

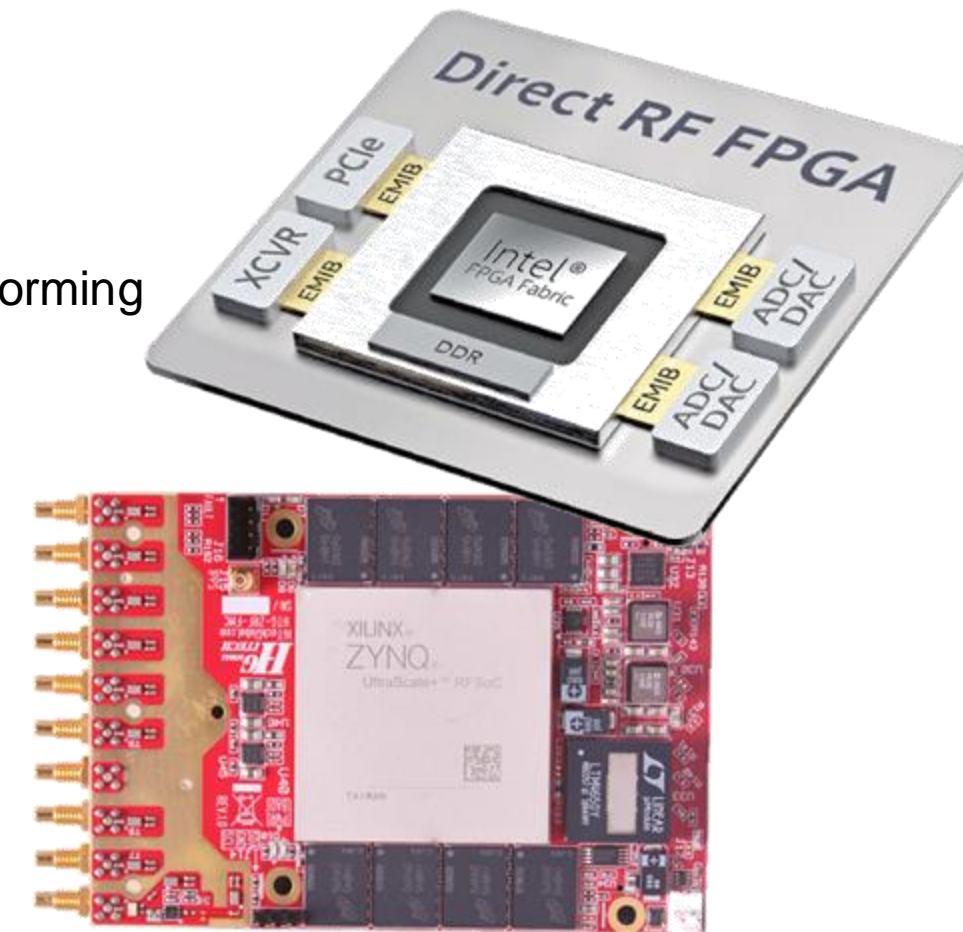
# 'Direct RF to Bits' Testing

## Introducing the Digital Signal Transceiver (DST)

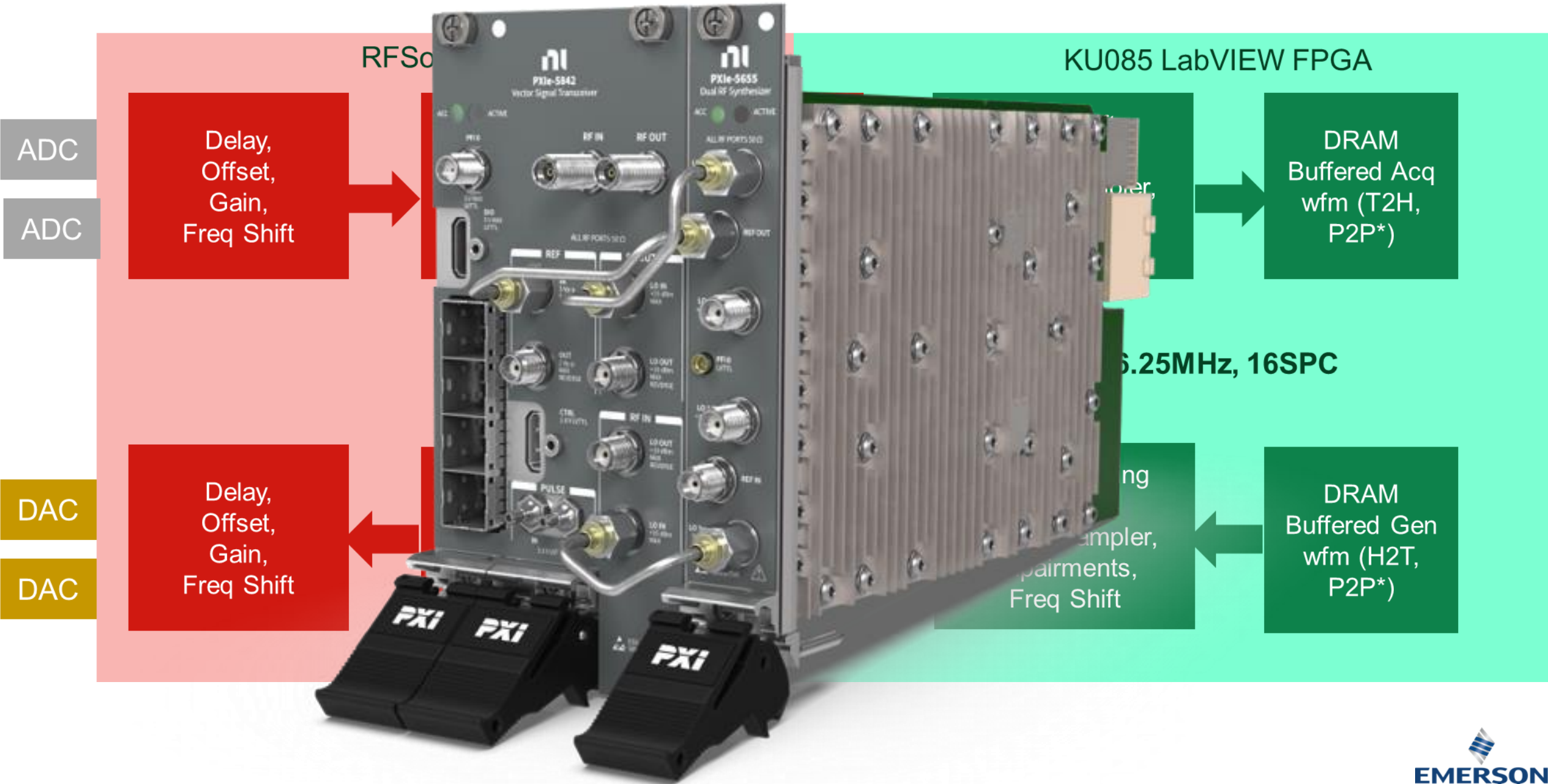
# Define 'RF to Bits' Devices

## RFSoc Enabled Devices Capable of Direct Sampling Wide-Band RF Signals

- Commonly sampling above 6GSa/sec to rates >64GSa/sec
- Significantly decreases component count to perform common operations like beamforming
- Digitally up/down converts signals and performs basic processing (gain, phase, eq)
- Requires digital bandwidths up to and beyond 100Gb/sec
- Flexible onboard FPGA with MGT streams to secondary processor
- Breaks common RF paradigm for using a VNA to test everything



