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Elevate your Solution Design game with Generative AI

Leverage DesignBuddy to reduce the design cycle time by 30%

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Inefficient and extended Software Solution Designs (SSD) lead to missed deadlines, and increased costs

Solution design is a key phase in software development, outlining product architecture and requirements. Solution Design falls under innovation, which receives **20%** of the technology budget in leading organizations. Report

Such a high budget is attributed to the inefficiencies in the SSD creation process.

Challenges in SSD creation

Knowledge Fragmentation:
Design info is scattered across formats and systems, causing inconsistencies.

Knowledge Concentration:
Reliance on a few experts creates bottlenecks & risks if they are unavailable.

Technology Evolution:
Frequent tech changes outpace manual design methods.

Inconsistent Quality:
Manual designs are prone to human error, leading to inconsistencies.

Impacts

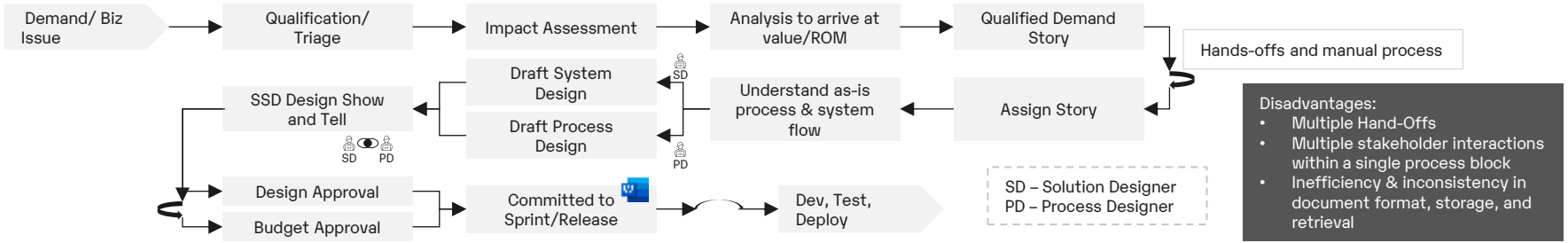
~15 -20% increase in time-to-market due to delays in design retrieval and inefficient design processes

26% more project delays are experienced by organizations with high dependency on key individuals

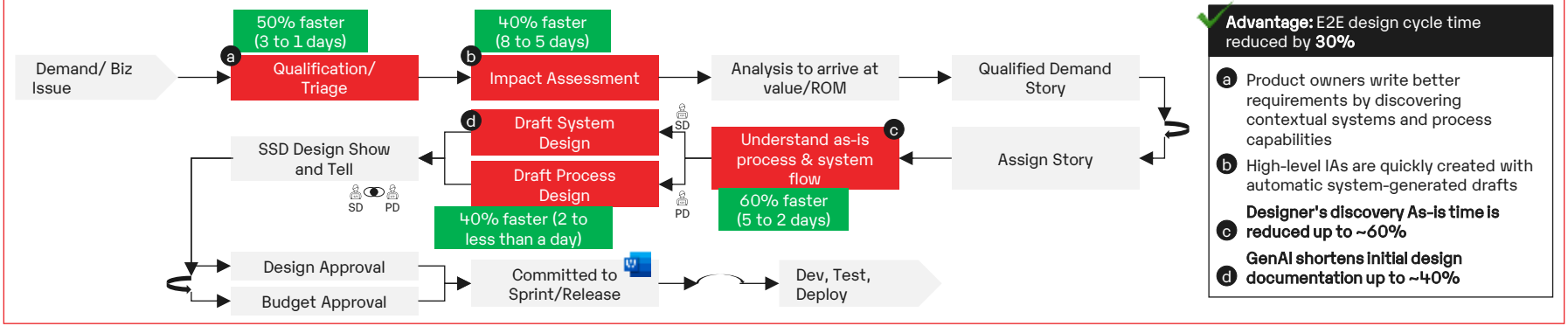
Generative AI can revolutionize the software development lifecycle across various phases, including requirement analysis and design phase, enhancing employee productivity and accelerating time to market for software products.

