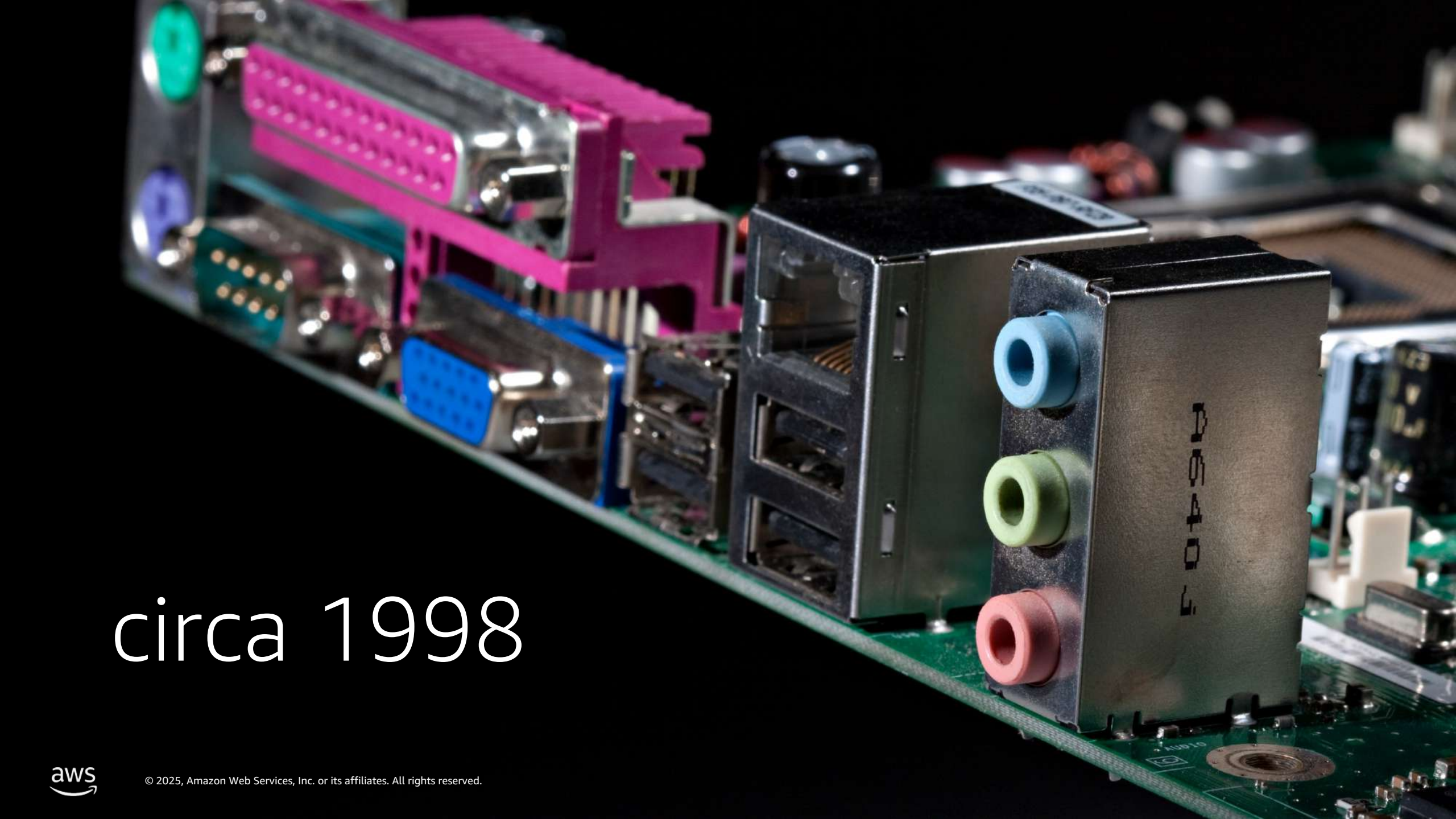
Build with OSCAL: the case for adoption and beyond

Actions Beyond Words: Automating Audits for Streamlined Cybersecurity Compliance in Europe, 23 April 2025

Fritz Kunstler, Principal Engineer, AWS

1982

Photo by Evan-Amos, Public Domain, https://commons.wikimedia.org/w/index.php?curid=17414881



circa 1998

Startup challenges (1998-99)

Build expert system that tells customer how to interconnect consumer electronics components and recommends cables.

