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RESEARCH ARTICLE

Design and Implementation of an Interactive Web-Based Near Real-Time Forest Monitoring System

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Abstract

This paper describes an interactive web-based near real-time (NRT) forest monitoring system using four levels of geographic information services: 1) the acquisition of continuous data streams from satellite and community-based monitoring using mobile devices, 2) NRT forest disturbance detection based on satellite time-series, 3) presentation of forest disturbance data through a web-based application and social media and 4) interaction of the satellite based disturbance alerts with the end-user communities to enhance the collection of ground data. The system is developed using open source technologies and has been implemented together with local experts in the UNESCO Kafa Biosphere Reserve, Ethiopia. The results show that the system is able to provide easy access to information on forest change and considerably improves the collection and storage of ground observation by local experts. Social media leads to higher levels of user interaction and noticeably improves communication among stakeholders. Finally, an evaluation of the system confirms the usability of the system in Ethiopia. The implemented system can provide a foundation for an operational forest monitoring system at the national level for REDD+ MRV applications.

1. Introduction

Tropical forests play an important role in stabilizing the climate, providing food, water, wood products and provide habitats for biodiversity [1]. Deforestation and forest degradation are now widely acknowledged by the scientific community as major contributors to recent increases in atmospheric greenhouse gas (GHG) concentrations and changes to the world's hydrological cycle [2, 3]. To reduce atmospheric GHG concentrations, the United Nations Framework Convention on Climate Change (UNFCCC) has proposed an international carbon trade mechanism, Reducing Emissions from Deforestation and Degradation (REDD+), to support the reduction of emissions and to enable forest conservation, sustainable management of forests and the enhancement of forest carbon stocks in developing countries [4]. Aside from being an important step towards reducing GHG concentrations, REDD+ also includes considerations for co-benefits, safeguards and biodiversity protection [5–7].

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ISACA COBIT Design and Implementation Certificate Sample Questions (Q44-Q49):

NEW QUESTION # 44

When assessing the current state of I&T, a continual improvement task includes:

- A. Identifying key enterprise and supporting alignment goals.
- B. Raising executive awareness of IT and the value of EGIT.
- C. Developing metrics to monitor I&T performance.
- **D. Identifying potential process improvements.**

Answer: D

Explanation:

In the COBIT 2019 Implementation Guide:

"During the 'Where are we now?' phase, the enterprise assesses the current state of governance and identifies process capability gaps. These gaps directly inform process improvement opportunities for the implementation roadmap." The emphasis at this stage is on evaluation and gap identification-not strategic goal-setting or awareness- building, which occur earlier in the lifecycle.

Reference:COBIT 2019 Implementation Guide, Phase 2

NEW QUESTION # 45

Who is responsible for performing a stakeholder satisfaction survey and gathering feedback on lessons learned from the implementation of an EGIT program plan?

- A. The risk and compliance function and IT audit
- **B. The CIO and the program steering committee**
- C. Business executives and the I&T governance board
- D. IT managers and IT process owners

Answer: B

Explanation:

The COBIT 2019 Implementation Guide assigns accountability for program-level evaluation and benefits realization to executive roles responsible for governance oversight. Specifically, the program steering committee, chaired or sponsored by the CIO, is accountable for monitoring outcomes, assessing stakeholder satisfaction, and capturing lessons learned once implementation phases are completed.

While IT managers and process owners contribute operational input, they are not accountable for enterprise- wide feedback.

Similarly, audit and compliance functions provide independent assurance rather than program ownership. Business executives and governance boards retain oversight but do not execute implementation monitoring activities.

The Implementation Guide stresses that continuous improvement depends on formal feedback loops, including stakeholder surveys and post-implementation reviews. These activities ensure alignment with enterprise goals, validate benefits realization, and support momentum for future governance improvements.

The CIO plays a central role by coordinating across business and IT, while the steering committee ensures decisions remain aligned with strategic objectives. This shared responsibility ensures accountability, transparency, and sustainability of the EGIT program.

NEW QUESTION # 46

Which of the following would BEST enable the prioritization of governance objectives?

