner Solutions to a comprehensive controls framework, VMware has established a standardized repeatable architecture for VMware Partner products. These Partner Products are tailored to integrate with the VMware architecture, thereby providing a single integrated solution. By building clouds and virtual environments based on a standardized reference architecture framework, the result is an environment which is more secure, less costly, and better equipped to meet the dynamic nature of today’s IT and Compliance world. It also reduces the time and resources required to evaluate the different solutions and capabilities for any organization.
5. Partner Solutions – Filling the Whitespace

As is the case for any software or hardware vendor offerings, there are no readymade solutions to meet every compliance requirement. Meeting all controls depends upon a variety of hardware and software providers. To help address these challenges, VMware has identified Partner Capability Categories shown in Figure 3. These Categories are designed to fill the compliance gaps not addressed by VMware-only products (VMware has or enables capabilities in dark green shaded areas in Figure 2), rather than leaving it up to an organization to choose which products to “mix and match.” As part of VMware’s Partner program, VMware has established a standardized process for Partners to map their solutions to VMware environments. Select VMware Technology Partners will be selected to
complete one or more of the Compliance Reference Architecture documents outlined in the Introduction section of this document. This affords a consistent analysis of capabilities across a known approach enabling a guided selection process for evaluating VMware and VMware Technology Partner Solutions working together to meet the regulatory compliance controls in an ongoing fashion. These VMware Technology Partner Solutions will be assembled and evaluated together through the lens of use cases focused on building and operating a compliant VMware vCloud environment. These architectures, known as Compliance Joint Reference Architectures, will be executed in an ongoing basis and will include various VMware Technology Partners working to portray the controls necessary to meet the pertinent regulation(s).

6. Related Technical Content

In addition to mapping VMware and Partner solutions to regulatory requirement use cases as outlined in this document, VMware also has many valuable resources for implementing vCloud Architectures. One example of this content is the vCloud Architecture Toolkit now in version 3.1 as of the writing of this document. The documentation in the Compliance Reference Architectures are generally written with the vCAT Design Considerations and Implementation Examples as baselines with focus on how a vCloud Architecture should be modified for both compliant posture and operations.

Figure 3: VMware vCloud Architecture Toolkit
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Solution credentials such as vCAT and the Compliance Reference Architecture Frameworks go beyond the hypothetical deployment scenarios and provide specific implementation and configuration guidance. They provide guidance for IT Architects, Administrators, and Auditors and thereby help organizations to properly design, deploy, and operate a more secure, compliant cloud. Approaches to many facets of the vCloud Architecture outlined therein are available in numerous locations across the web in the form of blogs and other information. A good place to start on researching this VMware knowledge base is on VMware.com under Technical Papers (Link has the Filter for 'Security'). Another good resource on securing the core vCloud platform, a critical first step in any Compliance initiative, that should be followed on a per release basis are the Hardening Guidelines.
7. Conclusion

VMware recognizes that security and compliance are critical areas that must be addressed by all organizations. By standardizing an approach to compliance and expanding the approach to include Partners, VMware aims to provide customers a proven solution that more fully addresses their compliance needs. This approach provides management, IT architects, administrators, and auditors a high degree of transparency into risks, solutions, and mitigation strategies for moving critical applications to the cloud in a secure and compliant manner.

If you are an organization or partner that is interested in more information on the VMware Compliance and Cyber Risk Solutions Program, please email us at compliance-solutions@vmware.com

Disclaimer:

VMware solutions are designed to help organizations address various regulatory compliance requirements. This document is intended to provide general guidance for organizations that are considering VMware solutions to help them address such requirements. VMware encourages any organization that is considering VMware solutions to engage appropriate legal, business, technical, and audit expertise within their specific organization for review of regulatory compliance requirements. It is the responsibility of each organization to determine what is required to meet any and all requirements. The information contained in this document is for educational and informational purposes only. This document is not intended to provide legal advice and is provided “AS IS”. VMware makes no claims, promises or guarantees about the accuracy, completeness, or adequacy of the information contained herein. Nothing that you read in this document should be used as a substitute for the advice of competent legal counsel.

Acknowledgements:

VMware would like to recognize the efforts of the VMware Center for Policy & Compliance, VMware Partner Alliance, and the numerous VMware teams that contributed to this paper and to the establishment of the VMware Compliance and Cyber Risk Solutions Program. VMware would also like to recognize the Coalfire Systems Inc. VMware Team www.coalfire.com/Partners/VMware for their industry guidance. Coalfire®, a leading PCI QSA firm, provided PCI guidance and control interpretation aligned to PCI DSS v. 2.0 and the Reference Architecture described herein.

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