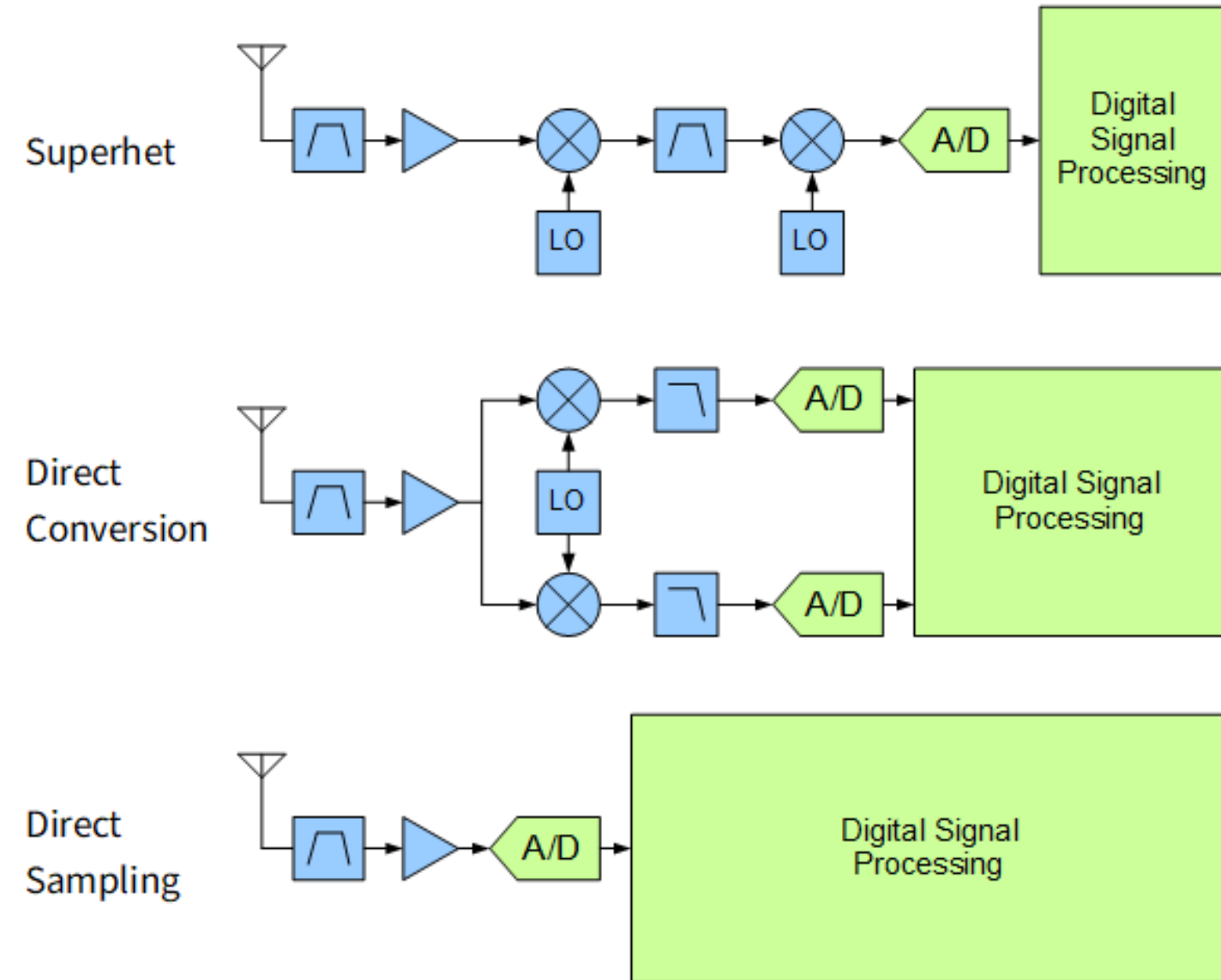
# PXIe-5842 VST – 5GSa/s ‘RFSoc’ Device



# Application: 'RF to Bits' Transmit Receive Systems

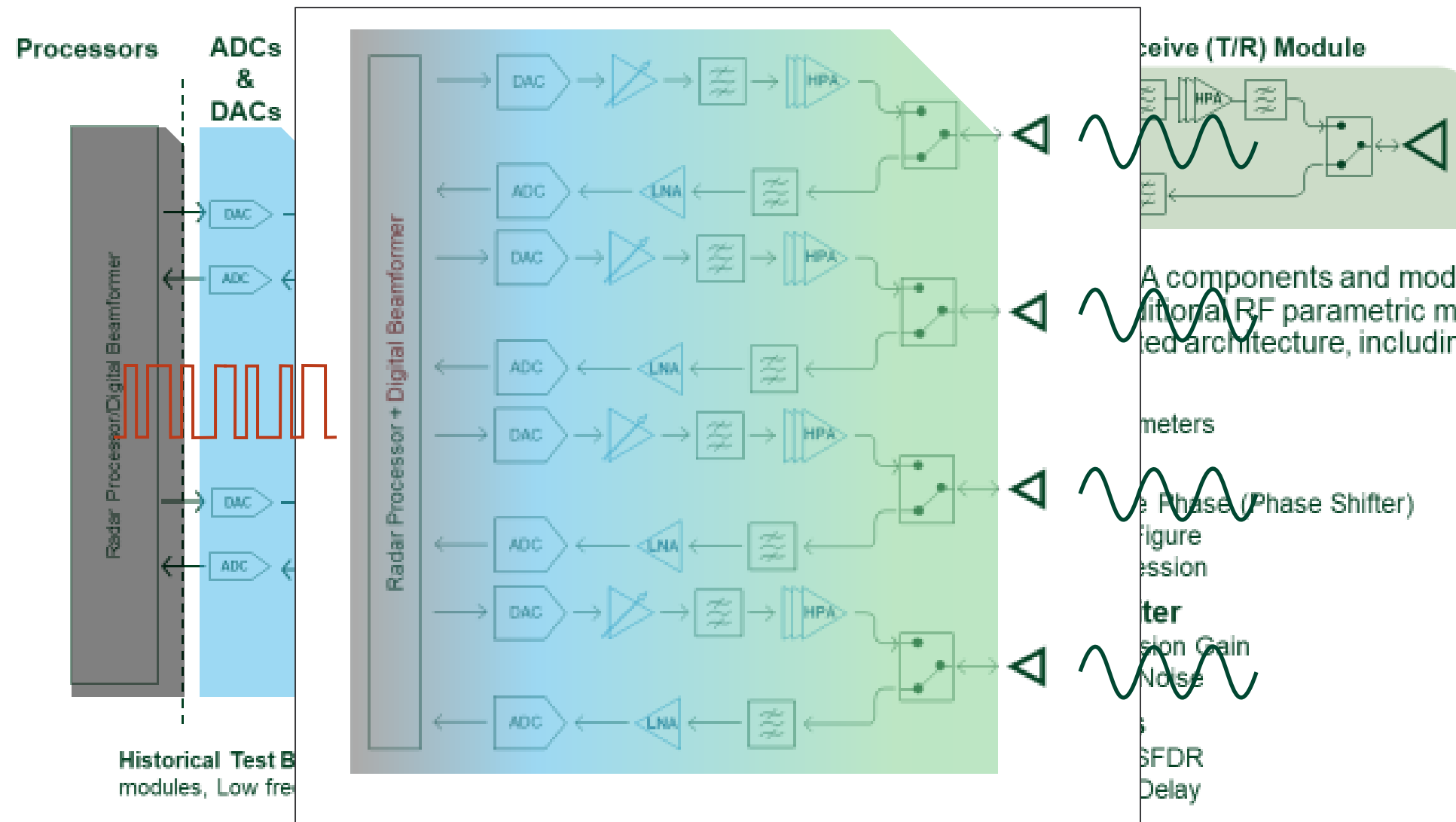


Human for Scale



# Industry Situation

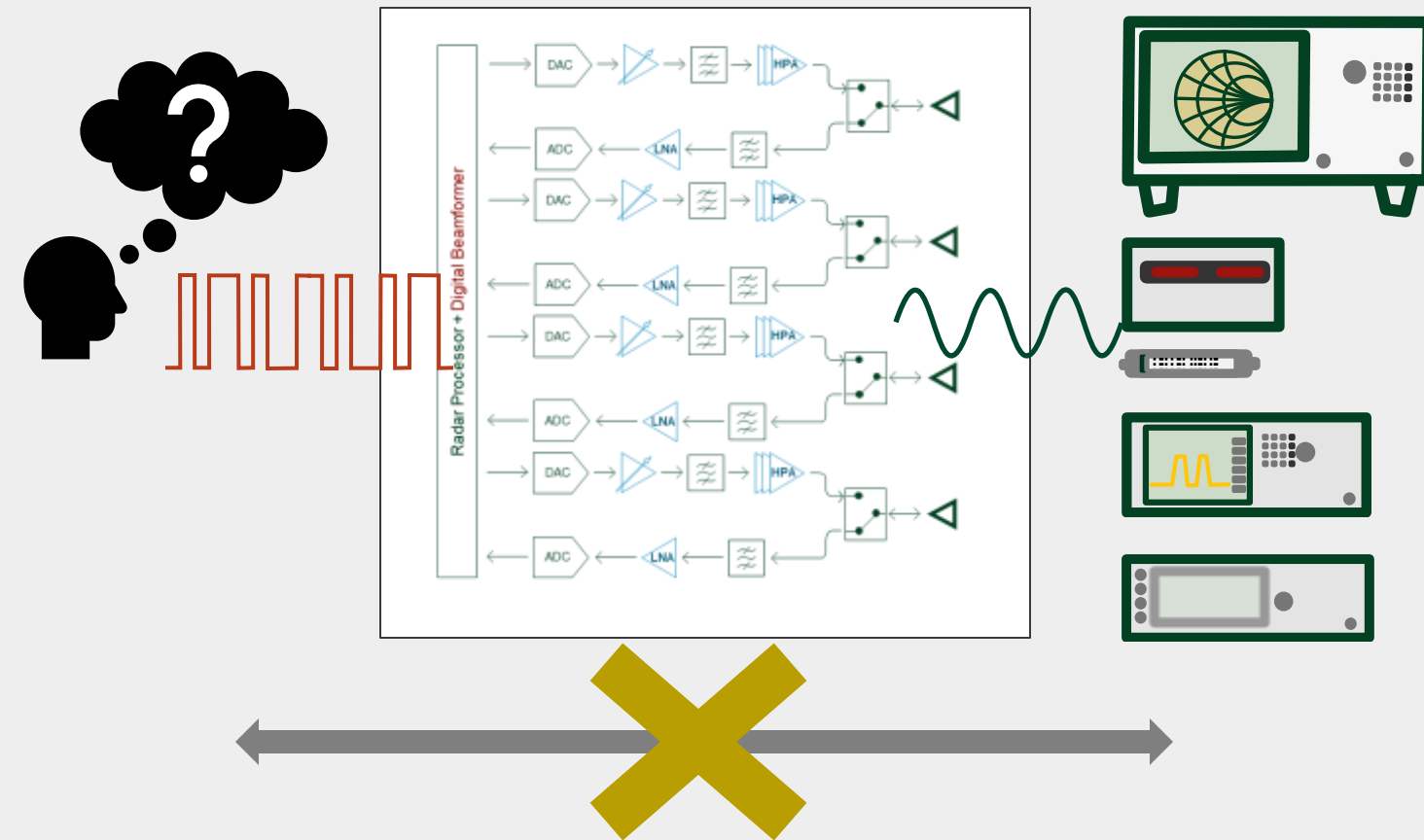
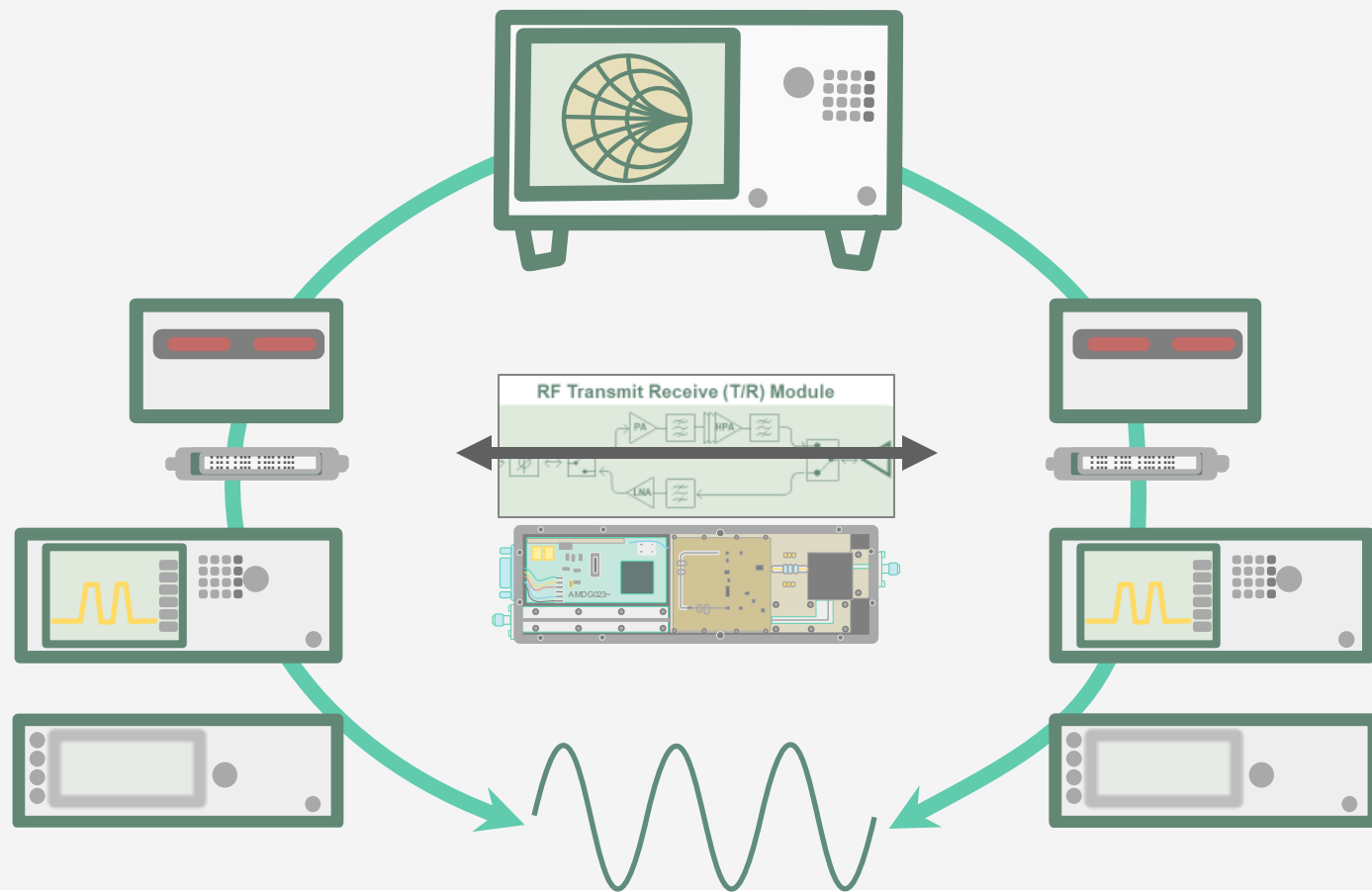
Active Electronically Scanned Array (AESA) antenna systems & signal chains have evolved from multiple, discretely testable, analog modules into digitally dominated transceiver systems with directly integrated high speed converters (ADC/DAC).





# Industry Challenge

Traditional AESA measurement methodologies and instruments, commonly utilizing analog VNAs, are incapable of fully addressing the modern signal & demands of these newly digitally integrated transceiver modules (DTRM).

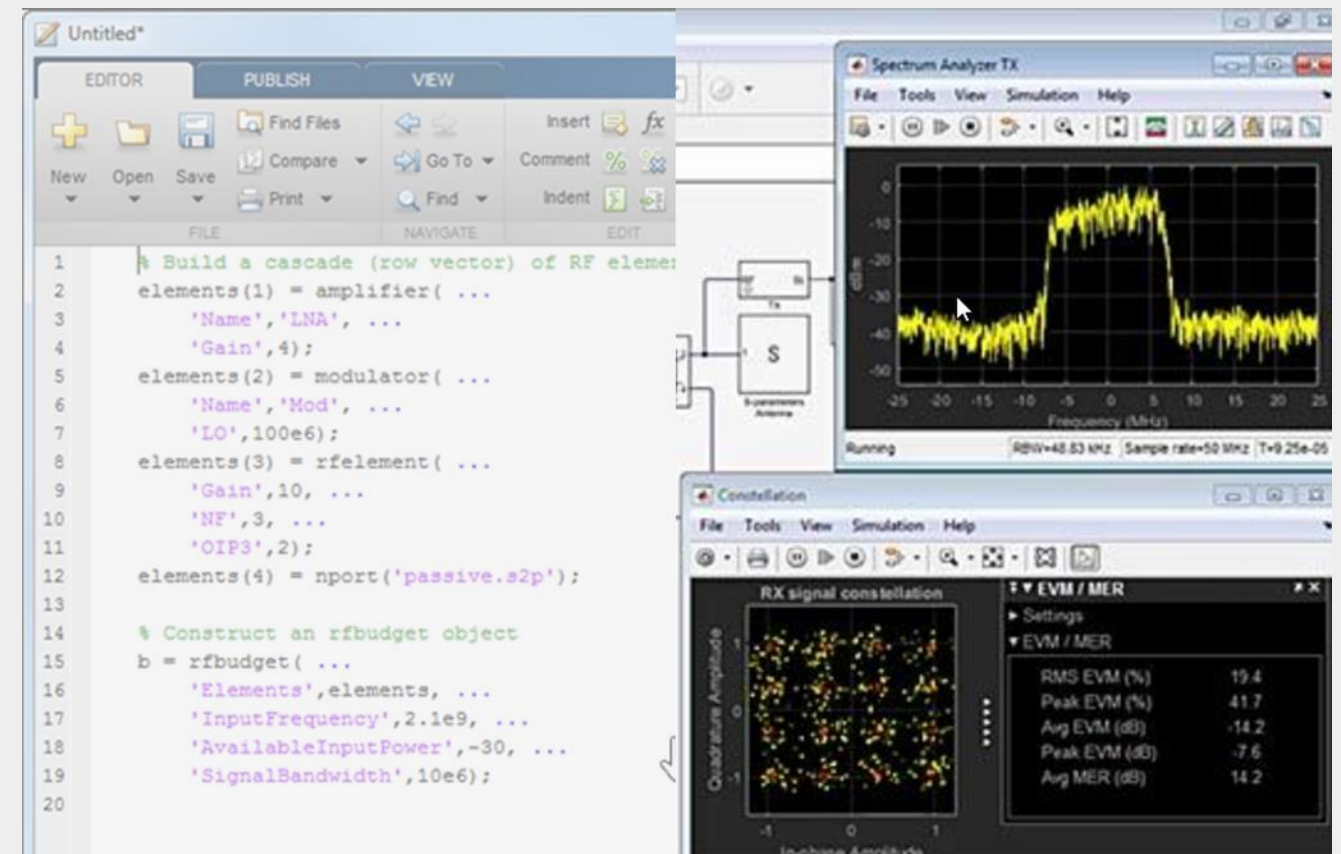


# Problem Breakdown

Digital Connectivity Not Ready To Scale



Underperforming Measurement Science



# What Connects to Your Digital?

## Evaluation / Home-Grown 'Solutions'

- Test departments not equipped with High-Speed-Serial (HSS) interfaces
- Home-grown digital solutions costly and difficult to produce at scale, maintain and deploy over a program's lifecycle
- Evaluation boards not designed or manufactured to be long term scalable solutions
- Memory and data transfer size and rates limit test time performance
- Not suited for production or your SUT connectivity demands

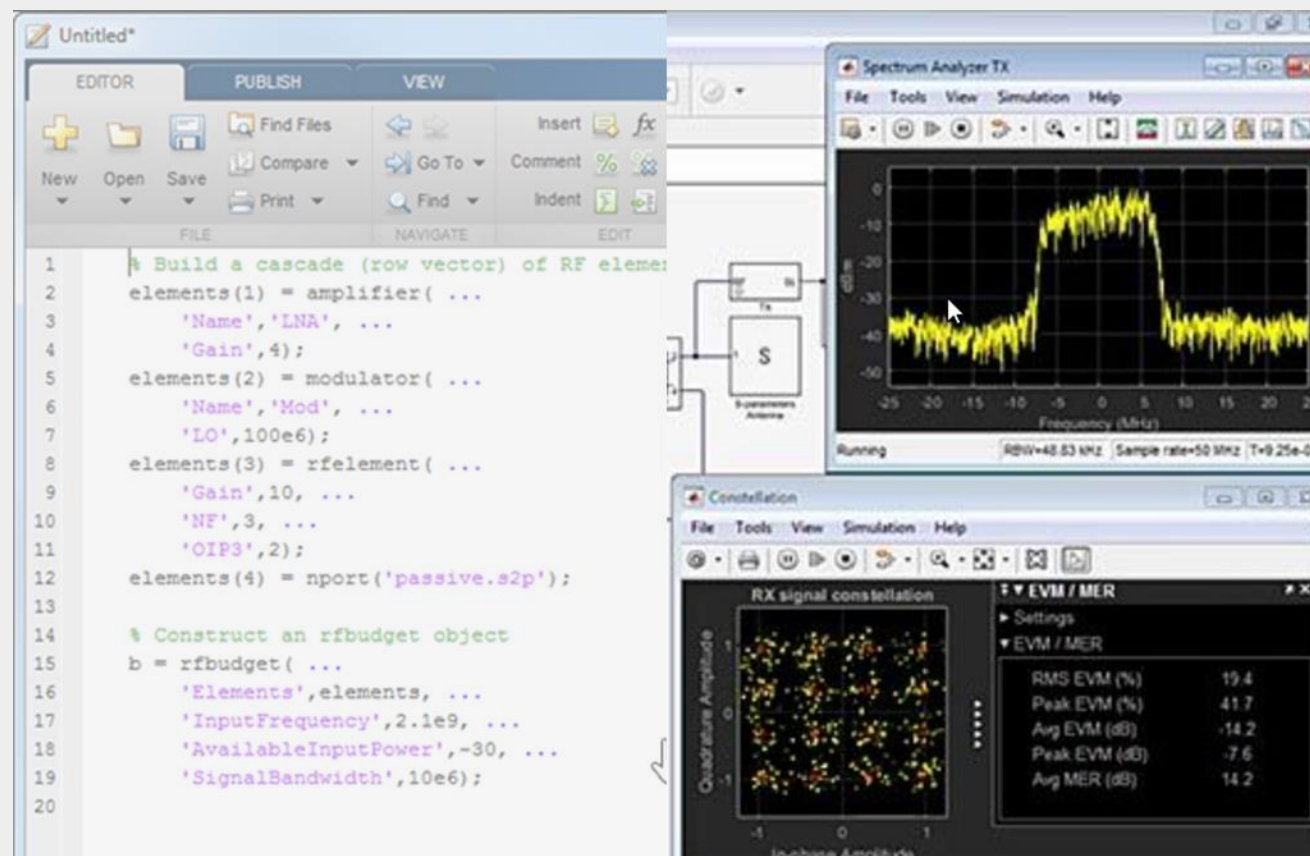
## Functional but Not Practical at Production





