

Enterprise Architecture For Global Game Publishing An Analysis Of Togaf Framework Adoption At Toge Productions

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Abstract. *The rapid evolution of digital transformation demands both continuous high availability and stringent data protection for enterprise applications. However, this dependency introduces a critical "dual-threat" landscape: external resource exhaustion through Distributed Denial of Service (DDoS) attacks, and systemic breaches via Unauthorized Access. While DDoS attacks paralyze system Availability—causing severe operational downtime and financial losses—Unauthorized Access compromises Confidentiality and Integrity, leading to fatal data breaches and privilege escalation. Reactive security measures are fundamentally insufficient against automated botnets and sophisticated credential exploits. Therefore, this paper proposes a proactive, security-by-design approach by integrating the National Institute of Standards and Technology Risk Management Framework (NIST RMF) SP 800-37 into a standard Three-Tier enterprise architecture. Utilizing a qualitative analytical methodology combined with quantitative risk metrics, this study systematically executes the seven-step RMF lifecycle. Under the "High-Water Mark" principle, both threats categorize the system as a High-Impact asset across the entire CIA Triad. Consequently, specific security controls from NIST SP 800-53 are selected and mapped to architectural vulnerabilities: Denial of Service Protection (SC-5) and System Monitoring (SI-4) to mitigate DDoS at the network perimeter, alongside Access Control (AC) and Identification and Authentication (IA) families to enforce Multi-Factor Authentication (MFA) and the Principle of Least Privilege at the core. The result is a comprehensive defense-in-depth blueprint that transitions dual-threat mitigation from a reactive technical patch into a strategic, measurable enterprise risk management process.*

Keywords: DDoS, Unauthorized Access, NIST RMF, Defense-in-Depth, CIA Triad, Risk Management, Cybersecurity, Enterprise Architecture.

I. INTRODUCTION

The global video game industry is changing fast. Today, successful independent (indie) game studios aren't just making games; they are evolving into full-fledged global publishers. Toge Productions, a leading indie studio from Indonesia, is a perfect example of this shift. As they transition into publishing games for other creators, their daily operations have become incredibly complex. They are suddenly dealing with international royalties, multi-platform releases (like Steam, Nintendo, and PlayStation), and massive libraries of creative assets.

When a creative company grows this quickly, their IT infrastructure usually struggles to keep up. Different departments end up using their own isolated tools, leading to fragmented data, manual bottlenecks, and a lot of

wasted time. To fix this, an organization needs to look at the big picture and align its IT systems directly with its business goals. This approach is known as Enterprise Architecture (EA).

Previous studies have shown that EA is one of the best ways to solve these growing pains. For instance, (Dumitriu & Popescu, 2020) emphasize that The Open Group Architecture Framework (TOGAF) provides a comprehensive set of tools for developing a strong IT management structure. Furthermore, research by (Girsang & Abimanyu, 2021) highlights that the TOGAF Architecture Development Method (ADM) is highly flexible, making it easy to align information systems with specific business objectives. We also see successful applications of TOGAF ADM in designing integrated blueprints that support complex business processes, as demonstrated by (Putra & Hadiana, 2020).

However, there is a catch. Most of these previous EA studies focus on rigid sectors like hospitals, banks, or government agencies. There is very little research on how to apply Enterprise Architecture to a fast-paced, highly creative environment like an indie game studio, where too much bureaucracy can kill creativity.

