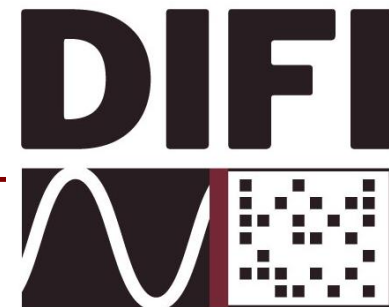


Digital IF Interoperability (DIFI) Consortium Introduction

August 19, 2021

Standards Without Interoperability



Vendor 1

ICD

Interface Test Software

VNF Application Software

Control Plane Software

Vendor 2

ICD

Interface Test Software

VNF Application Software

Control Plane Software

Digital IF Application Software

Transport Software

Firmware

Hardware

Vendor 3

ICD

Interface Test software

Digital IF Application software

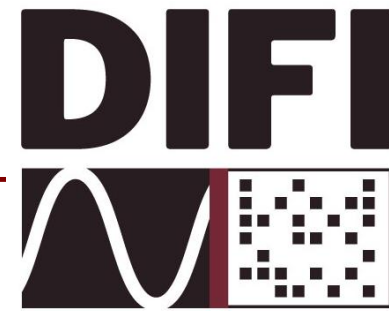
Transport Software

Firmware

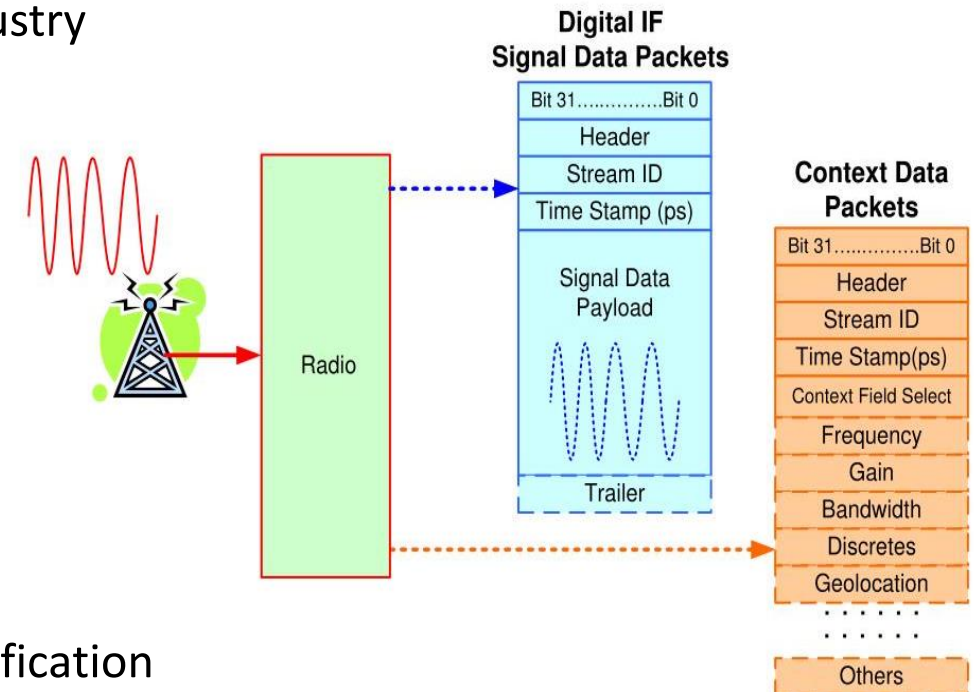
Hardware

Framework standards allow everyone to claim compliance but without interoperability. Result is vendor lock-in. Drives up development risk. Prevents economies of scale.

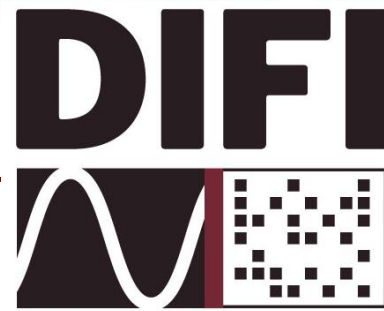
Digital IF Interoperability (DIFI) Consortium