# How Do You Calibrate and Correlate?

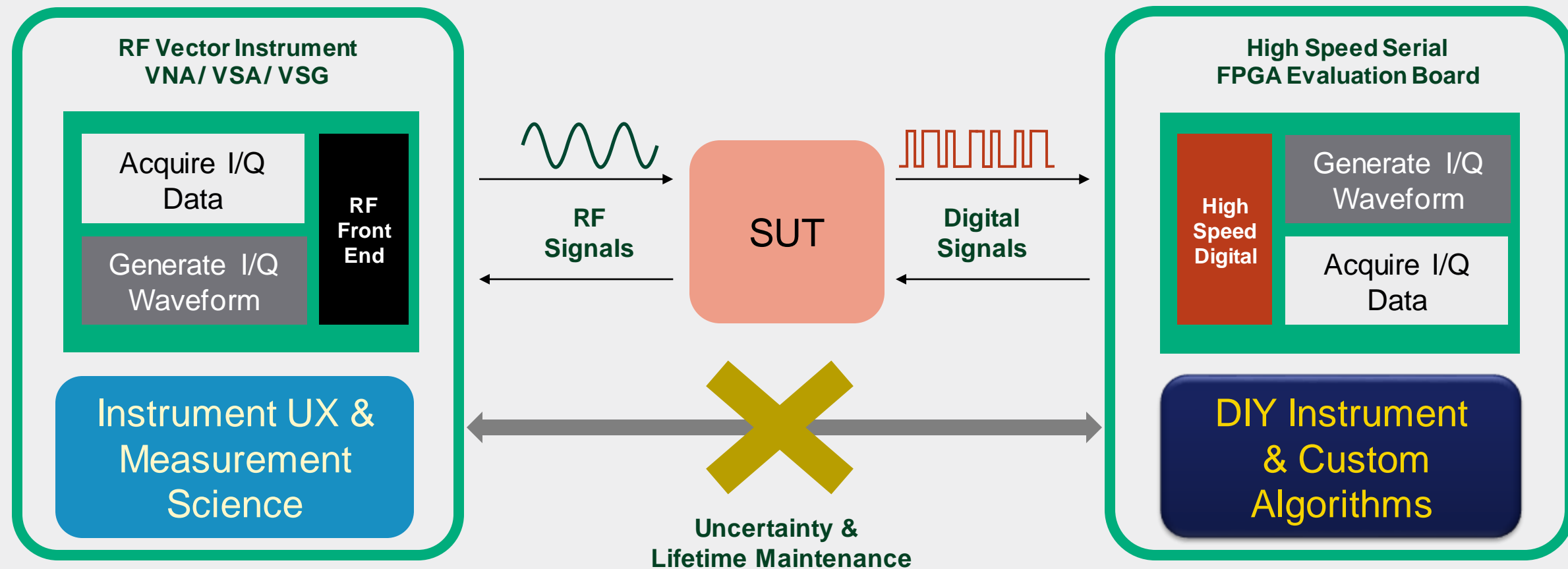
## Slow Results on Custom Algorithms



## Spend time measuring your device and not developing Instrumentation IP

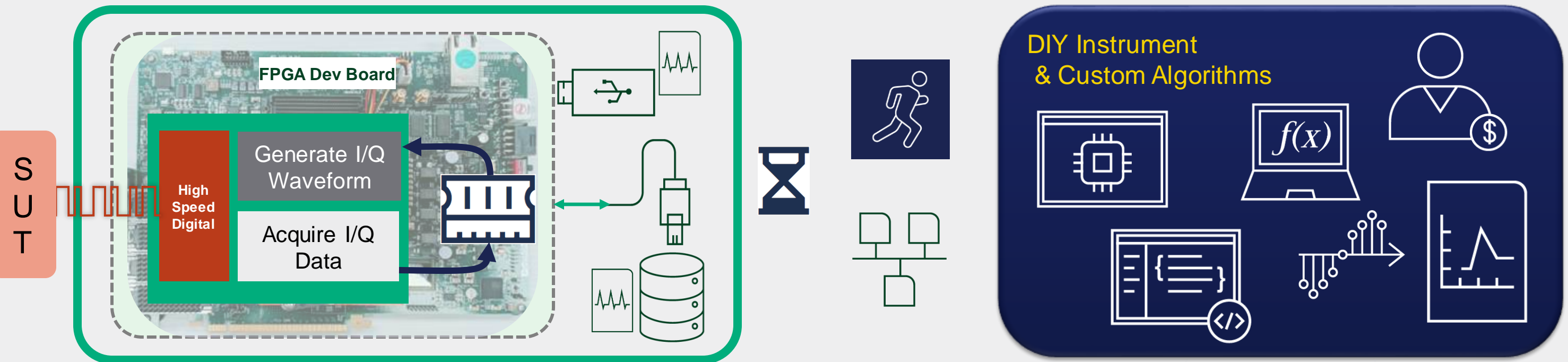
- Moving large data around memory or files is inherently slow
- Developing algorithms that display a result are easy, getting to good results you to correlate is hard
- Stimulus response measurements should have instrumentation on both stimulus and response
- Most custom algorithms and API are not developed for scalability, long term maintenance or speed
- Complex measurements like pulse profile analysis should be common regardless of domain (analog or digital)