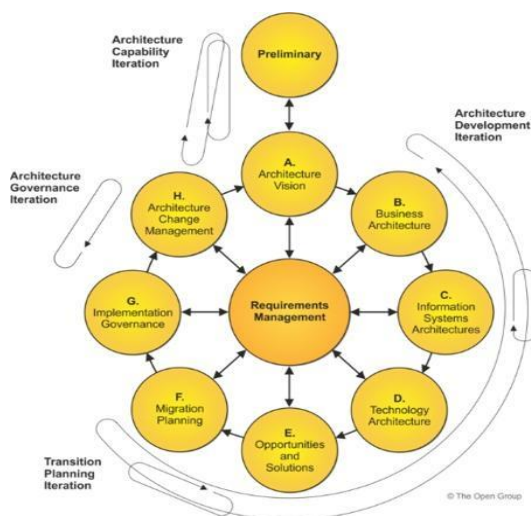
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This is where this study comes in. By tailoring the EA approach to fit the unique needs of a game publisher, this research aims to give Toge Productions ("Toge Game Fund Initiative," n.d.) a scalable digital roadmap. The main research question guiding this study is: How can the TOGAF ADM framework be tailored to design an integrated IT architecture that supports Toge Productions' global game publishing goals (toge productions, 2021) without sacrificing their creative agility?

II. LITERATURE REVIEW

Enterprise Architecture (EA) Enterprise Architecture (EA) is a strategic, comprehensive, and holistic approach to designing and implementing enterprise systems and components to align tightly with business objectives. In traditional corporate environments, EA is often utilized to enforce strict regulatory compliance. However, within the dynamic video game publishing industry, the primary goal of EA is to act as a digital enabler. For a rapidly scaling studio, EA provides a structured ecosystem that connects disparate creative departments—such as art, programming, and narrative design—and streamlines the publishing pipeline without stifling creative agility.

The Open Group Architecture Framework (TOGAF) The Open Group Architecture Framework (TOGAF) is a globally recognized, comprehensive framework used to develop an Enterprise Architecture. Rather than dictating a rigid set of rules, TOGAF provides a highly flexible methodology that can be tailored to the specific size, scope, and operational nature of the enterprise. The core of this framework is the Architecture Development Method (ADM).



Phase	Description
Preliminary	Define and establish the Organizational Model for Enterprise Architecture.
A	Establish the scope, constraints and expectations for an EA project.
B	Develop the baseline and target business architecture, and perform gap analysis.
C	Develop the baseline and target data and application architecture, and perform gap analysis.
D	Develop the baseline and target technology architecture, and perform gap analysis.
E	Identify major implementation projects as work packages and group them into Transition Architectures.
F	Complete the implementation and migration plan.
G	Prepare and issue Architecture Contracts. Ensure that the implementation projects conforms to the architecture.
H	Provide continual monitoring.

Getting the enterprise Committed and Involved	Getting the architecture Work
Getting the architecture Right	Getting the architecture Running

Figure.1 Source (vpadmin, 2025)

As shown in Figure 1, the ADM is an iterative cycle that ensures IT infrastructure decisions are strictly driven by business requirements. To maintain the agility required by an independent game developer and publisher, this study adapts the TOGAF ADM by focusing strictly on the foundational planning phases: Phase A (Architecture Vision), Phase B (Business Architecture), Phase C (Information Systems Architecture), and Phase D (Technology Architecture).

The core of TOGAF is the Architecture Development Method (ADM), which provides a continuous, iterative process for developing an enterprise architecture. The ADM is universally accepted as it aligns the four main types of architecture—business, data, application, and technology—directly with organizational needs.

[Insert Figure 1 Here: ADM Basic Structure - Enterprise Architecture Development Cycle]

As illustrated in the ADM cycle, the framework consists of several sequential phases. To ensure the architecture remains agile enough for an indie game publisher, this study specifically focuses on the foundational planning phases:

1. **Preliminary Phase:** This phase determines the framework and principles. For a game studio, this involves securing commitment from studio executives and defining the IT principles that will guide the publishing business.
2. **Phase A (Architecture Vision):** This phase focuses on defining the scope, mapping the overall strategy, and establishing the architectural vision. It ensures that the IT goals perfectly align with the studio's mission to become a global game publishing incubator.
3. **Phase B (Business Architecture):** This phase describes the current baseline business architecture and defines the target business goals, followed by an analysis of the gaps between them. It maps out exactly how game curation, internal development, and marketing currently operate versus how they should operate.
4. **Phase C (Information Systems Architecture):** This phase develops target architectures for both Data and Applications. It determines how digital assets (source code, pixel art) and applications (publishing portals, royalty trackers) should be integrated.
5. **Phase D (Technology Architecture):** This phase creates the overall architectural goal regarding hardware and infrastructure that will be implemented later. It defines the necessary cloud storage, server capabilities, and network security required to host multi-platform game data.
6. **Phase E to Phase H:** While Phase E through H deal with Opportunities and Solutions, Migration Planning, Implementation Governance, and Architecture Change Management, they fall outside the scope of this foundational blueprint design.