- A. The IT strategic plan
- **B. A matrixed scoring methodology**

- C. Expected performance outcomes
- D. The enterprises risk tolerance

Answer: B

Explanation:

In COBIT 2019, the prioritization of governance objectives is essential to ensure that the most critical aspects of IT governance receive the necessary focus and resources. A matrixed scoring methodology is considered the best enabler for prioritizing governance objectives because it provides a structured, systematic, and quantifiable approach to evaluating and ranking various governance objectives based on multiple criteria.

Detailed Explanation with References:

* IT Strategic Plan (Option A):

* The IT strategic plan outlines the strategic direction and objectives of IT within the organization.

While it provides guidance on long-term goals and initiatives, it does not offer a detailed mechanism for prioritizing specific governance objectives.

* Matrixed Scoring Methodology (Option B):

* A matrixed scoring methodology allows the organization to evaluate governance objectives against a set of predefined criteria such as strategic alignment, risk impact, resource availability, and expected benefits. This methodology helps in objectively assessing and comparing the importance and urgency of different governance objectives. By assigning scores to each criterion, organizations can create a prioritized list based on overall scores, ensuring that the most critical and impactful objectives are addressed first.

* This approach is comprehensive and takes into account multiple factors, providing a balanced and transparent means of prioritizing objectives. It enables decision-makers to justify their choices and ensures that prioritization is aligned with the organization's strategic goals and risk profile.

* Enterprise's Risk Tolerance (Option C):

* The enterprise's risk tolerance is an important factor in governance decisions, as it defines the level of risk the organization is willing to accept. However, while it influences prioritization, it is not a standalone methodology for prioritizing governance objectives. Risk tolerance must be considered within a broader context of criteria, which a matrixed scoring methodology can effectively encompass.

* Expected Performance Outcomes (Option D):

* Expected performance outcomes are crucial for evaluating the success of governance initiatives, but they do not provide a methodology for prioritizing objectives. They are one of the factors that can be included in a matrixed scoring methodology to assess the potential impact and value of each objective.

Conclusion: The correct answer is B. A matrixed scoring methodology. This method provides a robust, multi-criteria approach to prioritizing governance objectives, ensuring that decisions are made based on a balanced consideration of various relevant factors.

References:

* ISACA. COBIT 2019 Framework: Governance and Management Objectives. ISACA.

* ISACA. COBIT 2019 Design Guide: Designing an Information and Technology Governance Solution. ISACA.

NEW QUESTION # 47

When considering the compliance requirement design factor, and the design factor value is high, which of the following should be a management objective priority?

- A. Managed security (AP013)
- B. Managed relationships
- C. Managed data (AP014)
- **D. Managed risk**

Answer: D

Explanation:

In environments with high compliance requirements, managing risk is crucial to avoid legal penalties, financial losses, and reputational damage. The "Managed risk" objective ensures that risks related to compliance are identified, assessed, and mitigated effectively.

COBIT 2019 Framework References:

* COBIT 2019 Framework: Governance and Management Objectives, APO12 Managed Risk: This objective focuses on establishing a risk management framework to identify and mitigate risks, including those related to compliance.

* COBIT 2019 Design Guide, Chapter 2: Emphasizes the importance of managing risk in environments with high compliance requirements.

Prioritizing "Managed risk" ensures that the enterprise has robust processes in place to manage compliance-related risks, thereby safeguarding the organization against potential regulatory issues.

NEW QUESTION # 48

Which function within the IT corporate structure is responsible for classifying information using an agreed-upon classification scheme for a new data collection system?

- A. Information security
- B. Information privacy
- C. IT governance
- D. Enterprise architecture

Answer: A

Explanation:

The function within the IT corporate structure responsible for classifying information using an agreed-upon classification scheme for a new data collection system is the Information Security function. Information security ensures that data is properly classified to protect it according to its sensitivity and criticality.

References in COBIT 2019 Design and Implementation:

COBIT 2019 Framework: Governance and Management Objectives, APO13 (Managed Security): This objective outlines the responsibilities of the information security function, which includes defining and implementing information classification schemes. COBIT 2019 Implementation Guide, Chapter 3: This chapter details how information security policies and practices should be established, including the classification of information assets.

COBIT 2019 Framework: Deliver, Service and Support (DSS05, Managed Security Services): This objective highlights the role of information security in managing security services, including data classification and protection measures.

By classifying information, the information security function ensures that data is adequately protected against unauthorized access and breaches, adhering to compliance requirements and supporting the overall security posture of the enterprise.

NEW QUESTION # 49

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