- Goal: Wide adoption of an interoperable Digital IF standard
 - Match the interoperability that is native to analog IFs (e.g. L-band)
 - Create an open, simple, interoperable digital IF standard, and encourage its adoption throughout the industry
 - Encourage adoption of the standard throughout the industry
- Purpose:
 - Define an interoperable standard based on VITA-49
 - Design standard for easy adoption
 - Publish as an open, referenceable standard
 - Provide a way to certify compliance
 - Market the standard through the satellite industry
- Structure: simple as possible
 - Leverage IEEE-ISTO to manage the Consortium and specification
 - Free spec, straightforward certification, membership a good value

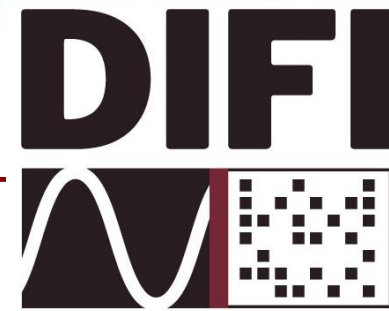


Organization Mission Statement



To enable the digital transformation of space, satellite, and related industries through a simple, interoperable Digital IF/RF standard that accelerates industry transformation from L-Band IF to Digital IF, while discouraging vendor lock-in

Why Subset of VITA Specification



- Two most common standards: VITA-49 and eCPRI
 - Both are framework standards allowing unique implementations (i.e. neither ensure interoperability)
 - VITA-49.2 is an established ANSI standard that is simple and well suited for satcom
- VITA-49 is the only widely deployed Digital IF standard in satellite market today
 - 100+ Digital IF systems in operations today
 - Used across multiple different customers and applications
 - Choice of US military, Cloud, aaS for satellite applications
 - Specification tailored for satellite industry requirements

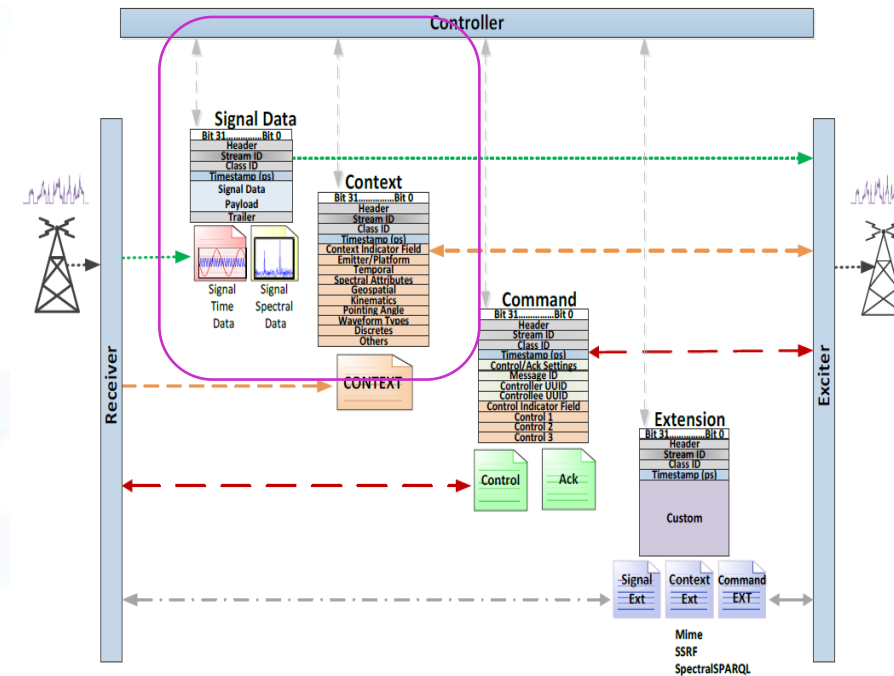


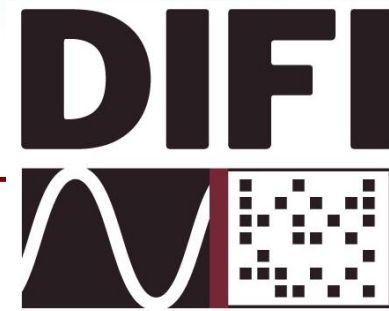
Figure 1-1: Overview of VITA 49.2 Packet Types