C. Value Chain Analysis Introduced by Michael Porter, the Value Chain is a representation of a firm's value-adding activities, based on its pricing strategy and cost structure. The model focuses on specific business activities where competitive strategies can best be applied and where information systems provide the most strategic impact.

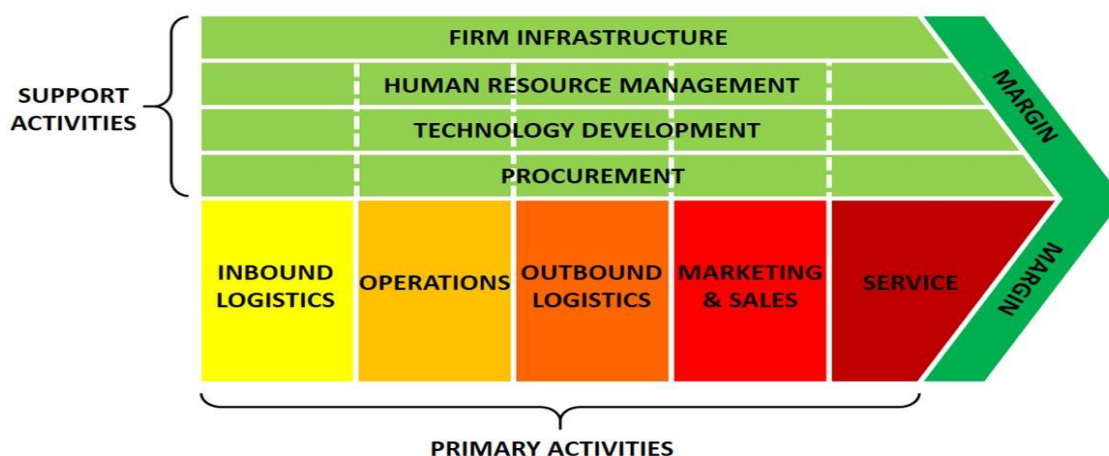


Figure 2 Source Lars de Bruin

As shown above, the Value Chain sees the company as a set of basic activities that add value to the business's products or services, divided into two main categories: Primary Activities and Support Activities. For a digital publisher like Toge Productions, Primary Activities translate to inbound logistics (curating third-party games), operations (internal game development), and outbound logistics (digital distribution). Mapping these activities is a critical preliminary step before conducting the gap analysis in Phase B. As illustrated in the figure above, Porter views a company not merely as a rigid collection of departments, but as a continuous chain of basic activities designed to add value to a product or service. The model categorizes these organizational processes into two overarching segments: Primary activities.

Primary Activities Primary activities are the core operational functions directly involved in the physical creation, sale, delivery, and post-sale support of a product or service. In the context of a digital game development and publishing ecosystem like Toge Productions, these stages are defined as follows:

- **Inbound Logistics:** Traditionally the process of receiving raw materials. For a publisher, these "materials" are intellectual properties. This translates to game incubation, receiving external pitch decks, and curating third-party indie games for the publishing label.
- **Operations:** The manufacturing phase that transforms inputs into the final product. This encompasses the entirety of internal game development: coding, pixel art creation, narrative design, Quality Assurance (QA) testing, and multi-platform porting.
- **Outbound Logistics:** The activities required to distribute the final product to consumers. In the digital gaming realm, physical shipping is replaced by digital distribution. This involves securing API keys, managing release schedules, and distributing secure game builds to digital storefronts (e.g., Steam, Xbox, PlayStation, Nintendo eShop).
- **Marketing and Sales:** Strategies utilized to build community hype and persuade consumers to purchase the product. This includes executing global PR campaigns, exhibiting at international gaming conventions (Gamescom, PAX), and releasing playable prologues.
- **Service:** Post-launch activities that maintain or enhance the product's lifespan and value. This involves deploying software hotfixes, monitoring community feedback, and developing Downloadable Content (DLC).