# RF to Digital Workflows

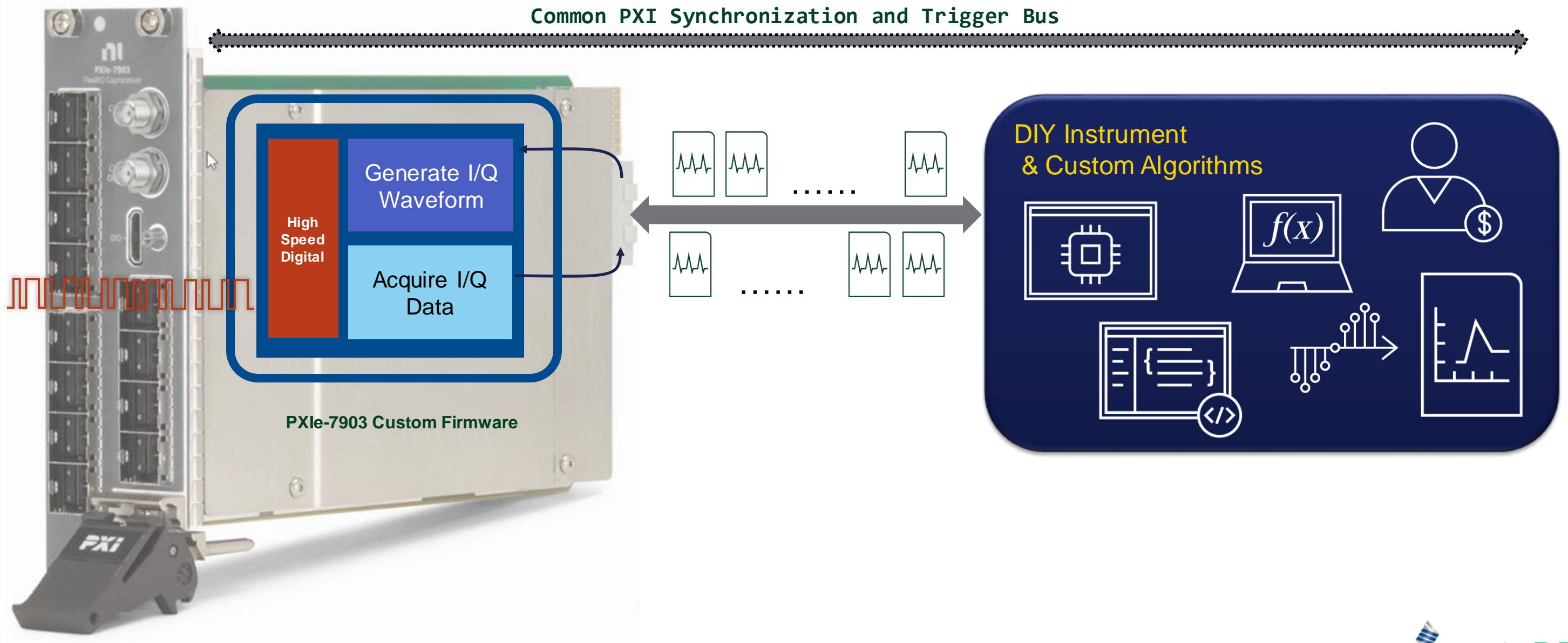


# RF to Digital Workflows

## Save/Load Memory Model



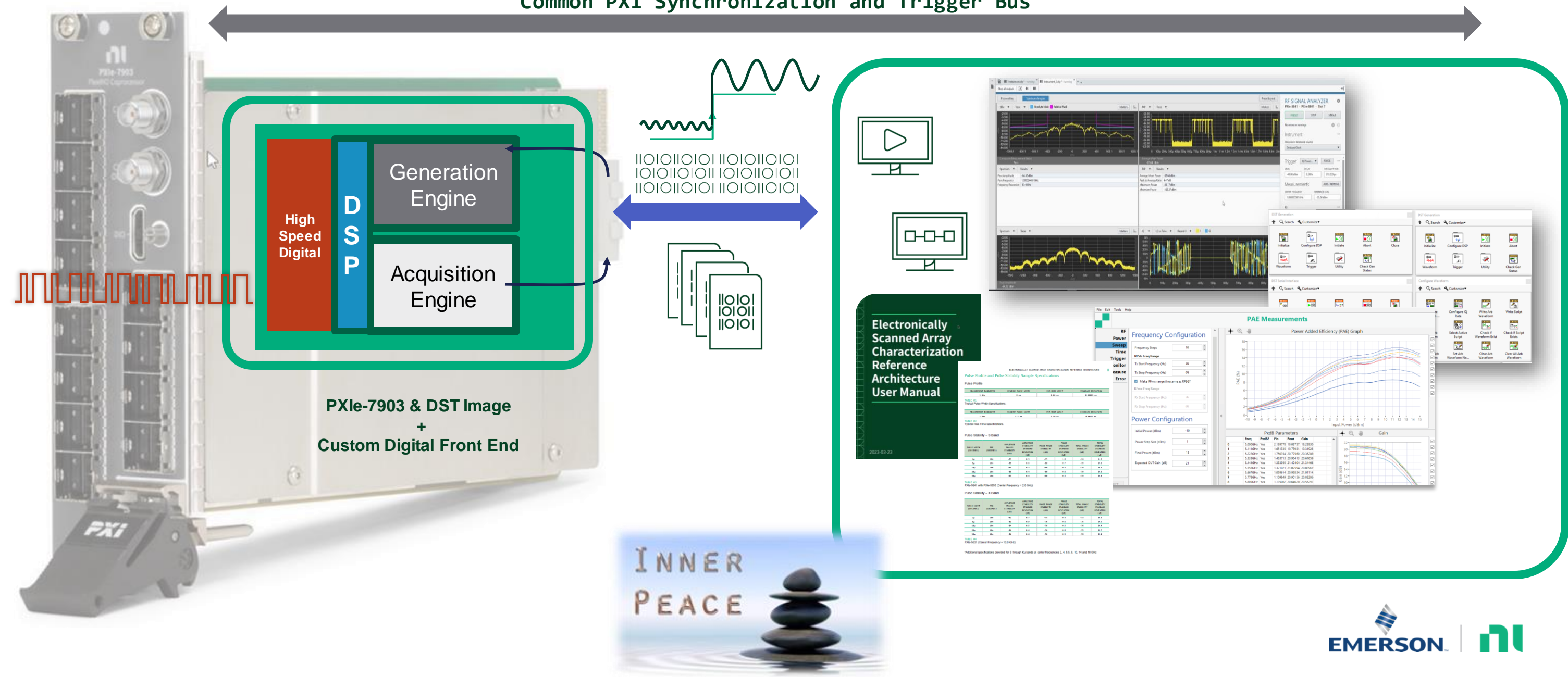
# DIY Digital Instrument Model





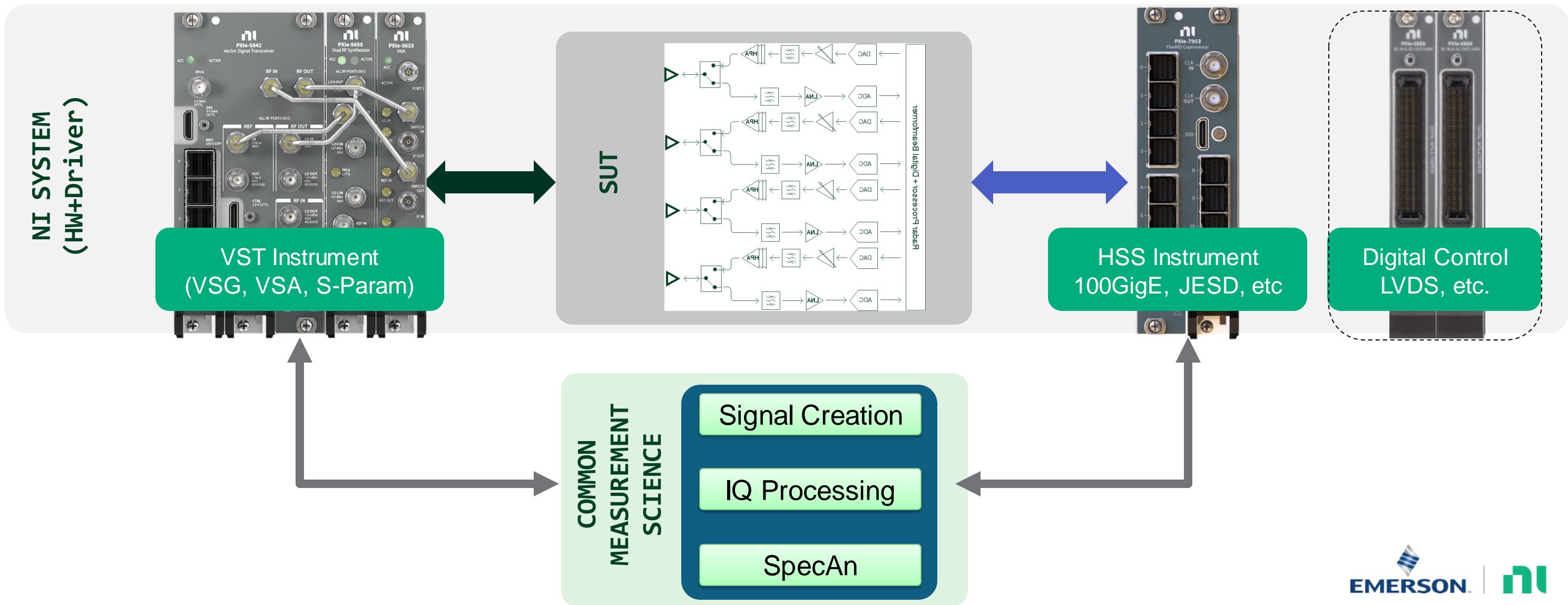
# DST - Digital Signal Transceiver

Common PXI Synchronization and Trigger Bus

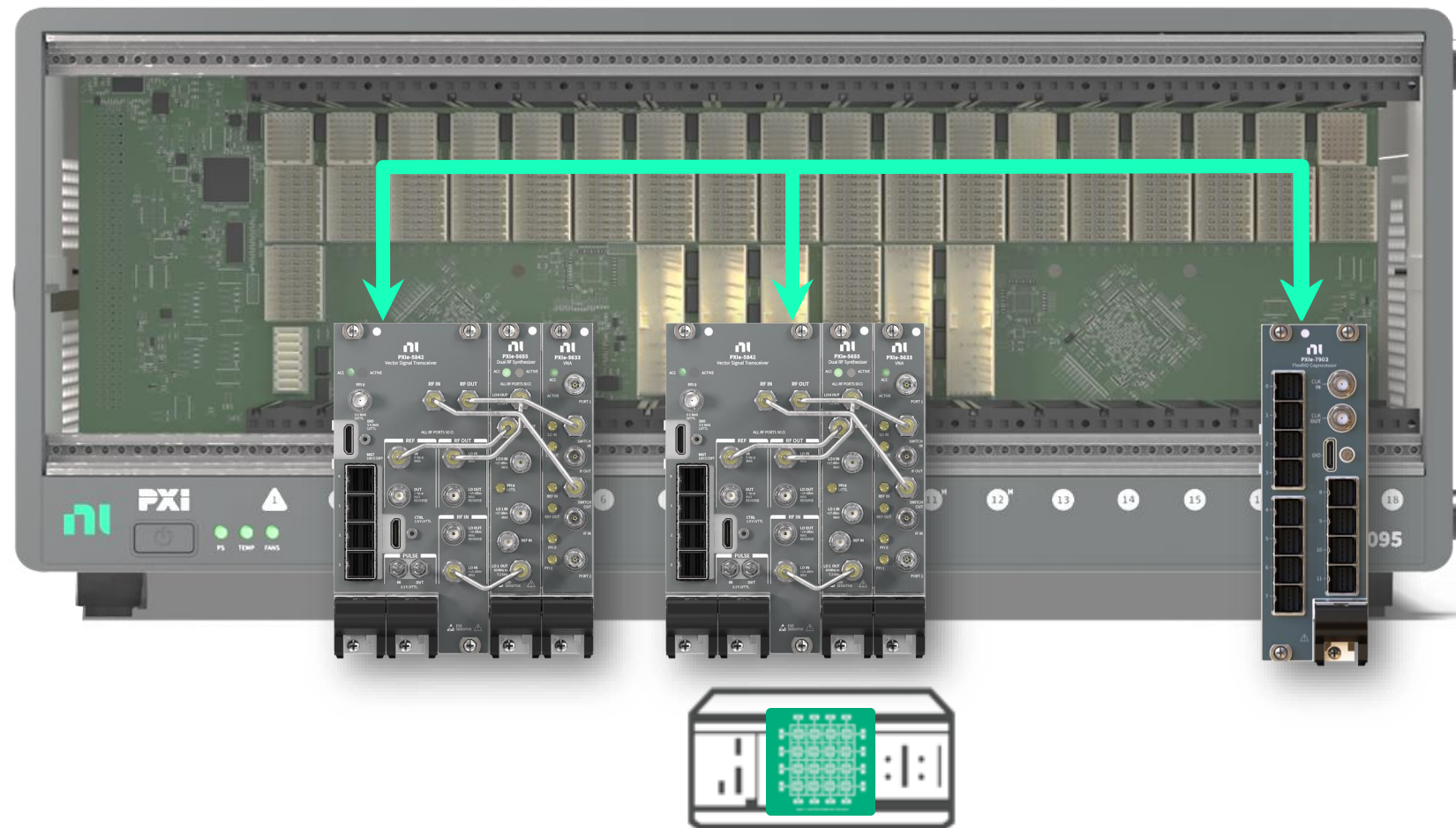
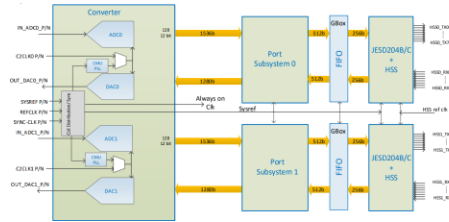


# Re-establishing the Instrumentation Hug

Common PXI Synchronization and Trigger Bus



# Instrument Coordination View



Common PXI Synchronization and Trigger Bus



# System Under Test





# Preview Demo

## DST Instrument Workflow

### Design and Development Accelerators

- **Interactive** out of the box
  - No-code acquisition and visualization
  - Debug platform for designers
  - Extensible interface through Instrument Studio
- Instrument Grade **Automation API**
  - Features and interfaces mirrored from RFSA/G
  - Powerful trigger engines
  - Waveform scripting
  - Stream data or capture records



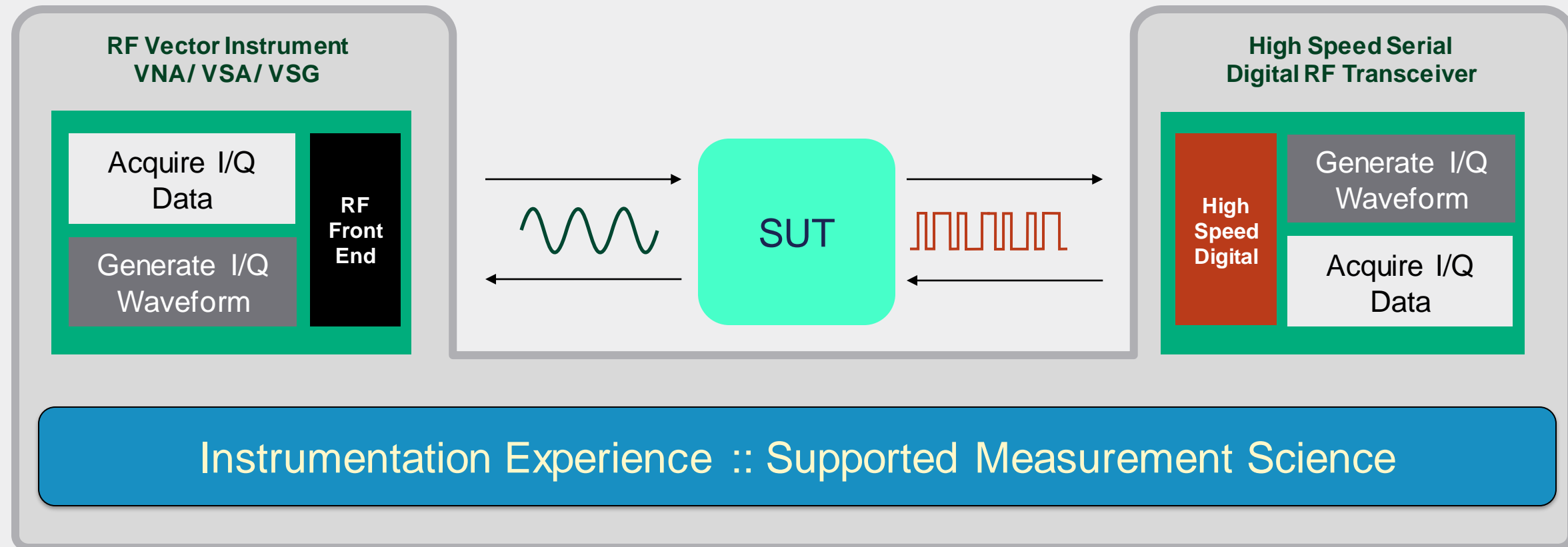
# Direct RF Systems

## Device Development Lifecycle

- Evaluate RFSoc
- Design System/Component
- Validate Design
- Characterization
- Integration
- Produce
- Mission
- Maintain