Approach to Specification



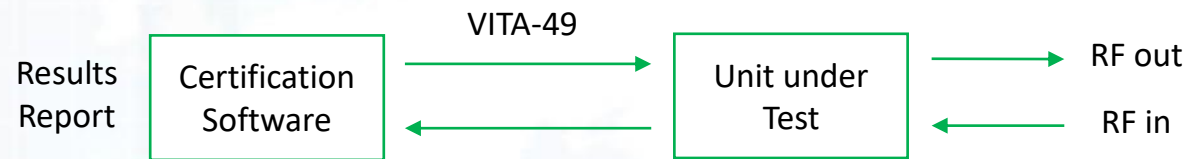
- Keep it simple and broadly applicable:
 - V1.0 is a minimum viable specification to achieve interoperability of IF/L-band
 - Data plane only
 - Signal and context packets only
 - Easy to adopt, implement, and certify
 - Limit road-blocks for adoption by vendors
 - Focus industry innovation on the hard problems
 - Hard problems include network transport, failover, etc.
 - Vendors can still differentiate

Certification Process

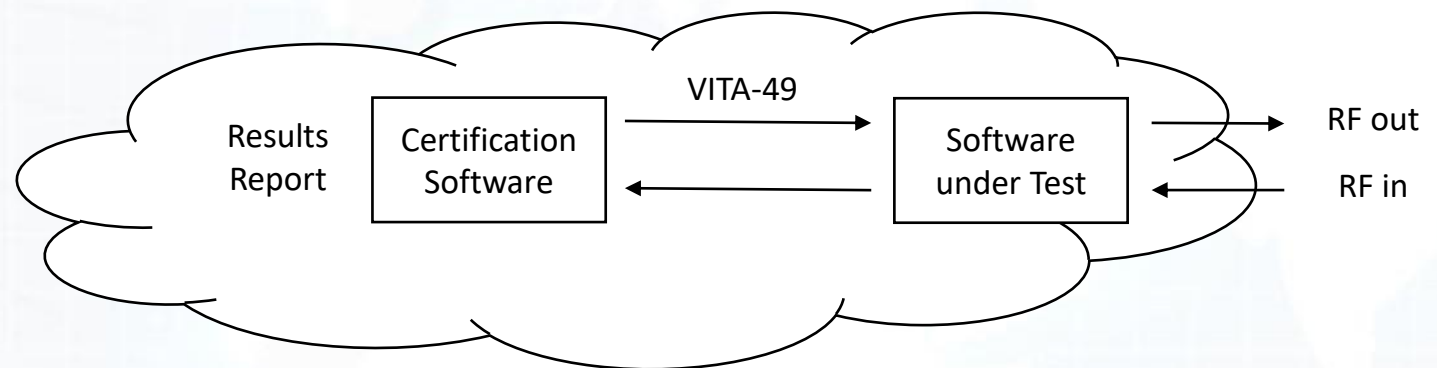


- Consortium provides basic certification software to validate packets
 - Provide software for testing and to allow self certification
 - Empower 3rd party certification organization(s)

Basic certification: Supported
Direct connection. Can be self
or 3rd party certified