Support Activities Support activities provide the necessary foundational infrastructure that allows the primary activities to function efficiently and continuously. These include:

- **Firm Infrastructure:** The overarching structural framework of the studio, including executive management, financial planning, and legal rights management (handling IP contracts and complex international royalty splits).
- **Human Resource Management:** The recruitment, continuous training, and retention of highly specialized creative and technical talent, such as programmers, narrative designers, and digital artists.
- **Technology Development:** Research and development initiatives that drive the company forward. This includes the adoption of advanced game engines (e.g., Unity, Godot), localization tools, and enterprise architecture planning to upgrade internal IT capabilities.
- **Procurement:** The acquisition of necessary external operational inputs, such as purchasing software licenses, upgrading high-end rendering hardware, and acquiring proprietary Console Development Kits.

By comprehensively mapping these activities, Enterprise Architecture planners can pinpoint critical bottlenecks—such as fragmented data silos between Operations and Marketing—and design targeted IT solutions to integrate the entire enterprise ecosystem.

Conceptual Framework In academic research, a conceptual framework is basically the "master blueprint" of the entire study. If all the previous theories—Enterprise Architecture, TOGAF, and the Value Chain—are the individual pieces of a puzzle, the conceptual framework is the picture on the front of the box that shows how everything fits together. Instead of just listing abstract theories, this framework provides a clear, visual roadmap showing exactly how Toge Productions will transition from its current operational setup to a highly optimized digital ecosystem.

