Appendix B - EA Smell Overview

B.1 Deficient Names

The "Deficient Names" smell arises when components, services, or business units are labeled with terms that lack semantic clarity, for example, the name is vague, meaningless, or fails to indicate what the element does. This smell can be caused by multiple architects with no common naming standard. It can lead to unclear behavior of components and inconsistent names. For example, a department labeled “NextGen Ops” does not indicate its purpose. A more precise name might be “Cloud Operations and Monitoring”. If issues occur, enterprise architects should consider renaming components and supporting complementary or interrelated functionality to avoid misunderstanding [2].

B.2 Contradiction in Input

The "Contradiction in Input" EA smell arises when two or more business rules, policies, or conditions within an architecture model are logically incompatible, meaning they cannot be valid simultaneously. This results in unreachable execution paths, as no operational logic can satisfy the conflicting requirements. For example, a rule such as “x < y AND x = y” creates an impossible condition to fulfill, thus halting the process. A practical business-layer example would be the coexistence of a policy requiring all customer queries to be answered within one hour and a cost-cutting directive mandating a 30\% reduction in support staff and limiting operations to weekdays from 9:00 to 18:00. These contradictory policies make it impossible to meet the service requirement under the given constraints. Such contradictions often appear in business documents where misaligned objectives result in inconsistent decision-making.

B.3 Language Deficit

The "Language Deficit" EA smell arises when the names of elements in enterprise architecture (EA) models and descriptions are vague, inconsistent, or do not adhere to naming conventions. This smell affects the clarity and maintainability of the EA model. TOGAF naming standards suggest, for example, that business object names should be nouns and business process names should be verbs or verb-noun combinations. For example, a process is labeled as “Customer Info Handling” instead of using a more apparent verb-noun form like “Handle Customer Information.” This leads to ambiguity and potential confusion when the documentation is interpreted by stakeholders or reused in downstream systems.

B.4 Shiny Nickel

The "Shiny Nickel" EA smell refers to the superficial adoption of emerging technologies, such as AI, blockchain, or digital twins, primarily to signal innovation rather than address concrete business or architectural needs. These technologies are often poorly integrated into core processes, leading to fragmented systems, redundant technology layers, and increased complexity in support and maintenance. This smell typically results from a lack of strategic IT governance and cohesive procurement practices, where decisions are driven by trend adoption rather than architectural alignment. For example, deploying AI-powered chatbots in customer service to appear technologically advanced, despite low interaction volumes and no backend integration, serves more as a signaling effort than a functional improvement. Avoiding this smell requires disciplined adherence to EA roadmaps and clearly defined technological standards [2].

B.5 Business Process Forever

The "Business Process Forever" EA smell arises when business processes have been rigidly defined in the past, often by technical experts, and are now considered stable and unchangeable despite shifts in business needs or market conditions. As a result, these processes become static and resistant to change, rendering business process owners powerless to adapt them. This can lead to inefficiencies, stagnation, and a failure to innovate or optimize operations. An example would be an onboarding process established a decade ago that remains unchanged despite the availability of digital tools and shifting customer expectations. Due to insufficient stakeholder involvement and fear of disruption, the process continues to rely on manual reviews and redundant data entry, leading to delays and increased costs. Liss et al. argue that this problem can be solved through integrating a process manager component [2]. This would help with process monitoring. In addition, enterprise architects should collaborate with business stakeholders to critically assess such processes and identify areas for redesign.

B.6 Ambiguous Viewpoint

The "Ambiguous Viewpoint" smell occurs when an architecture artefact fails to specify or consistently apply a stakeholder perspective. Absent or mixed viewpoints impede the separation of concerns, blur abstraction layers, and risk misrepresenting stakeholder priorities across the business, application, and technology domains. For instance, without declaring a governing lens, a corporate strategy map that simultaneously reflects the CEO’s growth agenda, the CFO’s cost targets, and Operations’ efficiency metrics leaves decision-makers without a coherent basis for trade-offs, thereby fostering misalignment and diffused accountability. Liss et al. recommend including one of the five

viewpoints to indicate the perspective: Business, Application, Technology, Strategy, Implementation, or Migration [2].