Revolutionize Solution Design with Gen AI to accelerate knowledge gathering, retrieval, and content generation, cutting the design cycle time up to 30%

As-is process of SSD creation



SSD Processes transformed by Gen AI



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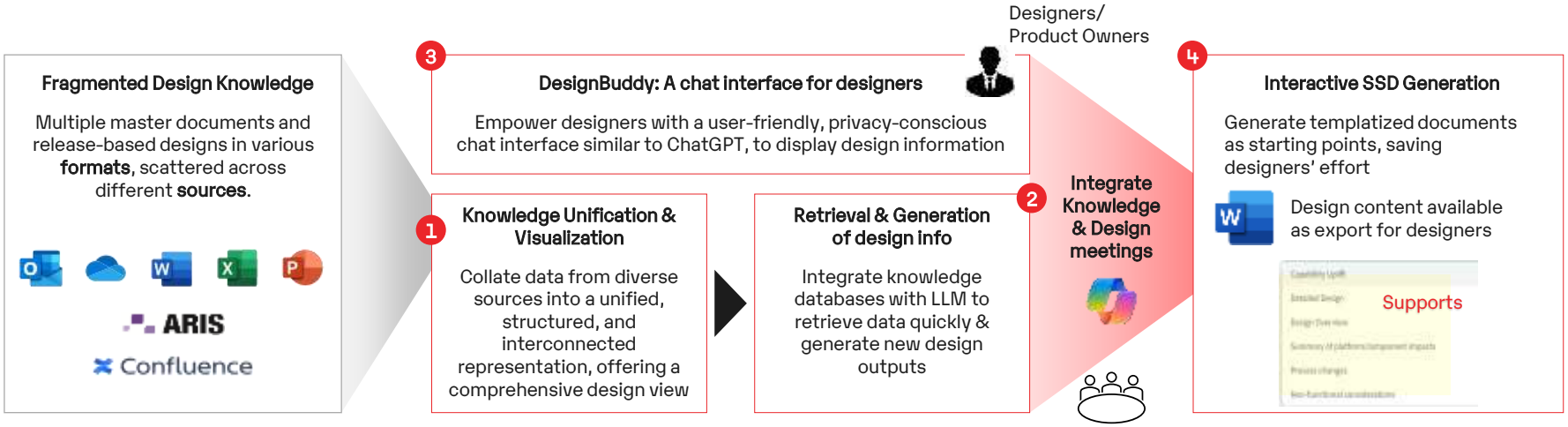
Adopt the DesignBuddy Framework powered by Generative AI for an interactive and standardized automated SSD generation

Key components of DesignBuddy Framework: Use a systematic approach to understand user demands, retrieve relevant data, conduct impact analysis, and generate tailored solution designs.



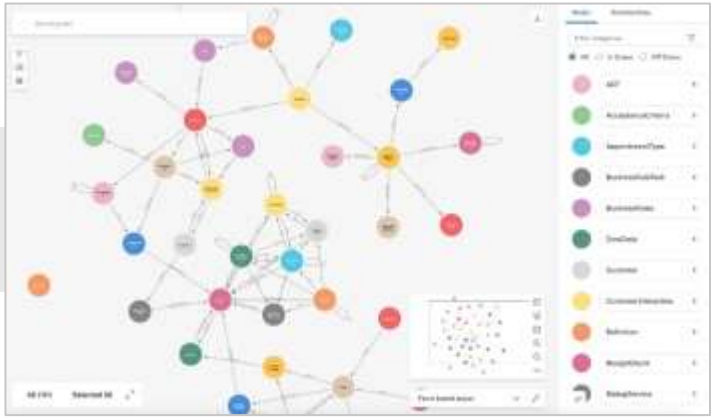
Implement the DesignBuddy Framework to boost design efficiency up to 30%, accelerate time to market up to 15%, and enable consistent, rapid software releases to maintain a competitive edge.