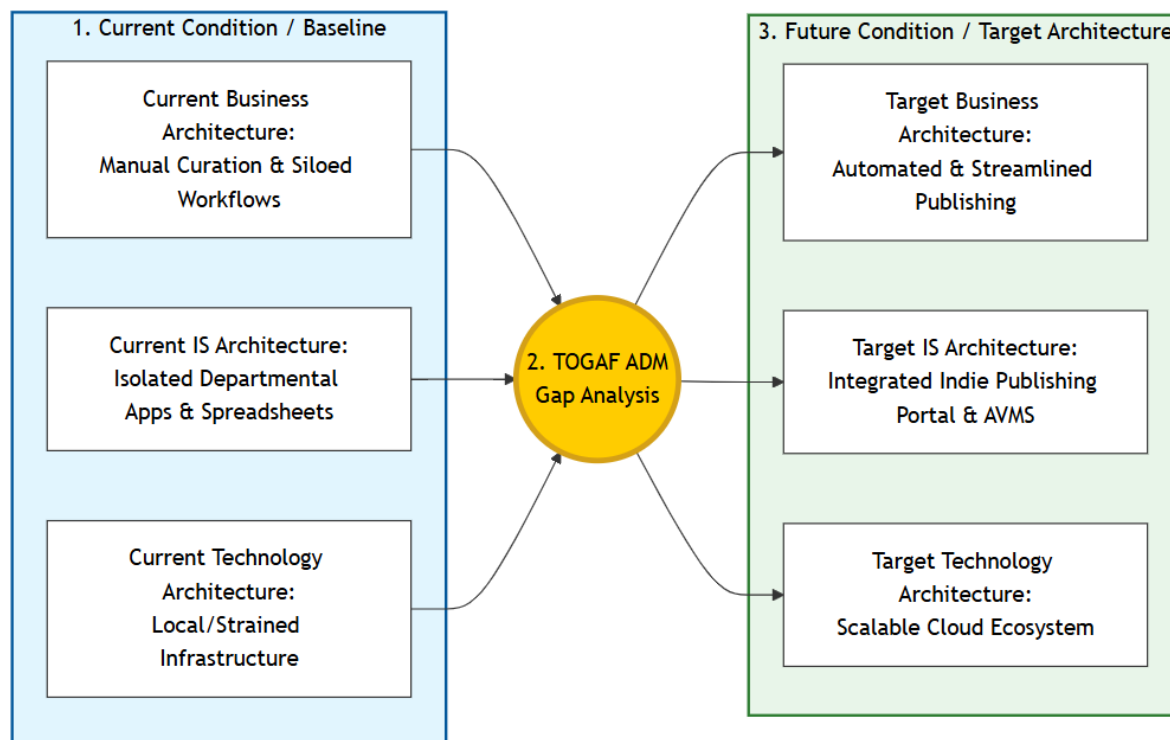


Figure 3 Togaf ADM

As illustrated in Figure 3, this study's framework acts as a bridge between where the studio is right now and where it needs to be to dominate the global indie market. The model is broken down into three logical phases:

Current Condition (The Baseline) This represents the reality of Toge Productions today. As a rapidly growing incubator and publisher, their current state is full of creative energy but is often weighed down by fragmented IT systems. In this phase, the framework maps out their existing *Business Architecture* (e.g., how they manually curate third-party games from the TGFI program), their current *Information Systems Architecture* (the isolated apps, messy Google Drives, and disconnected spreadsheets that different departments use), and their *Technology Architecture* (their current servers and local hardware). Essentially, this is the starting line.

Gap Analysis (The Engine of Change) You cannot fix a problem until you measure exactly how big it is. This middle phase is where the TOGAF ADM methodology steps in to act as the "engine" of the research. By laying the Current Condition next to the studio's ultimate business goals, we perform a systematic Gap Analysis. This step highlights the exact missing pieces—whether it is a lack of a centralized database for multi-platform game assets, or a missing automated system for calculating complex international developer royalties. It finds the "gaps" that are slowing the studio down.

Future Condition (The Target Architecture) This is the "level up." The Future Condition represents the final, idealized output of this research: a fully aligned Enterprise Architecture blueprint. It paints the picture of a unified studio where the *Target Business Architecture* (streamlined, automated publishing workflows), *Target Information Systems* (like a proposed centralized Indie Publishing Portal), and *Target Technology Architecture* (scalable, cloud-based infrastructure) all work together seamlessly.

Ultimately, this conceptual framework proves the core thesis of the study: IT planning isn't just about buying new computers or software licenses; it is about deliberately designing a technological ecosystem that empowers Toge Productions to publish better games, faster, while supporting indie developers across Southeast Asia.

III. METHODS

This development research utilizes a qualitative descriptive approach through a case study methodology (Creswell, 2017). The primary subject of this research is Toge Productions, an independent game development and publishing studio based in Indonesia.

Research Data Collection The data utilized in this study consist of primary and secondary data. Primary data were obtained through observational analysis of Toge Productions' current digital operations, specifically focusing on the operational workflows of internal game development and the curation pipeline for the Toge Game Fund Initiative (TGFI). Secondary data were gathered from published official archives, digital developer logs, industry reports on multi-platform digital distribution, and documented procedures from the studio's official platforms.

Research Data Analysis The data analysis method employed in this research is a systematic gap analysis comparing the current state of the architecture (baseline) with the desired target architecture. The replicable research procedure follows the foundational phases of the TOGAF Architecture Development Method (ADM) specifically Phase A (Architecture Vision), Phase B (Business Architecture), Phase C (Information Systems Architecture), and Phase D (Technology Architecture). To summarize and analyze the operational data effectively, the studio's processes are first mapped utilizing Michael Porter's Value Chain framework before the gap analysis is executed to design the final integrated blueprint.