# RF to Digital Workflows

## Digital RF Vector Instrument Model

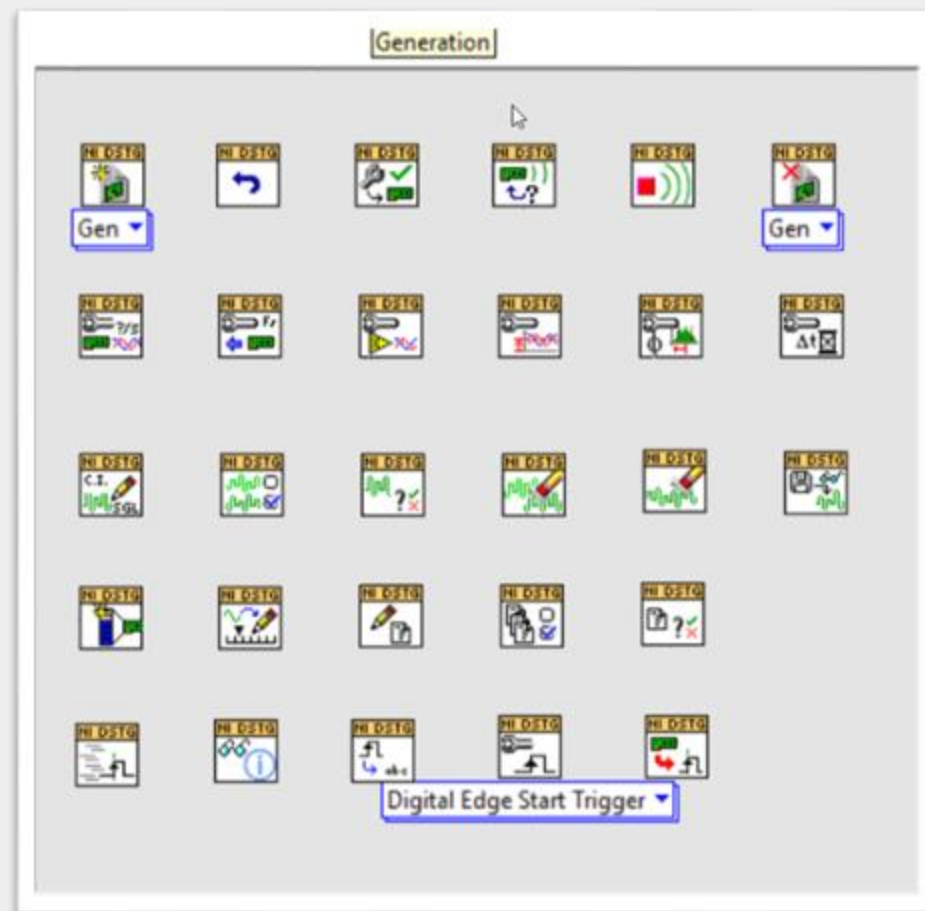


**Desired Instrumentation – I/Q Stimulus and Response**

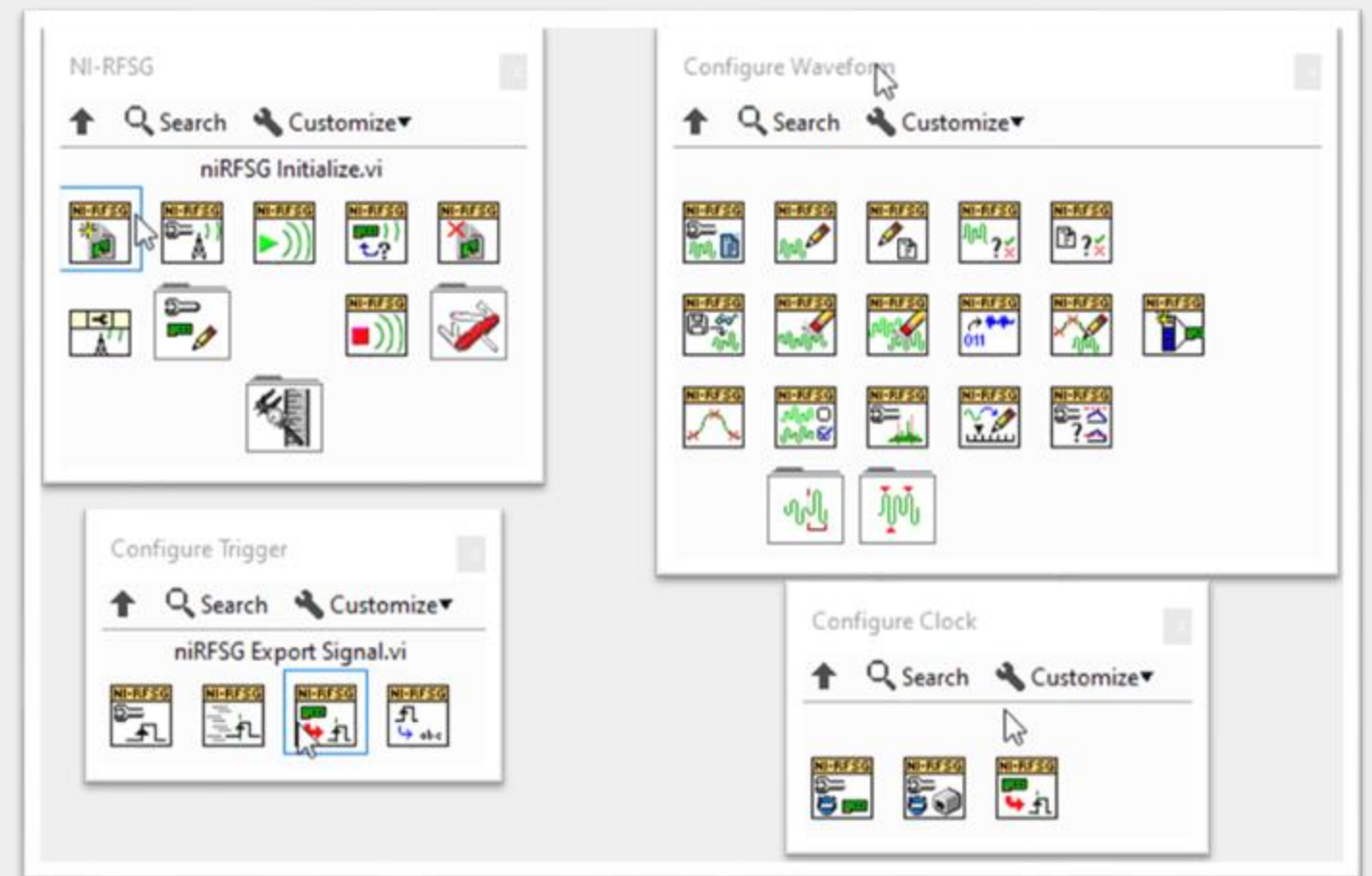


# Instrument Grade API – Generation Comparison

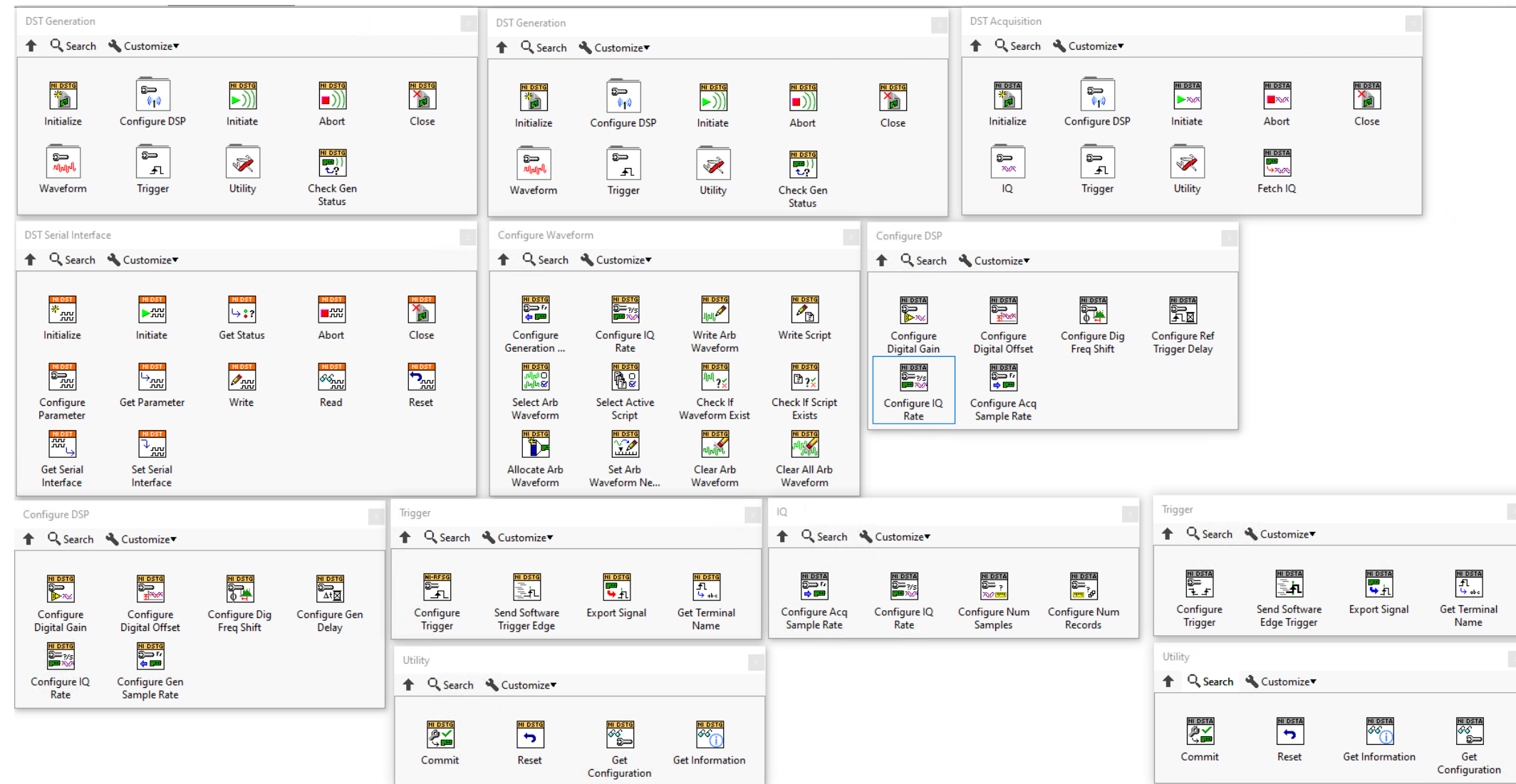
## DST-G



## NI-RFSG

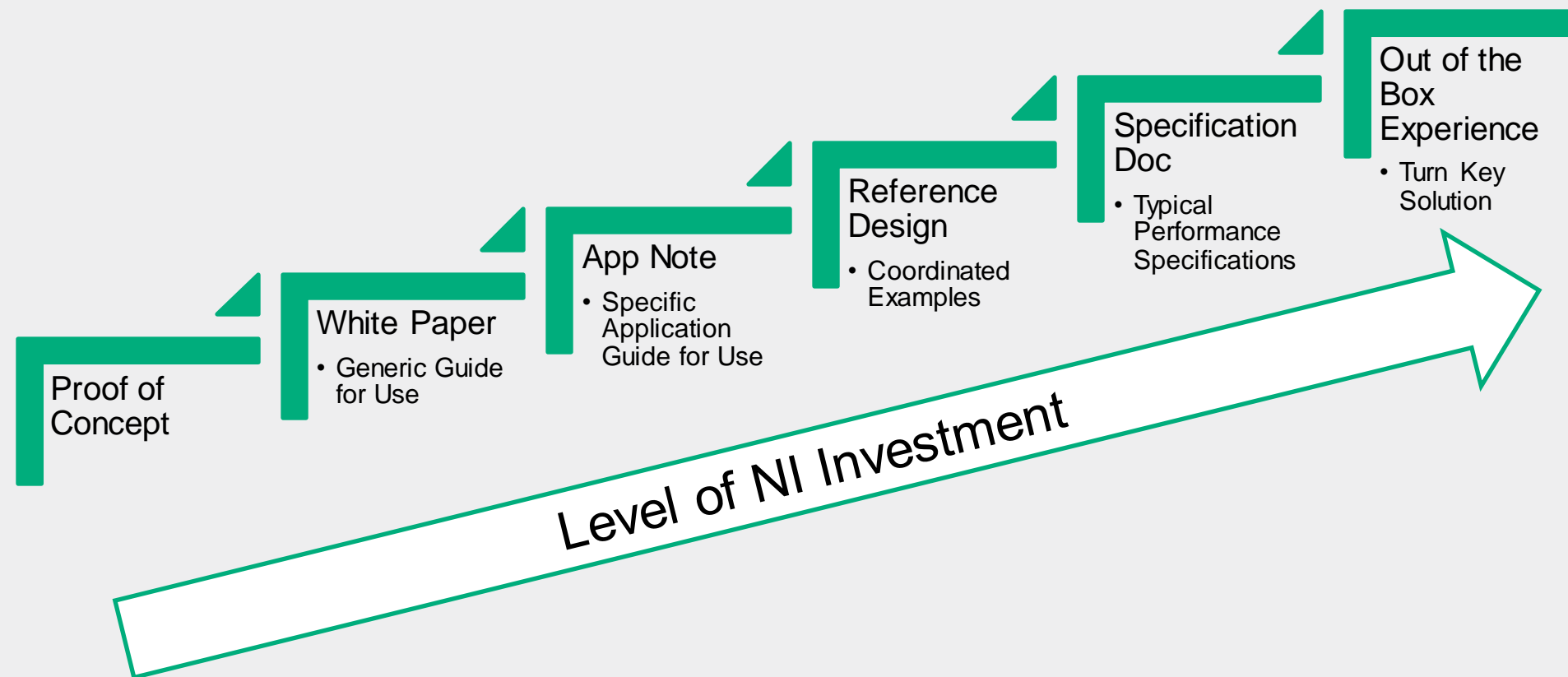


# Full Pallet Overview



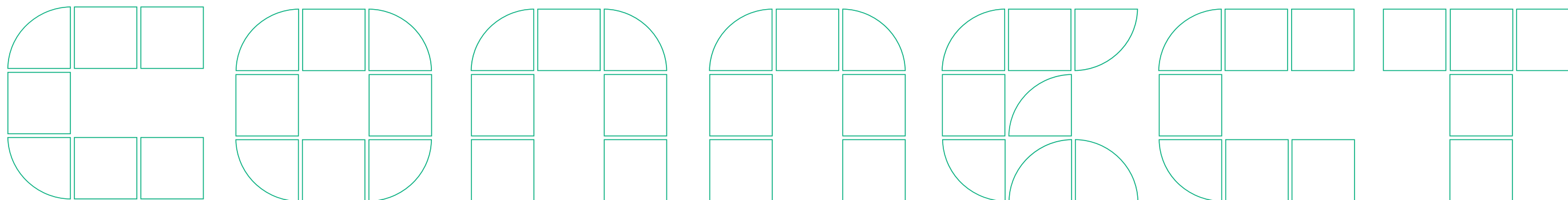
# Easing the Struggle

## NI Tiers of Service



## Optimizing Support

- NI is able to provide Levels of Service that meet the needs of each customer
- Identifying the level of investment that is value added for YOU the customer is key to **enabling** and **accelerating** your success



# Norm Kirchner

## Offering Manager

Norm.Kirchner@ni.com

# Kyle MacCoy

# Solution Marketing Engineer

Kyle.MacCoy@ni.com



# Backup Slides

# Working Slide : Feature Needs / Requests

## Lorem Ipsum Dolor Sit Amet

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Posuere lorem ipsum dolor sit amet. cursus metus aliquam eleifend mi in nulla. Enim nec dui nunc mattis enim ut. In cursus turpis massa tincidunt dui ut ornare lectus sit. Est placerat in egestas erat imperdiet. Sed augue lacus viverra vitae congue eu consequat ac felis. Etiam dignissim diam quis enim lobortis scelerisque fermentum dui. Aliquam ut porttitor leo a diam. Velit egestas dui id ornare arcu odio ut.



# NI PowerPoint Template

Updated October 2023





# Keeping it Simple

Protect your message. Don't lose it in overly complicated slides.

# 1

**Embrace negative space.**  
Don't fill empty areas with extra graphics or text.

# 2

**Champion consistency.**  
Use typefaces the same way throughout a presentation.

# 3

**Be choosy about color.**  
Except for charts, limit color to three per presentation.

# Template Fonts

Arial typefaces will be used for presentations as the font is standard on most systems. Times New Roman and Consolas will no longer be used.

## Typeface Mapping

Times New Roman to **Arial Black**

Arial remains Arial

Consolas to Arial Narrow

## Arial Black

- Use for all titles, as well as for emphasis on specific text or figures.
- Do not bold or italicize.
- Titles should always be Green.

## Arial

- Use for subtitles and standard body text.
- Avoid using italics.
- Subtitles and body text should always be black.

## Arial Narrow

- Use for captions and charts.
- Captions should always be black.



# PowerPoint Color Specifications

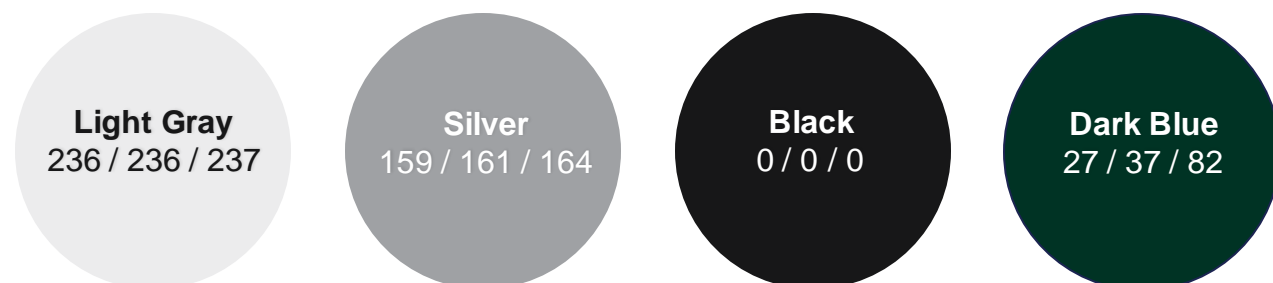
**Primary** Used for prominent color usage

---



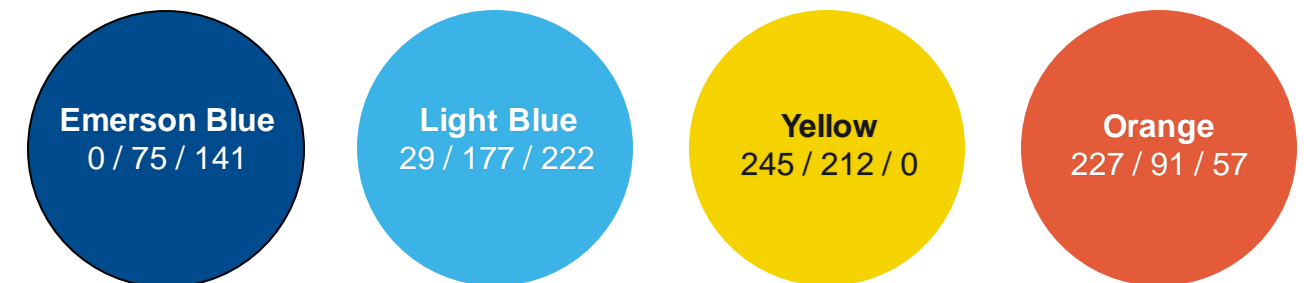
**Neutrals** Use to add dimension to your design without adding too much color

---



**Secondary** Use sparingly for supporting graphics and charts

---



These colors are preloaded into the template under the color selections. You can also use the codes specified here to create these colors by selecting the “More Fill Colors” option in the color picker dropdown menu.

# Sourcing Photography

Fit your needs with these photography options:

## NI Approved Imagery

Consider NI approved imagery first. They are licensed by NI, approved by BUs and adhere to our brand standards.

More information about NI imagery can be found here: [Imagery and Photography](#)

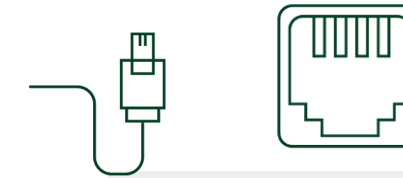
[Digital Asset Management System](#) (must have VPN)

[Asset Library](#) (Limited Users)

Contact [Global.Creative@ni.com](mailto:Global.Creative@ni.com) with photography questions.