Consumer sees this as overhead; just wants it to work.

Complex, variable hardware-stack with components from potentially dozens of makers

Paper documentation of components

- Information silos (consumers, customers, makers)
- Lossy translation to English
- Inconsistent terminology, structure, detail between makers
- Subject matter experts (SMEs) required to manually extract data & maintain it in digital format

Cable Connector Reference Chart

Computer

VGA
Video Graphics Array

Name	VGA (15-Pin)	Mini-VGA (14-Pin)
	D-subminiature (D-sub)	
Info	**Function**: Video - Analog **Supported Resolutions**: 640 x 480 VGA; 800 x 600 Super VGA; 1024 x 768 XGA; 1600 x 1200 Ultra XGA; 2048 x 1536 Quad XGA **Common Uses**: Video projectors; Most PC laptops; Older computers and monitors; Power Mac G4 (2000 - 2002); Titanium PowerBook G4 (2001)	iMac (2002 - 2004); Dual USB iBook G3 (2002 - early 2003); iBook G4 (late 2003 - 2005); iMac G4 (2002 - 2003); iMac G5 (2004 - 2005); Aluminum PowerBook G4 (early 2003)
Male		
Female		

DVI
Digital Visual Interface

Name	DVI (24-Pin)	Mini-DVI (32-Pin)	Micro-DVI (34-Pin)
Info	**Function**: Video & Data - Analog & Digital **Supported Resolutions**: 1280 x 800 Wide WGA; 1920 x 1200 Wide Ultra XGA; 2560 x 1600 Wide Quad XGA (Dual Link only); 3840 x 2400 Wide Quad Ultra XGA (Dual Link only) **Common Uses**: Many computers and monitors; Newer projectors; Power Mac G4 (late 2002 - 2003); Power Mac G5 (late 2003 - 2005); Mac Mini (2005 - early 2009); Discrete MacBook Pro (2006 - 2008); Mac Pro (2006 - present); 12" Aluminum PowerBook G4 (late 2003 - 2006); Intel Plastic MacBook (2006 - mid 2009); Intel Aluminum iMac (2007 - early 2009); Intel Mac Mini (2009); MacBook Air (early 2008) **Male-Connector Types**: DVI-I (Single Link); DVI-D (Single Link); DVI-A (Analog only; Similar to VGA); DVI-I (Dual Link; Analog and Digital); DVI-D (Dual Link; Digital only; Similar to HDMI)		
Male			
Female			

DisplayPort

Name	DisplayPort (20-Pin)	Mini DisplayPort (20-Pin; Thunderbolt)
Info	**Function**: Video, Audio, Data, & Power (Thunderbolt only) - Digital **Supported Resolutions**: 1280 x 720 HD 720; 1920 x 1080 HD 1080; 2560 x 1600 Wide Quad WGA; 3840 x 2160 Quad Full HD **Audio**: 1 - 8 Channels @ 192 kHz 16 - 24 bit **Data Rate**: 8 to 17 Gb/s (1 to 2 GB/s); 20 Gb/s (2.5 GB/s) **Power**: 10 watts (7 volts) **Common Uses**: Some computers and monitors; Some laptop computers; Some laptop computers; Aluminum Unibody MacBook (late 2008 - mid 2009); Plastic Unibody MacBook (late 2009 - present); Unibody MacBook Pro (late 2008 - present); MacBook Air (late 2008 - present); Mac Mini (early 2009 - present); Mac Pro (early 2009 - present); Aluminum Unibody iMac (late 2009 - present)	
Male		
Female		