RESULTS AND DISCUSSION



Architecture Vision and Value Chain Analysis

In the early stages of Enterprise Architecture Planning, it is critical to capture the essence of Toge Productions' overarching business strategy. The studio's primary vision is to operate as a premier global indie game publisher and incubator, specifically championing Southeast Asian developers. To ensure the IT alignment is in place to support this vision, this study developed a Value Chain model tailored to the studio's digital publishing ecosystem. This Value Chain captures the primary activities within Toge Productions that directly contribute to main value creation (game development and publishing) and the supporting activities that ensure the success of those primary operations. The mapping utilizes Porter's approach for the Value Chain Diagram. Figure 4 shows the result of this

development. Within this proposed Value Chain, this study categorizes all the activities that interact directly with the game product lifecycle and external developers as Primary Activities. These activities are the core drivers of Toge Productions' business model:

- **Inbound Logistics (Game Incubation & Curation):** The processes involved in sourcing "intellectualraw materials." This includes researching market trends, receiving game pitches from external indie developers, and curating third-party Intellectual Properties (IPs) for the publishing label.
- **Operations (Internal Game Development):** The heart of the production cycle. This encompasses game design, coding, pixel art creation, narrative writing, and rigorous Quality Assurance (QA) testing for internally developed titles.
- **Outbound Logistics (Digital Distribution):** The management of digital distribution. This involves securing API keys, managing release schedules, and distributing the final game builds to global storefronts such as Steam, Nintendo eShop, PlayStation Store, and Xbox.
- **Marketing & Sales:** Activities aimed at building community hype and driving sales. This includes releasing game trailers, participating in international gaming conventions (e.g., PAX, Gamescom), releasing playable prologues, and executing global PR campaigns.
- **Service (Post-Launch Support):** Providing ongoing value to the player base after the game's release. This involves monitoring community feedback, deploying hotfixes and patches, and developing paid or free Downloadable Content (DLC) to extend the game's lifecycle.

Business Architecture Modeling: DFD Analysis

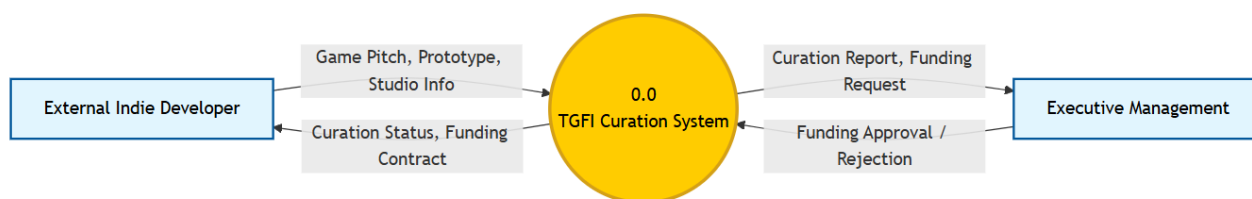
Based on the Value Chain mapping, the primary activities of Toge Productions require robust data management to function efficiently. To visualize how information flows through the proposed target architecture, this study utilizes Data Flow Diagrams (DFD).

The first critical primary activity is **Inbound Logistics**, which represents the Toge Game Fund Initiative (TGFI) curation pipeline. In the target architecture, this manual process is upgraded into an integrated **TGFI Curation System**.

DFD Level 0 (Context Diagram)

The Context Diagram (Level 0) provides a high-level overview of the entire TGFI Curation System. It illustrates the system as a single central process interacting with external entities.

For the TGFI pipeline, the two primary external entities are the **External Indie Developer** (who submits the game) and the **Executive Management** (who approves the funding).

