# IT Architecture – Dragon1 Step by Step Guide

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Date: April 17, 2023
Version: 1.4 final
Location: https://www.dragon1.com/downloads/IT-Architecture-Dragon1-Step-By-Step-Guide.pdf

*How to set up, design, build, use, and maintain an IT Architecture on the Dragon1 EA platform*

## 1. Introduction

This document introduces the Dragon1 step-by-step guide for IT Architecture. It is aimed at all business professionals and IT professionals in an organization that are concerned with Risk Mitigation and Management, Cybersecurity, IT Infrastructure and Management, Application Management, Data Analytics, Business Intelligence, Process Management and Service Management.

This document explains in a practical way what IT Architecture is and what the benefits are of documenting and using it in the organization. It also shows how to start working with IT Architecture.

This document helps to create an internal IT Architecture plan to design, set up, build, use, and maintain an IT Architecture on the Dragon1 platform.

## 2. What is IT Architecture?

IT Architecture is part of Enterprise Architecture. IT Architecture is a coherent set of IT-related concepts, principles, design guidelines and frameworks/standards, derived from the business strategy and IT strategy and the business model of an organization. IT Architecture helps to improve coherence and integration of the IT Environment of an organization. IT Architecture documentation gives overview and insights in the coherence and interdependencies of the IT environment of an organization.

As certain types of culture, values and identity are prominent concepts themselves and also introduce other concepts in the organization, culture, values and identity play an important role in IT Architecture. IT as a term is the way an organization brings forth IT services with business activities supporting or enabling purpose via a range of coherent IT activities. IT Architecture helps to create a strong secure, available and adaptable IT environment.

After deriving and selecting concepts and principles from the strategy, the concepts and principles need to be converted or translated into design guidelines and frameworks/standards. Because then you can select, buy, design, build and implement solutions (to problems) that will integrate or fit together great and support executing the strategy optimally. Therefore IT architecture or better said doing IT Architecture right, is a very serious and important strategic matter.

IT Architecture is a design discipline, to document, visualize and analyze gaps, weaknesses, and strengths in the current state of the IT of the organization and to design a strong future state of the IT of the organization. IT Architecture is to design a coherent set of IT concepts. A concept is an abstraction of an implementation, an approach and an idea. A principle describes the way a concept works, producing results. Almost everything can be seen as a concept, but only a few concepts are

 

relevant for an organization to be made part of an architecture. This is the challenge for the architect: find out what concepts and their principles should be made part of the IT architecture.

Example concepts of IT Architecture that almost any organization today uses, are: IT standardization, separation of concerns, service orientation, interoperability, single responsibility, microservice, application reuse, loosely coupling, RESTapi, platform, operating system, IP networking, server virtualization, data center, cloud, mobile device, BYOD, Client-Server, IDL, firewall, least privilege, AI (f.i. machine learning), low code, event monitoring and early warning system.

Examples of concept principles are:

| **Concept** | **Concept Principle (a Working Mechanism of a Concept)** |
|---|---|
| IT Standardization | - IT Standardization improves clarity and guarantees the quality of IT solutions<br>- By making software, systems and IT infrastructure, that are used throughout the organization, fully consistent and integrated, it is ensured systems will communicate more easily, business processes will run more efficiently, and work will be done faster. |
| Service Orientation | By partitioning software or applications into discrete autonomous and network-accessible “small” units, designed to only solve an individual concern, it is ensured that the ROI of IT solutions is shorter, business/IT alignment is higher, the agility of the organization is much higher and the interoperability within the organization and with other organizations is much higher than otherwise. |
| Micro Service | By having services with a single responsibility that can be managed independently, services can be scaled up and down without a significant impact on other services. |
| Application Reuse | -Reuse reduces complexity<br>-By using an application again or more costs are reduced |
| IT Complexity Reduction | - IT complexity reduction mitigates risks<br>- By actually replacing outdated systems and technologies with modern ones and standardizing compliant to policies, the complexity of IT is reduced, reducing (hidden) costs and mitigating risks regarding security and availability. |
| Loosely Coupling | - Loosely coupling between applications or IT components increases the availability and cybersecurity of the whole IT environment.<br>- By having applications and IT components interact with each other, purely based on an interface abstraction or description and not on each other’s internal working, a change of one application or IT component hardly impacts the collaboration and interaction of other applications and components, thus increasing the availability and cybersecurity of the whole IT environment. |
| IDL | - Intruder Detection Lockout prevents brute force attacks<br>- By maximizing the number of login attempts with incorrect credentials (threshold) and then blocking the account for a period, it is ensured brute force attacks are prevented, thus increasing the cybersecurity and availability of the IT environment as a whole. |

Together these listed concepts and principles form already the core of an IT Architecture.