Cloud certification: Could support
Cloud test of input/output files

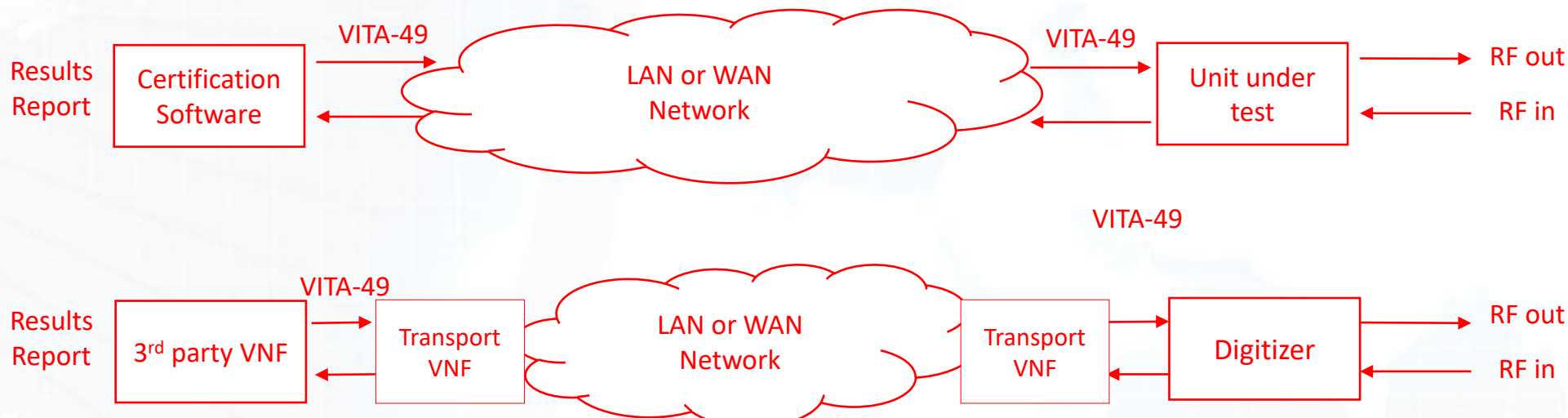


Certification Process Limitations

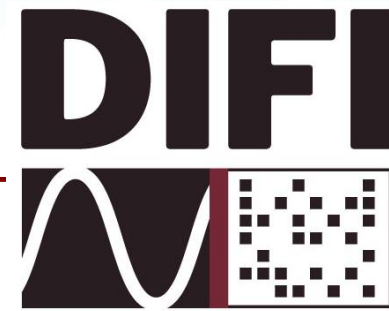
- Certification excludes testing of the LAN/WAN network
 - Networks are completely separate systems for the test environment, variable, complex
 - Consortium could provide advice on common network challenges associated with digital IF
 - Consortium could recommend companies/products that address digital IF and network challenges

Not supported:
Testing and certifying the LAN/WAN network*.

*Network transport IP is not part of Spec or Consortium IP, area for industry innovation



Consortium Structure



Consortium Membership

- Two levels paying (corporate) and non-paying members (Gov't & non-profits)
- All members participate in the WGs, only corporate members can be board members
- Any company can apply, must agree to support Consortium goal. Board has final approval rights.

Board of Directors

- Purpose to govern org, approve changes to specification, manage certification process
- Made up of elected member companies and a non-voting Chairman
 - Chairman does not vote, except to break a tie
 - 3-year term
 - Voting board members are operators and not vendors

Membership Dues

- Member companies ~\$5K/yr,
- Board member ~\$15k/yr
- Digital IF & modem vendors are encouraged to be working group members only

Standards Working Group

- Suggest, evaluate, and provide recommendations to the board on changes to the standard
- All member companies can each have one person and an alternate on the working group.

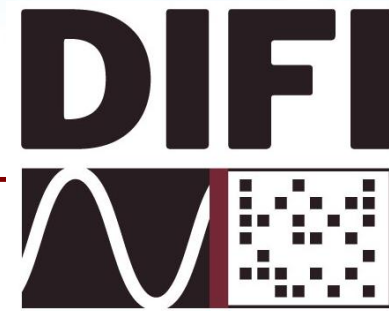
Certification Working Group

- Owns certification software and process. (self certification or 3rd party certification)
- All member companies can each have one person and an alternate on the working group.

Space Industry Specification Users (non-Members)

- Specification and certification available to both member and non-member companies
- Once implementation is certified, they are encouraged to publicly announce that and put it on their product

Teamed with IEEE-ISTO

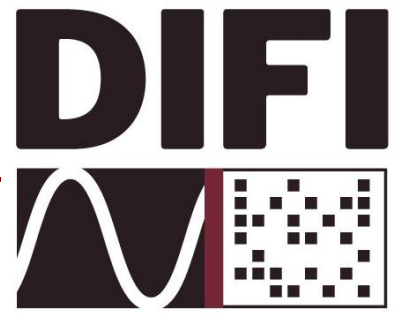


- Parent organization
 - Establishment of the organization,
 - Legal structure, bi-laws, insurance, accounting, monthly financials, taxes, web site, etc.
 - Run day-to-day operations
 - Assign a project manager, handle all accounting, billing, taxes, web site maintenance, and other operational functions
- Provide deep experience and credibility to organization and standard

VITA Group



- VITA Group is supportive of Consortium plans
 - Consistent with their goals of the organization
 - Provided a legal release to allow use their information
- Willing to help promote the organization
 - Already doing a white paper on AWS



Thank You!