B.7 Big Bang

The "Big Bang" smell occurs when an organisation replaces or redesigns its entire enterprise architecture (EA) in a single release rather than through staged iterations. This strategy conceals requirement gaps, disrupts communication, and introduces architectural inconsistencies. For example, a retail company moves every store, system, and process to a new omnichannel model in one global cut-over. Without staged pilots and readiness checks, daily operations stall, process execution diverges, and KPIs are missed.

B.8 Temporary Solution

The "Temporary Solution" EA smell arises when provisional fixes are introduced to keep operations running without going through a complete design cycle. Although intended as short-term measures, these workarounds often persist, becoming part of the architecture and adding to enterprise-architecture debt. For example, a retail organization plans to retire its legacy Order Management System (OMS A) and migrate to a cloud-native OMS C. Integration delays require an interim middleware component (OMS B) that transfers data from A to downstream analytics. Defined initially to run for three months, OMS B remains in production a year later, accumulating business logic and acting as an undocumented but critical dependency. Liss et al. recommend extracting the temporary solution, making monitoring its active duration and impact easier [2].

B.9 Responsibilities not defined

The "Responsibilities Not Defined" EA smell occurs when a business capability, process, or strategic objective lacks an assigned owner accountable for its execution and oversight. This absence of accountability can lead to stalled initiatives, indecision, duplicated efforts, and inconsistent execution, undermining strategic alignment across the enterprise. For instance, if a quarterly strategy document establishes an objective to increase cross-sell revenue by 15% in FY25 but fails to designate an explicit owner (e.g., Head of Sales, Digital Commerce Lead, or Marketing Analytics Manager), conflicting assumptions among sales, marketing, and product teams may result in inaction, leaving the target unmet.

B.10 Efficiency goals not visible

The "Efficiency Goals Not Visible" smell exists when artefacts that steer day-to-day or project work describe activities' performance but do not indicate quantitative targets for how well they should perform (e.g., cycle-time, cost-per-transaction, throughput, waste). Without such metrics, decision-makers cannot verify that automation, outsourcing, or lean redesign leads to a measurable benefit. Optimization becomes conjectural and typically delivers only marginal gains. For example, a company's “Global Expense Reimbursement Policy” outlines roles, admissible costs, and process steps. Yet, it specifies neither measurable targets, such as “average reimbursement lead-time ≤5 working days” nor “processing cost per claim ≤8.” Without explicit efficiency KPIs, managers cannot judge whether the current shared-service centre underperforms or whether improvements would generate a demonstrable return.

B.11 Lack of documentation

The "Lack of Documentation" EA smell denotes an absence, obsolescence, or fragmentation of essential architectural artefacts and their underlying rationale. Insufficient documentation obscures the as-is and to-be states, complicates impact and change analysis, and undermines governance. Through that, strategy and objectives become non-transparent, leading to stakeholders relying on tacit knowledge or informal channels [1]. For example, a bank’s digital-first strategy mandates omnichannel onboarding for every retail product, yet the document "Retail Onboarding" still contains a placeholder file. Therefore, teams duplicate analysis efforts, and management loses traceability between strategic intent and implementation.

B.12 Project goals not achieved

A "Project Goals Not Achieved" smell arises when an initiative fails to meet its declared scope, budget, schedule, quality, or strategic value objectives. Such discrepancies usually come from uncoordinated implementation practices, inadequate governance, or shifting stakeholder expectations. This failure erodes confidence in enterprise architecture at the business layer, as unrealised benefits distort key performance indicators. For example, a digital-sales project sought a 20% conversion uplift by deploying a recommendation engine across all regions. Only the European site is live twelve months later, and conversion has improved by just 5%. Project management must address the reasons for not meeting the project goals, and enterprise architects must check the effect on other enterprise processes.

References

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[2] Lukas Liss, Henrik Kämmerling, Peter Alexander, and Horst Lichter. Towards a Catalog of Refactoring Solutions for Enterprise Architecture Smells. In: *QuASoQ 2021*. https://ceur-ws.org/Vol-3062/Paper09_QuASoQ.pdf