IT Architecture is different from the IT structure. IT structure is how everything, like mission, vision, goals, objectives, priorities, IT capabilities, IT services, IT processes, applications, interfaces, APIs, microservices, networks, data centers, clouds, devices and servers, is connected and interdependent related to each other, but without the conceptual context. It is the conceptual context with concepts, principles, design guidelines and frameworks/standards that makes something an IT Architecture.

The purpose of IT Architecture is to have the IT structure of the organization be strategically and continuously transformed into a direction or state that much better supports the execution of the business strategy and IT strategy, than currently. Think of actually replacing all legacy systems, migrating everything to the cloud or introducing high-volume transaction systems successfully with high availability. The IT Architecture concepts, principles, visualizations and views will help the relevant stakeholders to do gap analyses, impact-of-change-analyses, what-if scenarios and risk assessments much more efficiently. As a positive side effect of data with IT Architecture, data will be managed as an asset much better in the organization.

IT Architecture can also be seen as a design capability of the organization. For this, IT architects are needed. They are qualified people that are able to design IT architecture. That means they know how to select the relevant IT-related concepts, principles, guidelines and frameworks/standards for the organization, to do structure analysis, gap analysis, what-if scenarios, planning, etc. It is best to have an EA Team in which IT architects take part.

IT Architecture can be described in an IT Architecture Dossier consisting of documents and visualizations with views. Often an IT Architecture Design Book is created consisting of 15 top-level visualizations (or diagrams) to easily communicate IT Architecture, showing the current state and future state and a transformation scenario.

The architecture diagrams will provide insights and an overview of the strengths and weaknesses of the IT Architecture, and they will show solutions.

It is best to document Business Architecture, Data Architecture, Application Architecture, Security Architecture, IT Architecture, and Solution Architectures as separate topics in an Enterprise Architecture document or dossier.

## 3. Design

Designing and documenting an IT architecture is the process of getting inspiration, sketching, modeling, weighing, and creating an IT architecture according to a plan or specification.

It is a best practice to create a plan on when and how to design, document, use and maintain an IT architecture. That plan document should define clear and realistic goals to pursue with the IT Architecture, such as standardization, integration or replacing technology debt. The plan also should define the resources and tools to do this. That plan should clearly list the key architecture and design decisions made, like central vs decentral, make vs buy, internal vs external, modern (proven) technologies vs futuristic (unproven) technology, ERP / big monolithic supplier only vs best of breed.

Today, designing and documenting the IT environment (its structure) and IT operation (its processes) of an organization with the focus of providing set of Business services and IT services (or APIs) is common and a good practice. In the future that could change, but for the next two decades service orientation and API orientation will stay viable concepts and services and APIs will stay viable concepts and design patterns.

The IT architecture of an organization from one angle can be seen as a coherent set of concepts. From another angle it can be seen as the sum of all solution architectures for the IT environment/IT infrastructure. Some organizations design and document their IT architecture by designing and documenting per Business service and IT service a solution architecture. Business service here is really a service provided to the customers and clients of the organization. IT service here is an internal created IT service, optionally depending on external IT services.

Reference models and best practices for the industry that you are in, will help a lot in getting you started designing and documenting your IT architecture.

To analyze the current state of IT Architecture or to design a future state of IT Architecture, a business strategy, data strategy and IT strategy are most useful as inputs, else workshops with stakeholders need to be held. Mission, vision, values, culture, legislation, organization structure, goals, objectives, priorities, job roles, projects and some capabilities are also very much needed as input.

With all these inputs, IT architects will be able to identify or create a total concept for the organization, consisting of often 10 key required/mandatory concepts, to fulfill its purpose. Each of these concepts has various principles in them. Making these principles explicit in documents and visualizations helps to direct and guide the evolution of the IT structure of the organization.

It is common to name and visualize the total concept and (often 10 major) key concepts of the IT Environment in design sketches and artist impressions, also using metaphors, to get the essence of the concepts and principles across the table. The total IT concept and key concepts should be justified with the goals and objectives of the strategy.

Examples of names for total IT concepts are: cloud-based health care services IT Infrastructure, digital omnichannel retail banking, and a modern real-time AI-enabled high-volume transaction engine for digital payments. In the design sketches of the total IT concepts 10 key concepts that are part of the total concepts could and should be drawn. Show the 5 to 7 key elements per concept and how they collaborate.