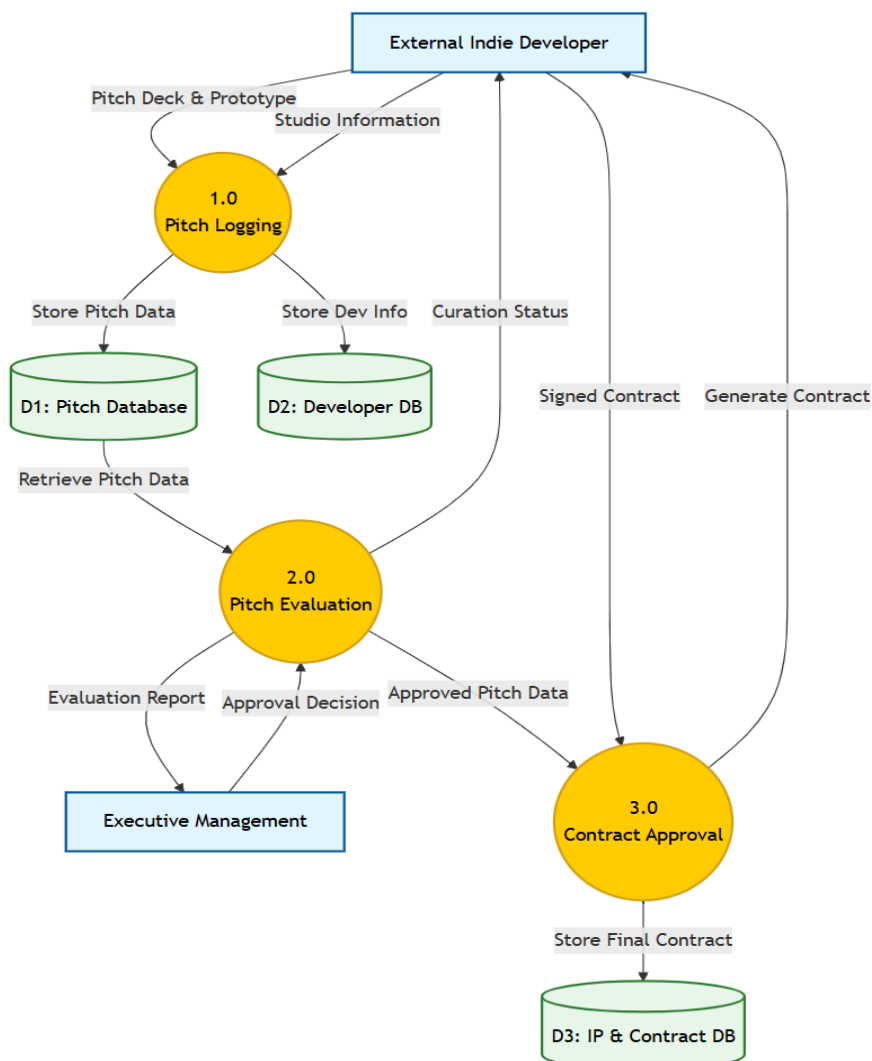


Explanation of Level 0:

- **External Indie Developer:** Acts as the primary data source, inputting Game Pitches, Prototypes, and Studio Information into the system. In return, they receive Curation Status updates and Funding Contracts.
- **Executive Management:** Receives summarized Curation Reports and Funding Requests from the system, and outputs Funding Approval decisions back into the system.

DFD Level 1 (Sub-Process Breakdown)

To provide deeper technical insight, DFD Level 1 breaks down the main system into three distinct sub-processes and introduces the internal data stores (databases) required to hold the information.



Explanation of Level 1:

- **Process 1.0 (Pitch Logging):** The system receives the raw pitch data from the developer and securely stores it into the **Pitch Database (D1)** and the **Developer Database (D2)**.
- **Process 2.0 (Pitch Evaluation):** The curation team retrieves the pitch data to evaluate the game's art, gameplay, and scope. The system generates a report for Executive Management and waits for an Approval Decision. The curation status is then routed back to the developer.
- **Process 3.0 (Contract Approval):** If approved, this process handles the legal documentation. It generates the TGFİ contract, receives the signed copy from the developer, and securely archives it in the **IP & Contract Database (D3)**.

V. CONCLUSION

This study successfully mapped and designed a target Enterprise Architecture for Toge Productions by tailoring the TOGAF ADM framework to fit the unique needs of a global indie game publisher. By adapting the foundational planning phases (Phase A through D) and utilizing Michael Porter’s Value Chain analysis, this research identified critical operational gaps within the studio's digital publishing pipeline. To bridge these gaps, the proposed blueprint introduces centralized IT solutions specifically the TGFI Curation System, the Internal Game Production System, and the Digital Distribution System which were visualized using structured Data Flow Diagrams (DFDs)

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