Video

HDMI
High-Definition Multimedia Interface

Name	HDMI Type A (19-Pin)	Mini-HDMI Type C (19-Pin)	Micro-HDMI Type D (19-Pin)
Info	**Function**: Video, Audio, & Data - Digital **Supported Resolutions**: 1920 x 1200 Wide Ultra XGA (v1.0 - 1.2); 2560 x 1600 Wide Quad XGA (v1.3); 4096 x 2160 4k (v1.4) **Audio**: 1 - 8 Channels @ 192 kHz 16 - 24 bit **Data Rate**: 4 - 10 Gb/s (0.5 - 1.3 GB/s) **Common Uses**: Many newer TVs and DVD players; Blu-Ray players; Some computers, laptops, and monitors	Some video and digital still cameras; Some cell phones and mobile devices	Newer cell phones and mobile devices
Male			
Female			

Component
RCA (YPbPr)

Info	Male	Female
Function: Video - Analog **Supported Resolutions**: 854 x 480 HD 480; Wide VGA; 1280 x 720 HD 720; 1920 x 1080 1080i **Common Uses**: Many newer TVs, media players, video projectors, video recorders		

Composite
RCA (YUV)

Info	Male	Female
Function: Video - Analog **Supported Resolutions**: 720 x 480 480i **Common Uses**: Most TVs, media players; video projectors; video recorders, consumer video equipment		

BNC
Bayonet Neill-Concelman

Info	Male	Female
Function: Video & Power - Analog & Digital **Supported Resolutions**: Limited only by hardware **Power**: <500 watts (< 500 volts) **Common Uses**: Older TVs/monitors; Professional video equipment		

F Connector
Coaxial RF

Info	Male	Female
Function: Video - Analog & Digital **Supported Resolutions**: Limited only by hardware **Common Uses**: Most TVs and set-top boxes; Older media players		

S-Video
Separate Video

Info	Male	Female
Function: Video - Analog **Supported Resolutions**: 704 x 480 480i **Common Uses**: Many older TVs, DVD players, video projectors, recorders		

Data

USB
Universal Serial Bus

Name	USB Type A (4-Pin)	USB Type B (4-Pin)	Mini-USB Type A (5-Pin)	Mini-USB Type B (5-Pin)	Micro-USB Type A (5-Pin)	Micro-USB Type B (5-Pin)	USB Type A (9-Pin)	USB Type B (9-Pin)	Micro-USB Type B (10-Pin)
	High-Speed 1.0 - 2.0						SuperSpeed 3.0		
Info	**Function**: Data & Power - Digital **Data Rate**: 480 Mb/s (60 MB/s); 4.8 Gb/s (572 MB/s) **Power**: 2.5 watts (5 volts); 4.5 - 9 watts (5 volts) **Common Uses**: Most computers and peripherals; Many newer TVs, monitors, DVR players; Some mobile and other devices	Most printers and scanners; Some media decks and device docks	Some small devices	Many hard drive docks; Many small devices	Some small devices	Many newer cell phones; Many small devices	Some newer computers; Some newer hard drive docks	Some newer hard drive docks	Some newer mobile devices; Some newer hard drive docks
Male									
Female									

FireWire
IEEE 1394, i.LINK, Lynx

Name	FireWire 400 (4-Pin)	FireWire 400 (6-Pin)	FireWire 800 (9-Pin)
Info	**Function**: Data & Power - Digital **Data Rate**: 100 - 400 Mb/s (12 - 50 MB/s); 800 - 3200 Mb/s (100 - 400 MB/s) **Power**: 7 - 8 watts (24 - 30 volts) **Common Uses**: Many video recorders; DV decks; Some desktop computers; Clamshell iBook G3 (late 2000); Clamshell iBook G3 (late 2000); Dual USB iBook G3 (2001 - early 2003); iBook G4 (late 2003 - mid 2005); Power Mac G4 (2000 - 2003); Power Mac G5 (mid 2003 - 2005); Titanium PowerBook G4 (2001 - 2002); Aluminum PowerBook G4 (2003 - 2005); eMac (2002 - late 2005); iMac G4 (2002 - mid 2004); iMac G5 (mid 2004 - late 2005); Plastic iMac (2006); Aluminum iMac (2007 - early 2009); Mac Mini G4 (2005); Mac Mini Intel (2006 - 2007); Mac Pro (2006 - present); Plastic MacBook (2006 - 2009); Discrete MacBook Pro (2006 - 2008); Power Mac G4 (2003); Power Mac G5 (mid 2003 - 2005); 15" and 17" Aluminum PowerBook G4 (2003 - 2005); 15" and 17" Discrete MacBook Pro (2006 - 2008); Mac Pro (2006 - present); Unibody MacBook Pro (late 2008 - present); Aluminum iMac (2008); Unibody iMac (late 2009 - present); Mac Mini Intel (2009); Unibody Mac Mini (2010 - present)		
Male			
Female			