It is a good practice to sketch or draw a principle details diagram of the first principle of every concept. The first principle is the principle that describes the working of the whole of the concept. Other principles of a concept only address a part of the concept.

The design of an IT Architecture should be done by qualified IT architects. They are able to analyze, weigh, select and propose domains, functions, capabilities, concepts, principles, design guidelines and frameworks/standards to management.

Note that it is important to be able to distinguish between capabilities, concepts, principles and guidelines to have a strong IT Architecture. Capabilities can be seen as implemented concepts. All capabilities can be seen as concepts, but not all concepts qualify as capabilities. Whereas principles can be seen as the explanation of how concepts work and produce results.

Today IT Architectures are often built around IT capabilities. IT capabilities are assemblies of qualified people, processes and technology/tools. An IT capability is what the IT organization should be excellent at, because of its mission, vision and business model. Selecting the right IT capabilities and measuring how well they are currently implemented is an important task.

It is a best practice to at least distinguish between core IT capabilities and supporting capabilities (this helps us to do the make or buy decisions).

Examples of IT capabilities are: Access Management, Analytics, IT Gap Analysis, IT Strategy, Incident Management, Provision, Reporting, Systems Development and Version Management.

As you see, these are also all concepts. They are management or process focused. Dragon1 prefers to see capabilities as implemented concepts, So, when Access Management as a concept is not yet implemented successfully, it is not yet a capability of the organization, or a capability at maturity level 1: ad-hoc/chaos.

Often the design of IT Architecture takes place in iterations and often takes 3 to 9 months. Every month one can have and publish intermediate versions. Collecting and updating the data to use for the design, will be a continuous, never-ending, process. Therefore, the collection of the data should be done as automated as possible.

It is common to group the concepts and principles of the IT architecture in groups or layers, for instance, the services layer, application layer, servers layer, network layer and (tele)communication layer.

All the concepts and principles need to be “converted” by IT architects into design guidelines, standards/framework and rules, so it is clear for projects, procurement and suppliers how to build, buy and provide solutions that include or comply with the concepts and principles. This work is part of IT Architecture.

Many organizations first choose only to document reactively the current state IT structure and label or communicate that as IT Architecture. But then you will not cash in the strategic benefits of IT Architecture. It is always realistic and doable to plan to actually document, design and use the current state and future state IT Architecture of the organization. As a best practice use a roadmap to design, use and maintain your IT Architecture.

Most organizations worldwide focus on increasing IT standardization and reducing technology debt with IT architecture. That is a great first step that brings many benefits and therefore is worthwhile pursuing.

As all mission and business-critical data should be managed as assets, the data used to design IT Architecture is likely to be managed in all kinds of source systems. Try to identify these source systems and their owners.

A best practice to speed up designing an IT Architecture is to make use of industry standards and reference models. A best practice is also to document all the design decisions made by you or the stakeholders and owner/client.

On the Dragon1 website, there are various reference models for capabilities, concepts and principles to get started with IT Architecture.

## 4. Set Up

To set up an IT Architecture Dossier it is best to use a repository-based EA Tool like Dragon1. In the EA tool, you document/administer the concepts, principles, design guidelines and standards of the architecture, and entities like capabilities, services, processes, data objects and applications and their relationships (this is the structure of the organization). Also, you create and design visualizations, viewpoints, views and scenarios in the EA Tool.

Create at least 3 atlases (f.i. IT Architecture, Solution Design, Projects) and 15 templated visualizations for the current state of IT Architecture and per solution and project at least 1 templated visualization.

For every diagram named below, there are templates available on Dragon1. Make sure that in the end, all the diagrams together tell a story.

At any point in time, you can generate a pdf IT Architecture document using the Dragon1 MS Word template and PowerPoint template for an IT architecture document. Two other powerful documents to generate are : IT Standards document and IT Architecture Principles document. Make sure the C-suite of the organization approves these documents so they can be put in policy documents.

Create at least 3 stakeholder-based views (visual overlays) with every visualization. To be able to have relevant views, create a list of key stakeholders (about 20) and find out their wants, needs and requirements via interviews and workshops. Per stakeholder, recognize role-based viewpoints. Often viewpoints address issues and concerns on a role-based topic for a stakeholder. Per viewpoint, identify 1 or more views to visualize the issues and concerns of the stakeholder. Tip: create a model of all this.