Design Knowledge Unification: Integrate data from diverse sources into a unified, structured, and interconnected representation, offering a comprehensive design view

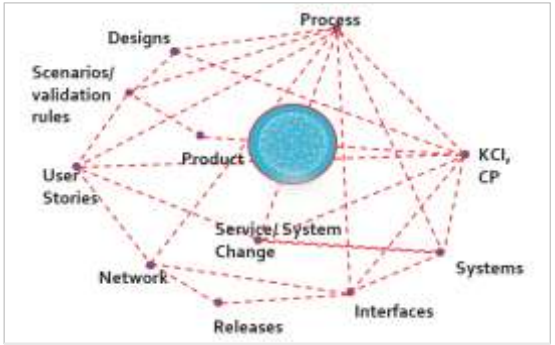
1 2 3 4

Crucial design data is dispersed, increasing retrieval time by up to **40%,** as service providers often avoid knowledge graphs due to the complexity and need for specialized domain expertise.

Consolidate diverse design information (processes, biz capabilities, n/w, technology)—by identifying key **entities** (product, journey) and establishing **relationships** between them. Create an ontology and store the resulting **knowledge graph** in a specialized database like Neoj4. Use query languages like **Cypher** for data retrieval and manipulation and integrate **visualization tools** to explore and present the graph data effectively.



Snapshot of Neo4j Bloom showcasing graphs



All design info (designs, processes, interfaces, etc.) is unified into a single, cohesive view.

Recommendation

- Choose a **scalable graph database** like Neo4j, Amazon Neptune that can handle large datasets and complex queries efficiently
- Emphasize Reusability by adopting **Flexible Schemas** that can accommodate various data types and structures, making it easier to integrate new data sources; **Reusable Query Engines** facilitating complex queries and analytics

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Retrieval & Generation of design information: Integrate knowledge databases with LLM to reduce the discovery time from weeks to a few hours

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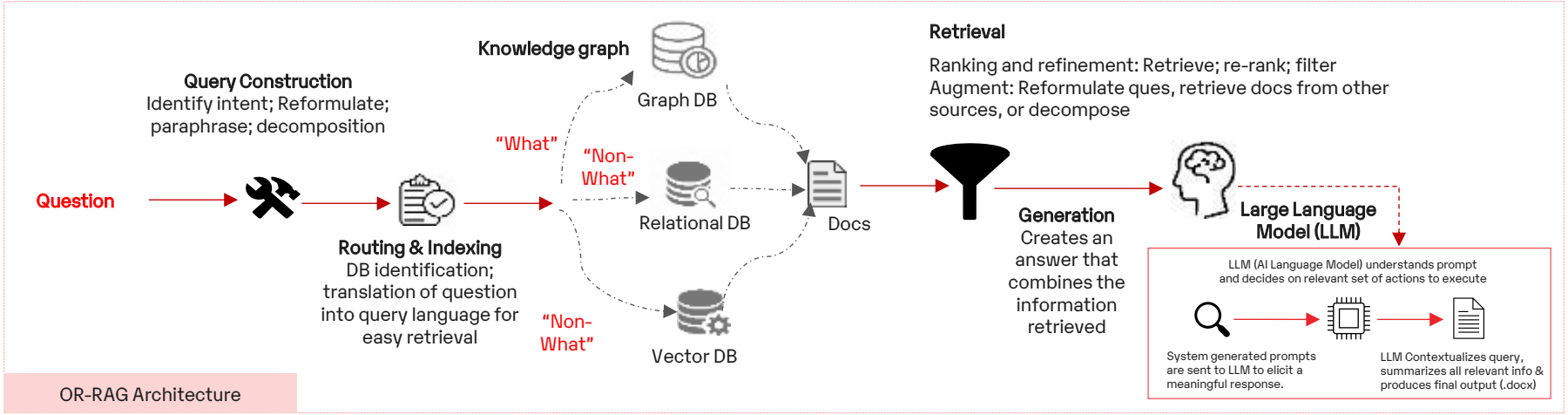
The As-is process for retrieving information is entirely **manual** and requires **weeks** of back-and-forth between fragmented documents, sources, and stakeholders.

Implement an **Ontology-Relevant Retrieval Augmented Generation (OR-RAG)** Architecture to streamline SSD creation. This system **interprets** demand, **routes** queries to relevant sources (e.g., "what" questions to a Graph DB), **indexes** data, and **generates** documents. Use NLP and advanced indexing for context-aware responses and create **reusable prompt templates** for role-specific content.