# Icon Library

Copy and paste needed icons from the selection below. Size and color can be adjusted as needed. Additional icons be be found in the [NI online icon library](#).



## To Resize an Icon

To maintain proportions, press and hold **Shift** while you drag the corner sizing handle.

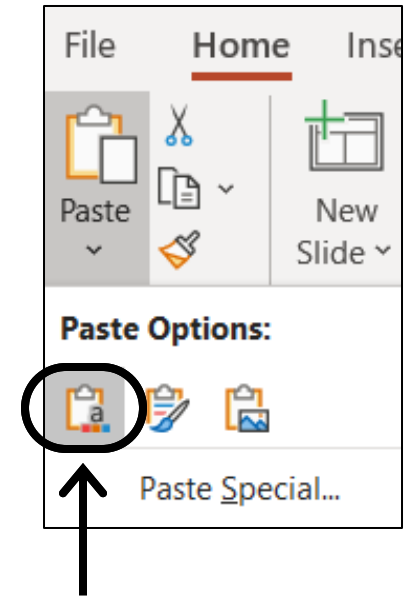
To keep the center in the same place, press and hold **CTRL** and **Shift** while you drag the sizing handle.

## To Recolor an Icon

You can change the color of the icons through **Shape Fill**.

# Applying Template to Existing Slides

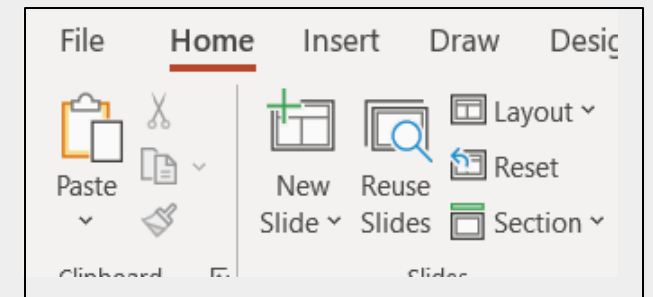
1. If you have slides created in a different template, the best way to convert them to the new NI template is to first save a copy of this template file. Then, select all the slides you need to convert. Then, click **Copy**.
2. In your newly created saved NI template file, click **Paste**, and select the **Use Destination Theme** icon. This will apply the formatting of the existing template to the new slides. You can then delete all the sample slides from the template file that you no longer need.



**Important:** PowerPoint can recognize text boxes, body copy boxes and charts that are on the master layouts and will update fonts, colors and styles throughout. However, any shape, object, chart or text box that is on the slide that is not part of the master layout might not be updated when pasted in.

When applying the NI template, it's best to check that colors and fonts have been updated throughout, as some elements may need to be updated manually using the specifications in this document.

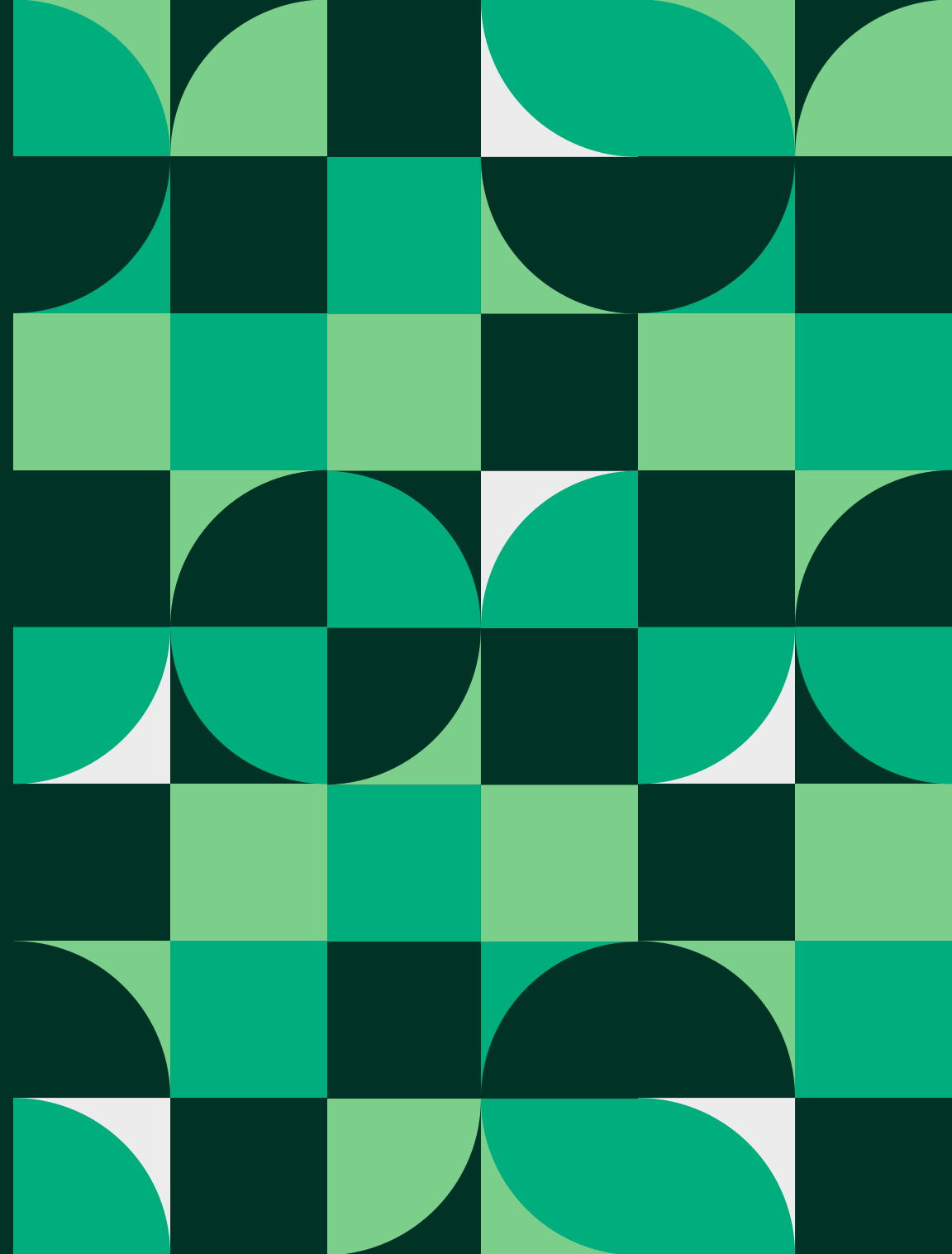
Use the **Reset** button to reset the positioning, size, and formatting of the slide placeholders to their default settings. This is helpful if a title, page number or footer is accidentally moved out of place.





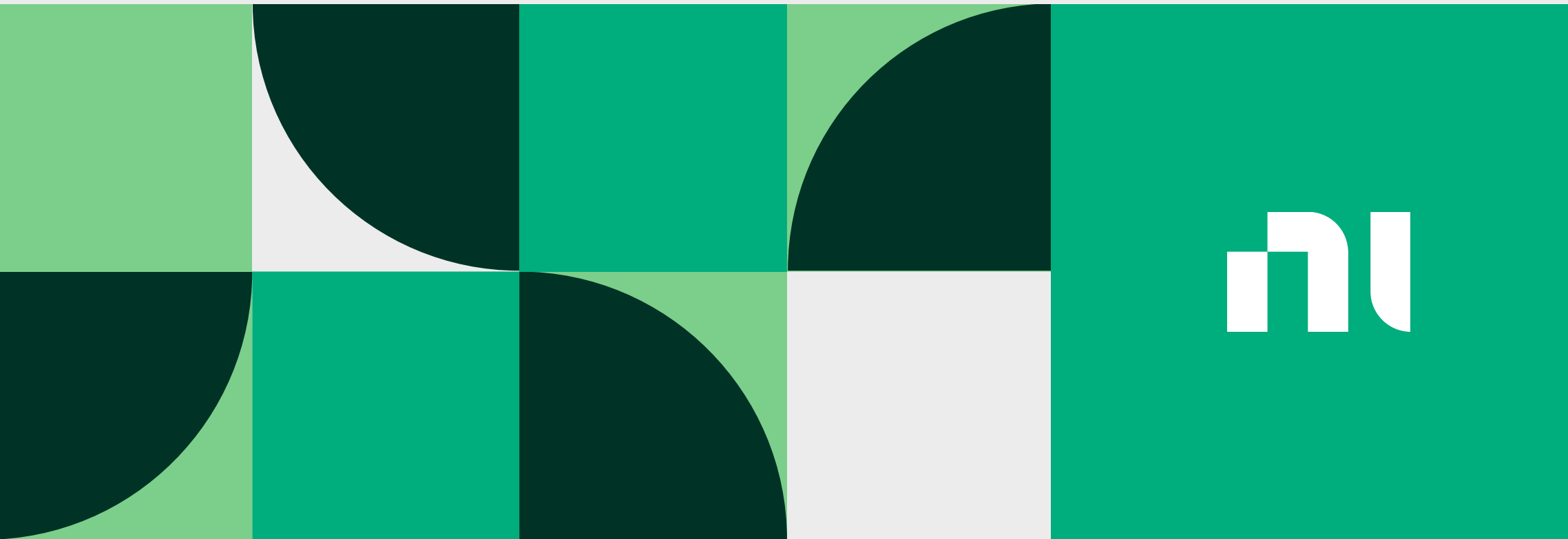
# Generic Title: Lorem Ipsum Dolor

Quisque vel metus massa





NI is now part of Emerson.



NI is now part of Emerson.

# Left Title: Lorem Ipsum Dolor Amet Sit

Quisque vel metus massa





# Right Title: Lorem Ipsum Dolor Amet Sit

Quisque vel metus massa







**Bottom Title: Lorem Ipspm Dolor**

Quisque vel metus massa

# Lorem Ipsum Dolor Sit Amet

---

Quisque vel metus massa

# Lorem Ipsum Dolor Sit Amet

---

Quisque vel metus massa





# **Lorem Ipsum Dolor Sit**

Quisque vel metus massa



# **Lorem Ipsum Dolor Sit**

Quisque vel metus massa





# **Lorem Ipsum Dolor Amet Sit**

Quisque vel metus massa





# Quisque vel metus massa



# Agenda or Table of Contents

**Topic**      Supporting Text

**Topic**      Supporting Text

**Topic**      Supporting Text

**Topic**      Supporting Text

**Topic**      Supporting Text

**Topic**      Supporting Text

# Single-Block Content Slide

## Lorem Ipsum Dolor Sit Amet

- Lorem ipsum dolor sit amet, consectetur adipiscing elit. Quisque vel metus massa
- Lorem ipsum dolor sit amet, consectetur adipiscing elit. Quisque vel metus massa
- Lorem ipsum dolor sit amet, consectetur adipiscing elit. Quisque vel metus massa

# Two-Block Content Slide

## Lorem Ipsum Dolor

- Lorem ipsum dolor sit amet, consectetur adipiscing elit. Quisque vel metus massa
- Lorem ipsum dolor sit amet, consectetur adipiscing elit. Quisque vel metus massa
- Lorem ipsum dolor sit amet, consectetur adipiscing elit. Quisque vel metus massa

## Lorem Ipsum Dolor

- Lorem ipsum dolor sit amet, consectetur adipiscing elit. Quisque vel metus massa
- Lorem ipsum dolor sit amet, consectetur adipiscing elit. Quisque vel metus massa
- Lorem ipsum dolor sit amet, consectetur adipiscing elit. Quisque vel metus massa

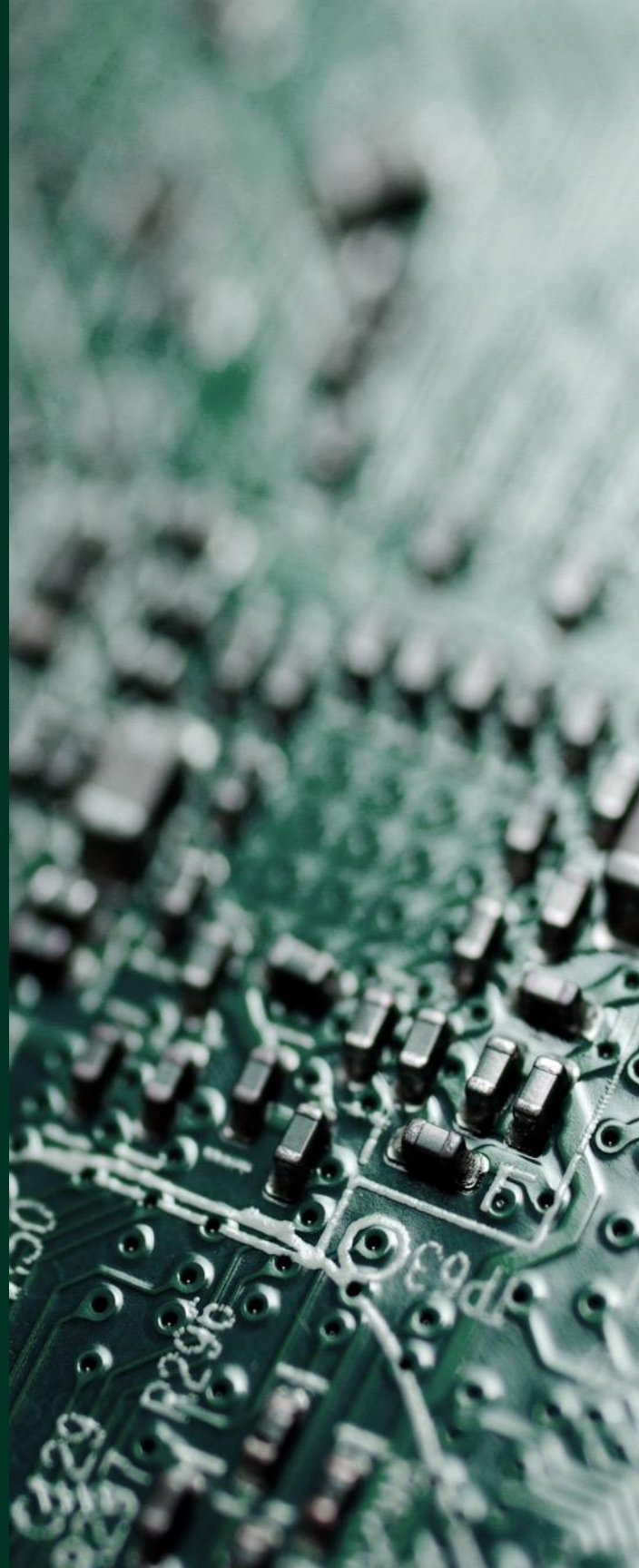


# Single Block Picture Content Slide

- Lorem ipsum dolor sit amet, consectetur adipiscing elit. Quisque vel metus massa
- Lorem ipsum dolor sit amet, consectetur adipiscing elit. Quisque vel metus massa
- Lorem ipsum dolor sit amet, consectetur adipiscing elit. Quisque vel metus massa



# Single Block Picture Content 3



## Lorem Ipsum Dolor Sit Amet

- Lorem ipsum dolor sit amet, consectetur adipiscing elit. Quisque vel metus massa
- Lorem ipsum dolor sit amet, consectetur adipiscing elit. Quisque vel metus massa
- Lorem ipsum dolor sit amet, consectetur adipiscing elit. Quisque vel metus massa

# Two-Block Content Slide 2

## Lorem ipsum dolor sit amet

- Lorem ipsum dolor sit amet, consectetur adipiscing elit. Quisque vel metus massa.
- Lorem ipsum dolor sit amet, consectetur adipiscing elit. Quisque vel metus massa.
- Lorem ipsum dolor sit amet, consectetur adipiscing elit. Quisque vel metus massa.