Examples of linked roles, viewpoints and views for visualizations are:

| **Role** | **Viewpoint** | **View** |
|---|---|---|
| CFO | IT Risk Management Viewpoint | - IT Capabilities Maturity View<br>- Foreign Approved Suppliers View |
| CIO | IT Innovation Viewpoint | - Outdated Platforms View<br>- Standards Compliance View |
| CISO | Network Security Viewpoint | - Planned Implementation of Network security measures View<br>- Actual Implemented network security measure View |
| HR Manager | Modern Knowledge Viewpoint | - Current IT Competences Availability View<br>- Future IT Competences Necessity View |
| IT Manager | Version Management Viewpoint | Latest software & driver version installed |

IT Architecture is a suited approach to visualize and weigh various scenarios. A scenario is a series of events, choices/decisions and changes. The strategy documents of an organization often contain information to identify transformation or change scenarios for the IT Architecture, like centralizing or decentralizing or moving towards a new more digital and data-driven business model.

Be sure to document at least three different scenarios for transformation in your IT Architecture. Like: small change/impact, medium change/impact, and large change/impact.

The following top-level visualizations are very common to create for an IT Architecture (for the current, intermediate and future state).

| | | |
|---|---|---|
| IT Metamodel (showing how all the parts of the IT Architecture & IT structure are related to each other) | IT Capabilities Map / IT Concepts Map (High level or detailed) | IT landscape (showing the relationship between servers, networks, devices, OS-ses, routers, hubs, gateways, firewall) network layer, data core layer and platform layers |
| IT Strategy Framework diagram | IT Management Dashboard | Application Landscape & Data Landscape |
| IT Architecture Framework diagram | Layered Enterprise Map (with customers, products, services, organizations, processes, data and applications and IT infra) | Concepts/Process/Application Landscape |
| Enterprise Architecture Blueprint or IT Architecture Blueprint | IT Services map (linked to the IT Service catalog) | 10 detailed diagrams explaining the principles of the key 10 IT concepts |

| | | |
|---|---|---|
| IT Transformation Roadmap (High-level or Basic) | 5 blueprints / detailed diagrams of 5 key IT services. | Key IT Solutions/Projects Landscape (solutions/projects plotted onto the IT Landscape |
| IT Frameworks/Standards Map | IT Governance Model and Reporting Map | IT Solution Design Guidelines Map |
| IT Architecture Artist Impression or Design Sketch of the total concept and 10 concepts highlighted (for communicative purposes) | IT Domains Map & Networks Map | IT Functions and Information Systems Map |

Note that if a visualization or view becomes too complex, it is a best practice to divide it up into domains.

## 5. Build

When you have set up the dossier (created the template versions of the atlases, visualizations, views and scenarios), you can start to build or create the actual models, visualizations, views and scenarios. It is a best practice to plan when and how you will create/build the models, visualizations, views and scenarios.

To build a model, visualization, view or scenario you need data (objects with attributes and relationships) from source documents. So, you need to plan ahead of when you will receive data.

Always create or draw a sketch of the metamodel and model of the visualization you are creating.

Test and see what color schema, type of icons and styles work best with your stakeholders.

Always add a name, title, subtitle, and communication message to your visualization. It helps to make your visualization understandable to your audience.

Be sure to inspire stakeholders with reference models or example visualizations of what you are going to create. Sometimes the data that you need is not yet available or updated. And this helps the stakeholders to provide you with the data needed.

Define three or four cycles or iterations to create and improve your visualizations in. If possible try to have your models and visualizations be generated 100% from external sources, so the models and visualizations stay updated automatically.

Define maturity levels for (the implementation of) IT capabilities and IT processes. Look at frameworks like CMM.

Work closely together with your stakeholder for which you create the visualizations, views and scenarios. The views and list of events, decisions and changes in the scenario should be understandable for the stakeholders.

On Dragon1, users will have the option to play the scenario automated and comment on every step. You can also create a video of the scenario animation. Be sure to ask for feedback from your stakeholders when you have published a visualization.

## 6. Usage

To make sure people in the organization use the IT Architecture diagrams, it is advised to do the following:

- Have the owner/client and stakeholders participate in the design of the IT Architecture and the creation of the diagrams and views. Have them comment on the diagrams and views.