OR-RAG Architecture

Recommendation

- Enrich documents with **Metadata** and schedule **real-time indexing** for effective search across repositories (Amazon S3, RDS, SharePoint)
- Use pre-built connectors like Amazon Kendra's out-of-the-box (OOB) options to index and search content across various data sources, enabling seamless data integration and retrieval
- Focus factors for high-quality response: Knowledge availability, Retention, Search effectiveness, Result prioritization, Code modularity

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Chat interface for designers (DesignBuddy): Design a user-friendly conversational UI, similar to ChatGPT to display design information

1 2 3 4

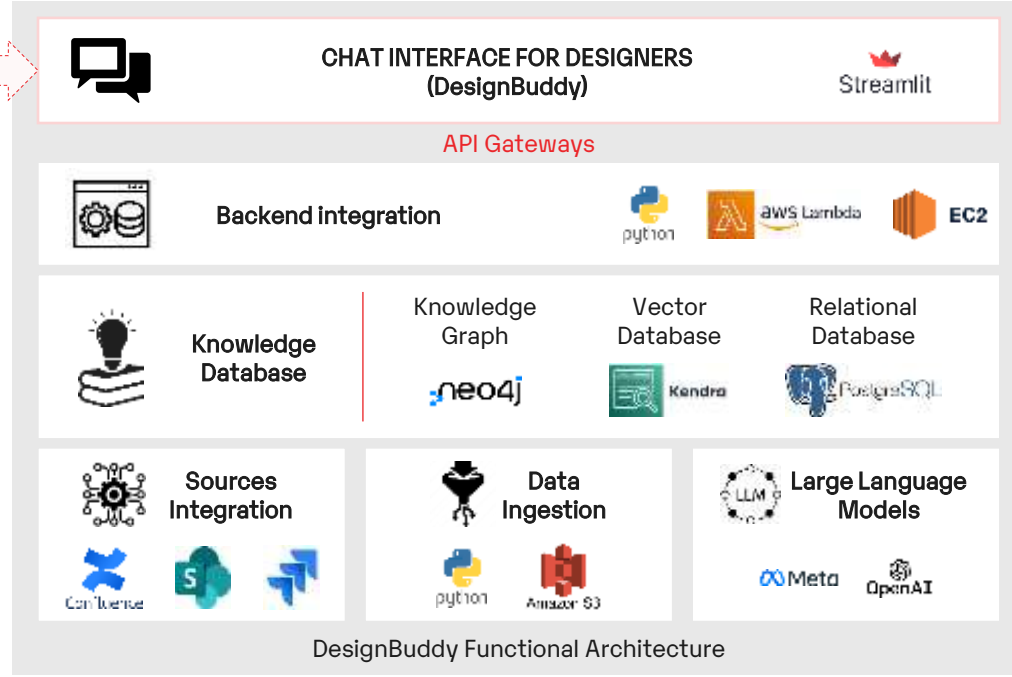
A window for designers to contribute and influence the designs. DesignBuddy acts as an assistant to aid the speed of SSD creation.

Create a DesignBuddy interface in 3 easy steps

1. Develop a simple and intuitive chat UI using web apps & open-source platforms like Streamlit. Perform **backend server integration** to manage communication between the interface and the LLM (integrated with the knowledge database).

2. Connect the chat interface to the LLM with **APIs**. The backend processes the LLM's response and sends it to the interface for display to users.

3. Enhance the chat experience with **context management, error handling,** and **feedback loop.**



DesignBuddy Functional Architecture

Recommendation

- Implement Reusable Functions: Modular functions for repetitive tasks used for e.g data loading, preprocessing, visualization
- Create Reusable Templates and Layouts: Design consistent and reusable layouts using containers, columns, and markdowns

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Interactive SSD generation: Automatically create design skeletons based on call transcripts