## Lorem ipsum dolor sit amet

- Lorem ipsum dolor sit amet, consectetur adipiscing elit. Quisque vel metus massa.
- Lorem ipsum dolor sit amet, consectetur adipiscing elit. Quisque vel metus massa.
- Lorem ipsum dolor sit amet, consectetur adipiscing elit. Quisque vel metus massa.

# Three-Block Content Slide

## Lorem ipsum dolor sit

- Lorem ipsum dolor sit amet, consectetur adipiscing elit. Quisque vel metus massa.
- Lorem ipsum dolor sit amet, consectetur adipiscing elit. Quisque vel metus massa.
- Lorem ipsum dolor sit amet, consectetur adipiscing elit. Quisque vel metus massa.

## Lorem ipsum dolor sit

- Lorem ipsum dolor sit amet, consectetur adipiscing elit. Quisque vel metus massa.
- Lorem ipsum dolor sit amet, consectetur adipiscing elit. Quisque vel metus massa.
- Lorem ipsum dolor sit amet, consectetur adipiscing elit. Quisque vel metus massa.

## Lorem ipsum dolor sit

- Lorem ipsum dolor sit amet, consectetur adipiscing elit. Quisque vel metus massa.
- Lorem ipsum dolor sit amet, consectetur adipiscing elit. Quisque vel metus massa.
- Lorem ipsum dolor sit amet, consectetur adipiscing elit. Quisque vel metus massa.



## Lorem Ipsum Dolor Sit Amet



Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat. Duis aute irure dolor in reprehenderit in voluptate velit esse cillum dolore eu fugiat nulla pariatur. Excepteur sint occaecat cupidatat non proident, sunt in culpa qui officia deserunt mollit anim id est laborum.

Name

Title

Company



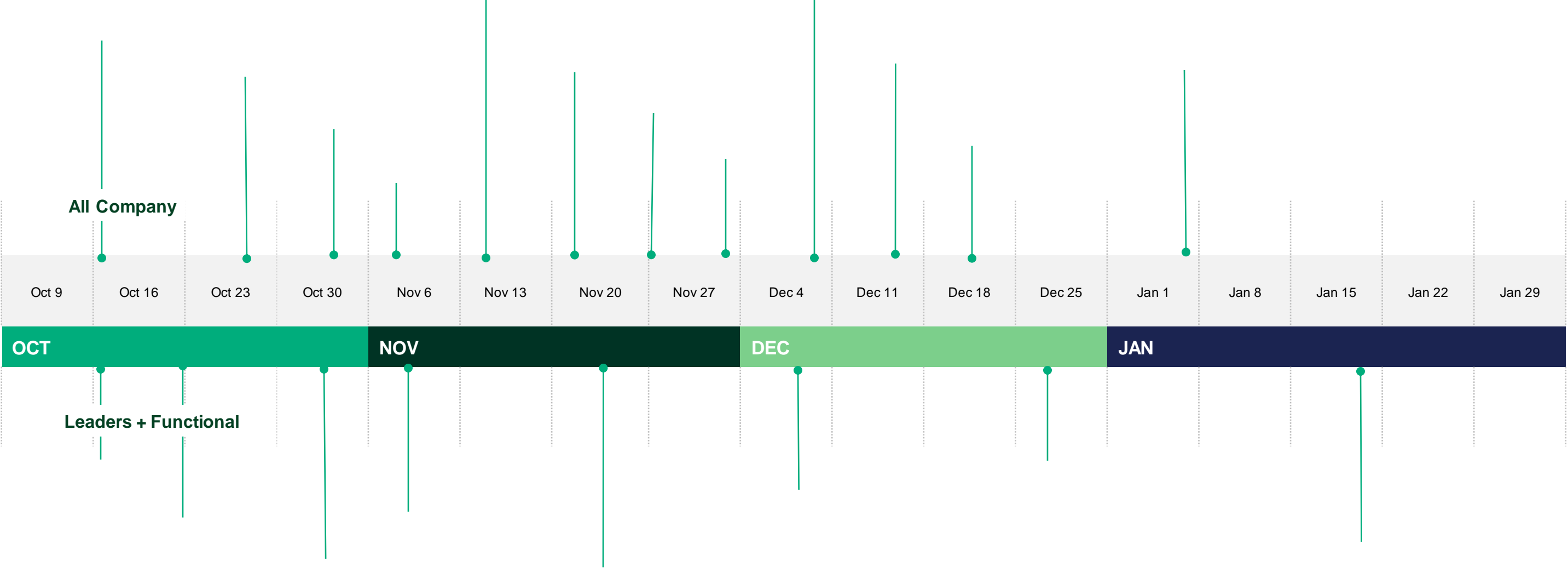
# Lorem Ipsum Dolor Sit Amet Ut Enim

Name  
 Title  
 Company

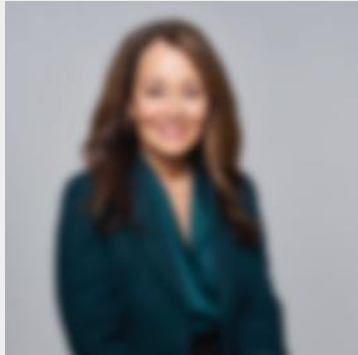


Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat. Duis aute irure dolor in reprehenderit in voluptate velit esse cillum dolore eu fugiat nulla pariatur. Excepteur sint occaecat cupidatat non proident, sunt in culpa qui officia deserunt mollit anim id est laborum.

# Timeline Slide

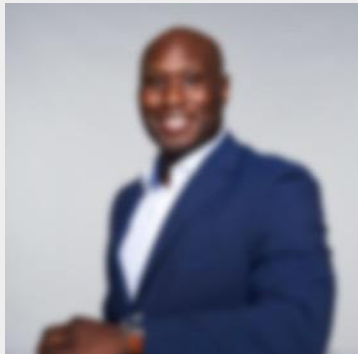


# Headshot Feature Content Slide



Lorem ipsum dolor sit amet

- Lorem ipsum dolor sit amet, consectetur adipiscing elit. Quisque vel metus massa. Pellentesque posuere tempor sapien, vel lacinia urna imperdiet sit amet.



Lorem ipsum dolor sit amet

- Lorem ipsum dolor sit amet, consectetur adipiscing elit. Quisque vel metus massa. Pellentesque posuere tempor sapien, vel lacinia urna imperdiet sit amet.

# Org Chart

Lorem ipsum dolor  
sit amet



**Name**  
Title



**Name**  
Title



**Name**  
Title



**Name**  
Title



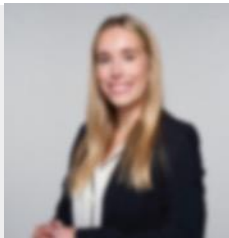
**Name**  
Title



**Name**  
Title



**Name**  
Title



**Name**  
Title



**Name**  
Title



**Name**  
Title

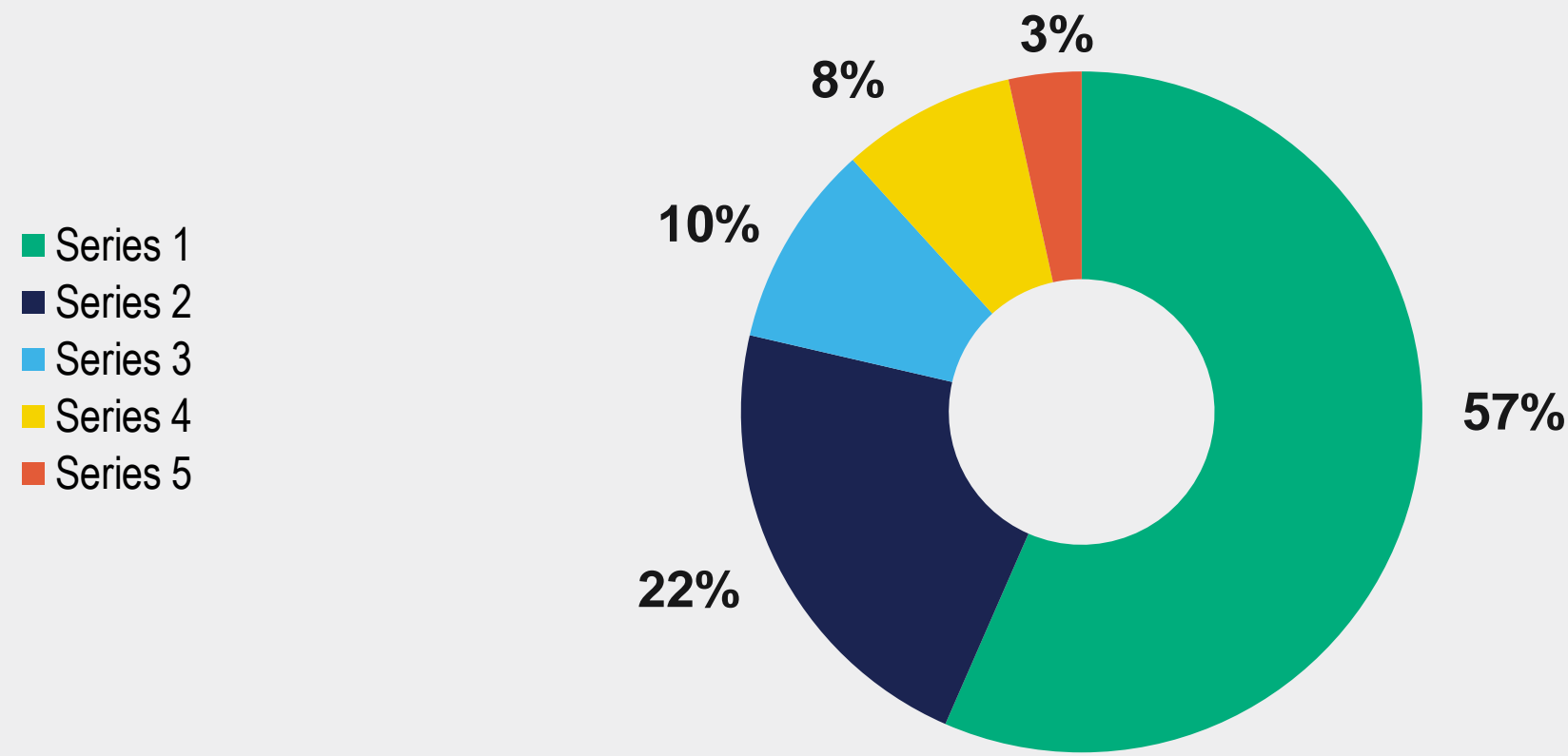


**Name**  
Title



# Data Content Slide – Pie Chart

Chart Subtitle Text Here

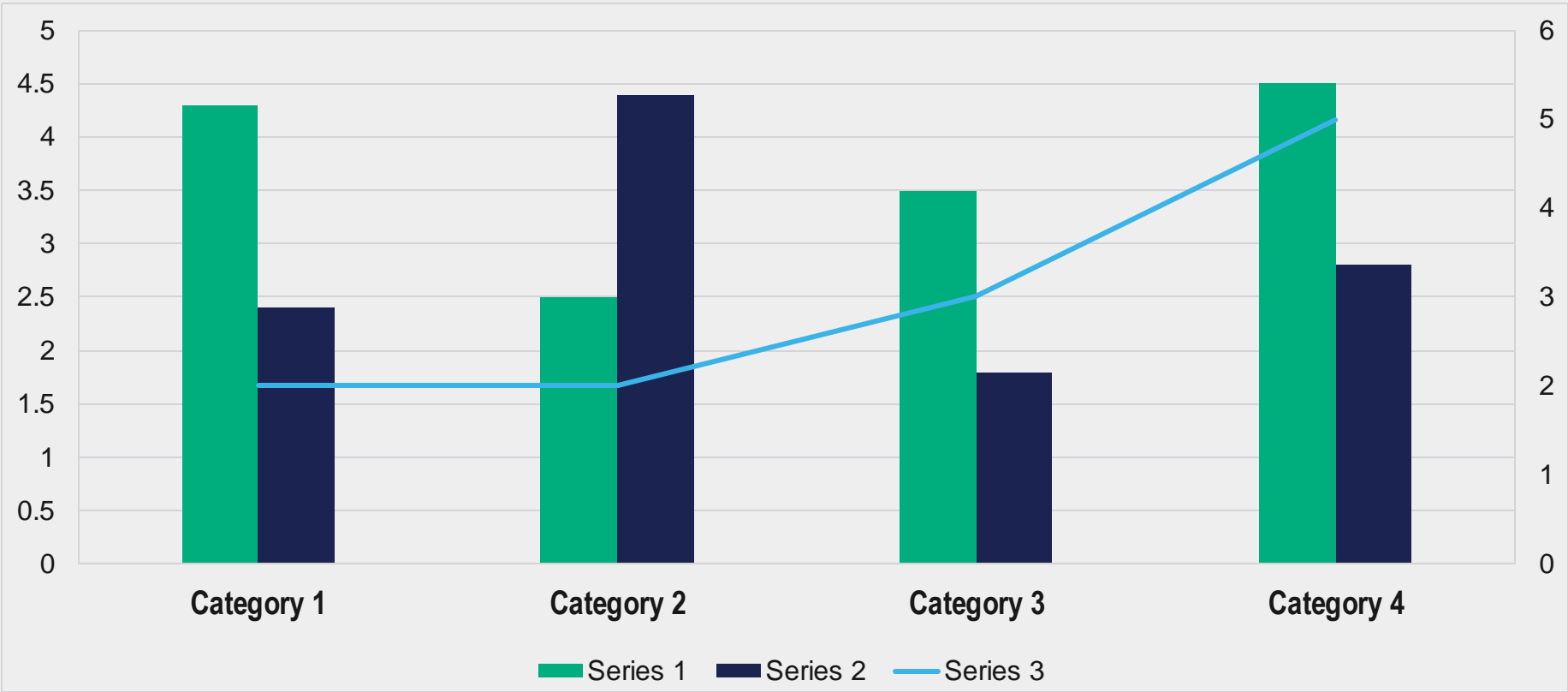


Lorem ipsum dolor sit

- Lorem ipsum dolor sit amet, consectetur adipiscing elit. Quisque vel metus massa.