- Educate them on the why, when and how of the architecture visualizations you are going to create. Try to have them order or ask for the visualizations and views because of their role.
- Focus on creating visualizations for 20 stakeholder-based viewpoints, so that 20 key stakeholders are interested to use the IT Architecture diagrams daily.
- Distinguish formal and informal diagrams. Informal diagrams, like diagrams about principles, are often useful to get the essence across to non-technical people.
- Have the architecture (concepts, principles, design guidelines and frameworks/standards) get approved by C-level, an architecture board or another governing committee or body.
- Embed the architecture in policies. Make sure departmental plans, solution designs and project documents have to refer to the architecture (concepts, principles, design guidelines & frameworks/standards) and do: comply or explain.
- Make it very easy for stakeholders to access and comment on the latest updated architecture documents, visualizations, and views.
- Make it easy for stakeholders (checklists?) to audit, review or use a visualization in a meeting.
- Promote on the intranet the existence of the IT Architecture diagrams and place an IT Architecture awareness presentation on the intranet.
- Have the stakeholders follow the Dragon1 Viewer training.

## 7. Maintenance

To make sure the IT Architecture can be maintained, it is advised to do the following:

- Have 3 to 5 people follow training in the creation and maintenance of diagrams on Dragon1 and how to create views and scenarios.
- Define and draw a maintenance process.
- Create a maintenance plan and schedule when maintenance will take place.
- Develop a naming standard for all types of entities and make sure IDs are meaningless unique numbers and officially managed.
- Proactively contact the stakeholders and interview them on what they would like to have changed.
- Create interfaces with source systems, so that certain data is automatically updated in the repository.
- Try to automate the measuring of maturity of IT capabilities and IT processes.
- Design formulas on how to measure objectively how well IT capabilities are implemented: present qualified people/job roles, processes (documented and audited), technologies and tools implemented.
- Ask if source documents can be put in a permanent place on the intranet or elsewhere.
- Make sure there is a list of source documents or source systems and that changes in the sources are communicated to the team. Make sure you have contact persons for all the sources and contact them regularly. This will enable you to quickly update changes.
- Monitor access to the visualizations and views by stakeholders. If certain visualizations and views are never accessed, ask the stakeholders what needs to be improved.
- Regularly reach out to stakeholders if they are in need of new visualizations and views.
- Optionally have third parties review your IT Architecture or ask them for a second opinion.

## 8. Dragon1 IT Architecture Questions

Below, you find Dragon1 IT Architecture Questions. Answering them for your organization helps you start designing your IT Architecture that will help execute your Business Strategy and IT Strategy better.

1. What is IT Architecture according to Dragon1, to you and to your organization?
2. What are the main benefit and (strategic) purpose of IT architecture for you or your organization?
3. What are the 5 most important IT concepts for you or your organization?
    a. Current state: …
    b. Future state: …
4. What are 5 important Business Strategy or IT Strategy objectives or goals?
5. How do they relate to the 5 IT concepts?
6. What are 5 important IT concept principles? (These are the working mechanisms of the concepts)
7. How do you derive/extract concepts from strategy? What method do you use to do this?
8. What is your name for the current state total IT concept of your organization and the future state total IT concept of your organization (and what are the 10 key concepts part of it)?

| **Strategic goals / objectives / stakeholder requirements** | **Current State IT concept** | **Future State IT concept** |
|---|---|---|
| [goal/object/requirement 1] | [concept 1] | [concept 1] |
| [goal/object/requirement 2] | [concept 2] | [concept 2] |
| [goal/object/requirement 3] | [concept 3] | [concept 3] |
| [goal/object/requirement 4] | [concept 4] | [concept 4] |
| [goal/object/requirement 5] | [concept 5] | [concept 5] |

| **Previous state total IT concept / IT architecture** | **Current State total IT concept / IT architecture** | **Future State total IT concept / IT architecture** |
|---|---|---|
| [full name of the total IT concept] | [full name of the total IT concept] | [full name of the total IT concept] |
| [key concept 1] | [key concept 1] | [key concept 1] |
| [key concept 2] | [key concept 2] | [key concept 2] |
| [key concept 3] | [key concept 3] | [key concept 3] |
| [key concept 4] | [key concept 4] | [key concept 4] |
| [key concept 5] | [key concept 5] | [key concept 5] |
| [key concept 6] | [key concept 6] | [key concept 6] |
| [key concept 7] | [key concept 7] | [key concept 7] |
| [key concept 8] | [key concept 8] | [key concept 8] |
| [key concept 9] | [key concept 9] | [key concept 9] |
| [key concept 10] | [key concept 10] | [key concept 10] |

## 9. 100 Days Step-by-step Plan

Dragon1 has developed a 100 days step-by-step plan for clients, which follows the approach described in this document.

For every business working day, three tasks are suggested that could or should be done.

The plan is split up into 5 sections: set up, design, build, use and maintenance.

If you as a client are interested in the plan, please contact Dragon1 by sending an email to info@dragon1.com