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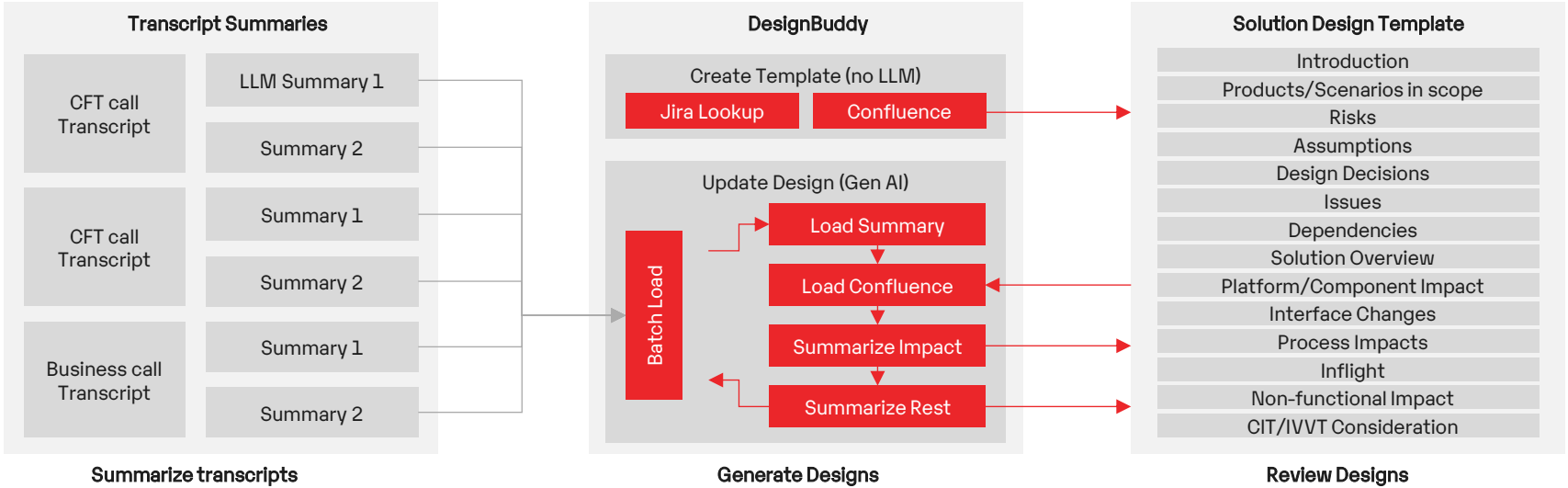
Summarize key call transcripts with AI, **generate design templates** by pulling data from Jira and Confluence, and **update design templates with Gen AI** by integrating summaries from transcripts, loading details from a template, and summarizing key impacts.



Recommendation

- Use query templates for frequently asked questions or common data retrieval tasks
- Develop an **intent recognition model** that can be trained on generic intents and then fine-tuned for specific applications, allowing the core model to be reused with minimal adjustments
- Shared Vocabulary: Establish a shared vocabulary for intents and entities to maintain consistency across various implementations

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Sample Use Case: Automated Generation of SSD for a 5G Network Management System

DesignBuddy Framework streamlines the role of a designer in the document creation process, highlighting how advanced tools like LLMs, knowledge graphs, and retrieval systems automate and enhance the generation of Software Solution Documents.

User

"Generate SSD for 5G N/w Management System using cloud-native microservices"

DesignBuddy

Parse Query to understand intent

Intent & Entity Extraction

"5G"; "NMS"; "cloud native"; "microservices"; "SSD generation"

User can edit (add/delete) the entities

Knowledge Graph Querying

Retrieve related graphs (5G design patterns, microservices architecture) of the identified entities

User can select the relevant graphs

Document Retrieval (OR-RAG)

Search docs (telco standards, technical docs, previous project docs); retrieve & rank as per relevance

SSD Generation (LLM)

Combine all information and generate the first draft of SSD covering architecture design, technology stack, security protocols, integration points

SSD Enrichment (LLM)

Structure into a defined template; enhance details, diagrams, language

available for download & user feedback is captured

SSD First Draft

Benefits achieved by a Broadband Network Solutions Provider in the UK by leveraging DesignBuddy

30 %
Improved design efficiencies with faster design discovery and automated design draft generation.

15 %
Faster Time-to-Market due to streamlined design cycles and accelerated software releases.

30 %
Reduction in design phase cost with optimized resource allocation.

- Reusable tools and generic solution
- Scalable and standardized design innovation
- Improved customer satisfaction

Thank you

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