# Data Content Slide – Column/Line

Chart Subtitle Text Here

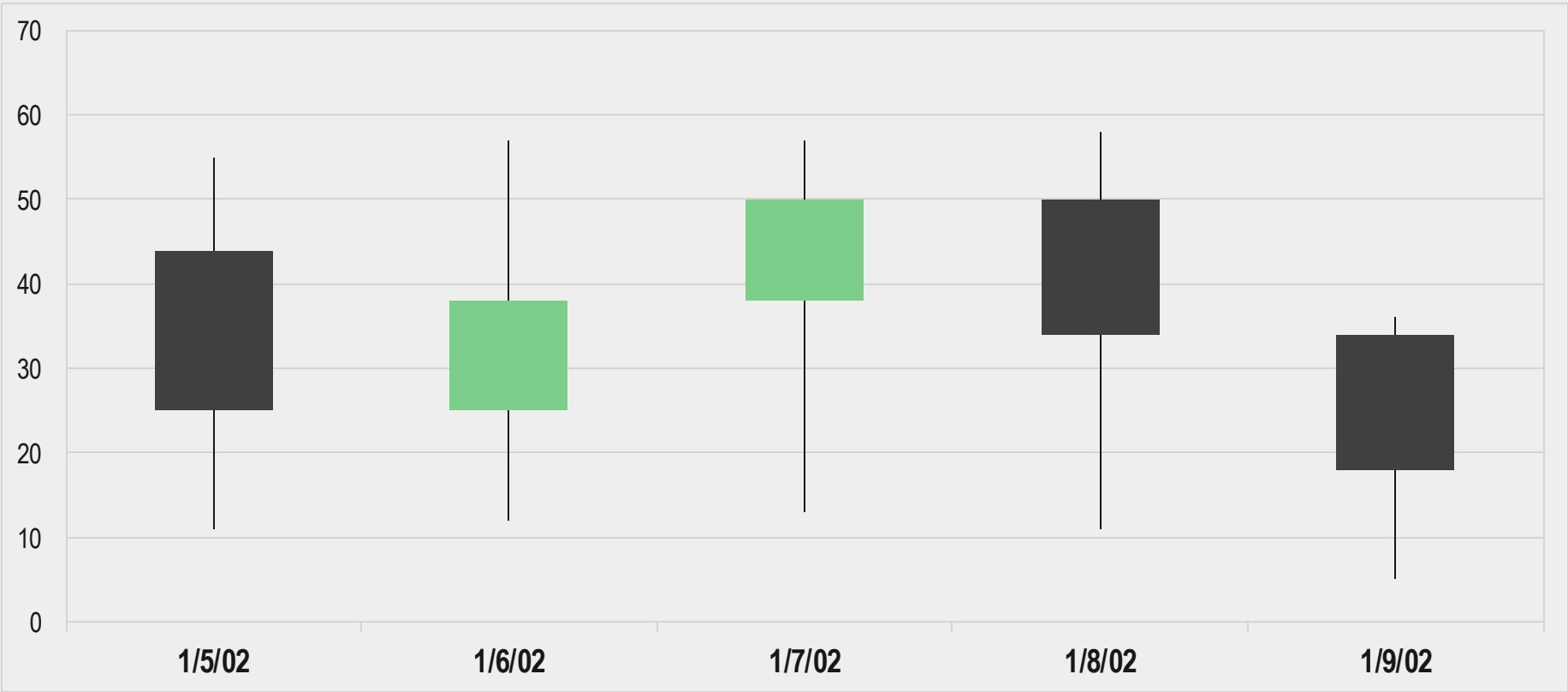


Lorem ipsum dolor sit

- Lorem ipsum dolor sit amet, consectetur adipiscing elit. Quisque vel metus massa.

# Data Content Slide – Waterfall

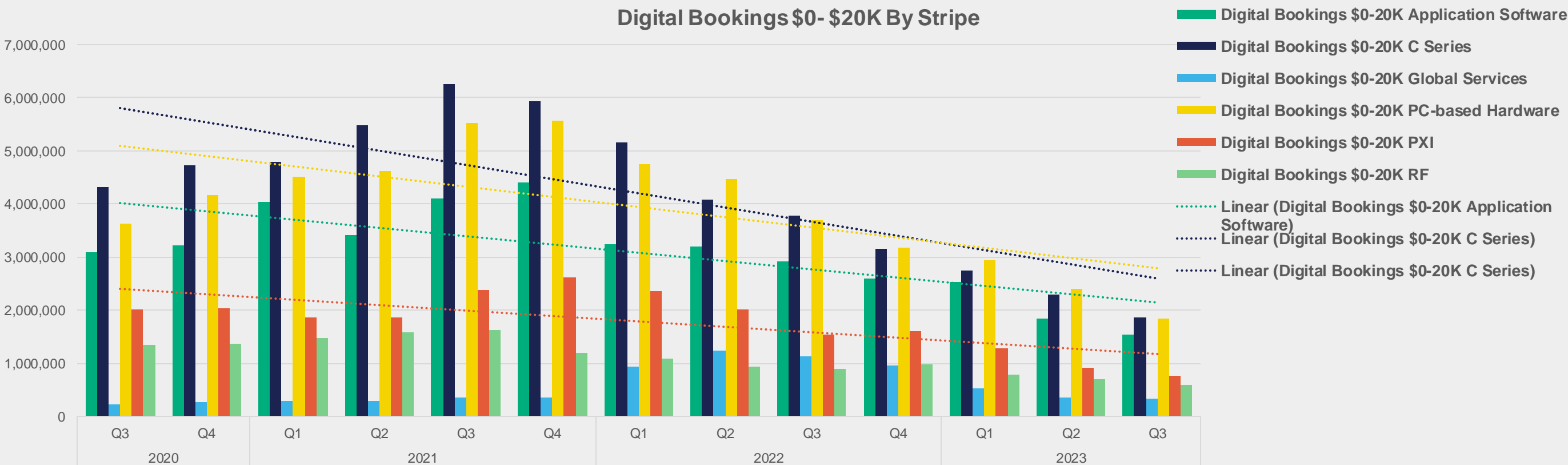
Chart Subtitle Text Here



Lorem ipsum dolor sit

- Lorem ipsum dolor sit amet, consectetur adipiscing elit. Quisque vel metus massa.

# Data Content Slide – Column/Line 2

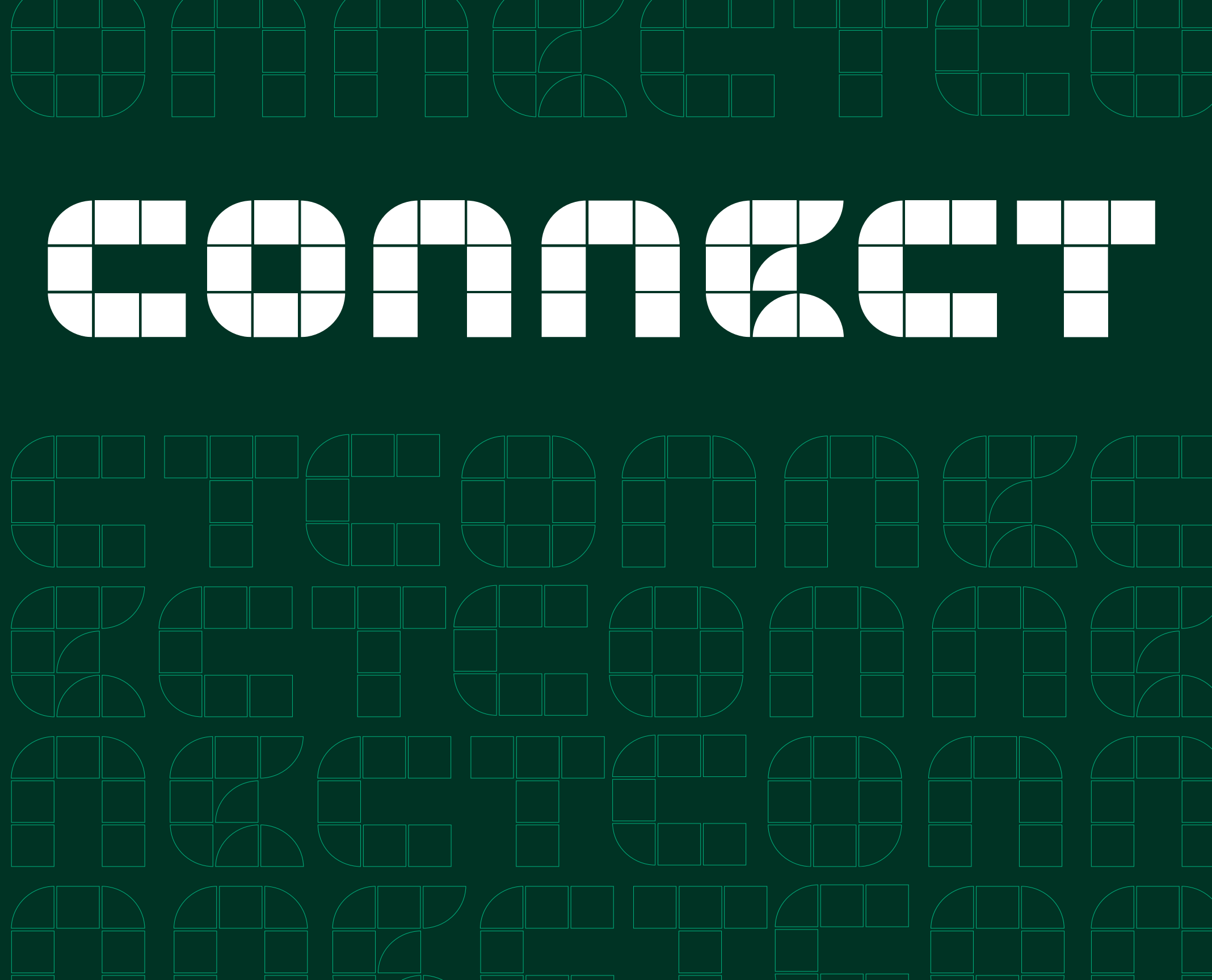




2	0
2	4

tescon

# connect



# Lorem Ipsum Dolor Sit Amet

## Lorem Ipsum Dolor Sit Amet

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Posuere lorem ipsum dolor sit amet. Cursus metus aliquam eleifend mi in nulla. Enim nec dui nunc mattis enim ut. In cursus turpis massa tincidunt dui ut ornare lectus sit. Est placerat in egestas erat imperdiet. Sed augue lacus viverra vitae congue eu consequat ac felis. Etiam dignissim diam quis enim lobortis scelerisque fermentum dui. Aliquam ut porttitor leo a diam. Velit egestas dui id ornare arcu odio ut.

2	0
2	4

tescon



# Lorem Ipsum Dolor Sit Amet

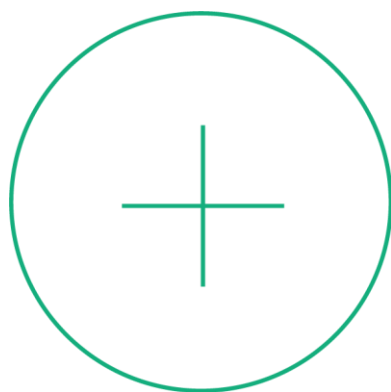
## Lorem Ipsum Dolor Sit Amet

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Posuere lorem ipsum dolor sit amet. cursus metus aliquam eleifend mi in nulla. Enim nec dui nunc mattis enim ut. In cursus turpis massa tincidunt dui ut ornare lectus sit. Est placerat in egestas erat imperdiet. Sed augue lacus viverra vitae congue eu consequat ac felis. Etiam dignissim diam quis enim lobortis scelerisque fermentum dui. Aliquam ut porttitor leo a diam. Velit egestas dui id ornare arcu odio ut.



# connect

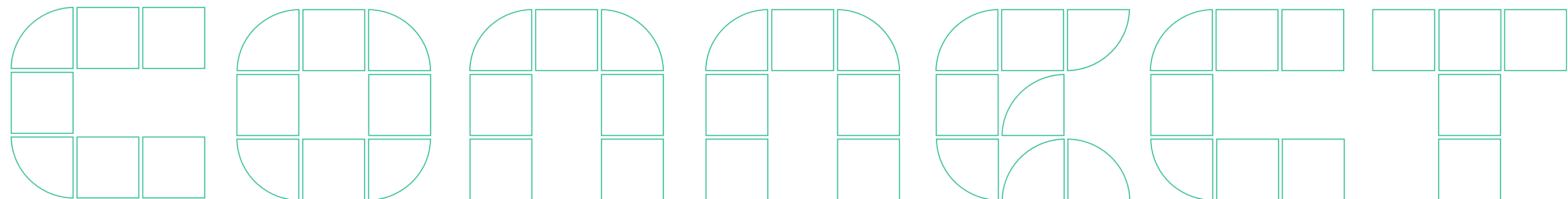
2024 AUSTIN



# Lorem Ipsum Dolor Sit Amet

## Lorem Ipsum Dolor Sit Amet

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Posuere lorem ipsum dolor sit amet. cursus metus aliquam eleifend mi in nulla. Enim nec dui nunc mattis enim ut. In cursus turpis massa tincidunt dui ut ornare lectus sit. Est placerat in egestas erat imperdiet. Sed augue lacus viverra vitae congue eu consequat ac felis. Etiam dignissim diam quis enim lobortis scelerisque fermentum dui. Aliquam ut porttitor leo a diam. Velit egestas dui id ornare arcu odio ut.



# LOREM IPSUM DOLOR SIT AMET

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore



# Lorem Ipsum Dolor Sit Amet

## Lorem Ipsum Dolor Sit Amet

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Posuere lorem ipsum dolor sit amet. cursus metus aliquam eleifend mi in nulla. Enim nec dui nunc mattis enim ut. In cursus turpis massa tincidunt dui ut ornare lectus sit. Est placerat in egestas erat imperdiet. Sed augue lacus viverra vitae congue eu consequat ac felis. Etiam dignissim diam quis enim lobortis scelerisque fermentum dui. Aliquam ut porttitor leo a diam. Velit egestas dui id ornare arcu odio ut.

**LOREM IPSUM  
DOLOR SIT AMET**

# Lorem Ipsum Dolor Sit Amet

## Lorem Ipsum Dolor Sit Amet

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Posuere lorem ipsum dolor sit amet. cursus metus aliquam eleifend mi in nulla. Enim nec dui nunc mattis enim ut. In cursus turpis massa tincidunt dui ut ornare lectus sit. Est placerat in egestas erat imperdiet. Sed augue lacus viverra vitae congue eu consequat ac felis. Etiam dignissim diam quis enim lobortis scelerisque fermentum dui. Aliquam ut porttitor leo a diam. Velit egestas dui id ornare arcu odio ut.