eSATA (7-Pin)
External Serial Advanced Technology Attachment

Info	Male	Female
Function: Data - Digital **Data**: 3 Gb/s (300 MB/s) **Common Uses**: Some external hard drives; Some desktop computers		

Apple Dock Connector

Info	Male	Female
Function: Data - Digital **Data**: 480 Mb/s (60 MB/s) **Common Uses**: iPod Classic (3G - present); iPod Mini; iPod Nano; iPod Touch; iPhone; iPad		

Power

IEC 60320 Couplers

Name	IEC C5/C6 "Cloverleaf" or "Mickey Mouse"	IEC C7/C8 "Infinity" or "Shotgun"	IEC C7P/C8P "Circle-Square" (Polarized)	IEC C13/C14
Info	**Function**: Power **Power**: <250 volts **Common Uses**: Some video projectors, laptop power supplies, and other devices; iMac G4	Many video projectors, full-sized recorders, and other devices; Most laptop power supplies; Unibody Mac Mini		Most desktop computers, monitors, and printers; Many other peripherals and devices; iMac G5 - Unibody iMac
Male				
Female				

powerCon

Info	Male	Female
Function: Power **Power**: <250 volts **Common Uses**: AC power connections		

Audio

TRS (Audio Jack)
Tip Ring Sleeve Connector

Name	TS	TRS	TRRS
Info	**Function**: Audio (& Video) - Analog **Audio**: 1 (Balanced) - 2 (Unbalanced) Channels **Common Uses**: Mono audio connections; Stereo audio connections; Most consumer audio devices; Stereo audio and video; Stereo audio and microphone; Most smart phones; Some video recorders		
Male	Micro-mini 2.5 mm; 1/8" Mini 3.5 mm; 1/4" 6.3 mm	Micro-mini 2.5 mm; 1/8" Mini 3.5 mm; 1/4" 6.3 mm	1/8" Mini 3.5 mm
Female	Micro-mini 2.5 mm; 1/8" Mini 3.5 mm; 1/4" 6.3 mm		

Stereo Audio RCA

Info	Male	Female
Function: Audio - Analog **Audio**: 2 Channels **Common Uses**: Most TVs, media players, video projectors, consumer audio equipment	Left Audio; Right Audio	

Digital RCA
Coaxial Audio

Info	Male	Female
Function: Audio - Digital **Audio**: 2 Channels @ 192 kHz 16 - 24 bit **Common Uses**: Some newer media players and consumer audio equipment		

Optical
TOSlink Connector

Info	Male	Female
Function: Audio - Analog &Digital **Audio**: 1 - 2 Channels @ 192 kHz 8 - 24 bit **Common Uses**: Some TVs, desktop computers, media players		

MIDI
Musical Instrument Digital Interface

Info	Male	Female
Function: Data (Audio) - Digital **Data**: Velocity, Note-on/off, Pitch (0 - 127) **Common Uses**: MIDI Controllers; Keyboard peripherals		

XLR Connector

Name	XLR (3-Pin)	Mini XLR (3-Pin)
Info	**Function**: Audio (& Data) - Analog & Digital **Audio**: 1 (Balanced) - 2 (Unbalanced) Channels @ 192 kHz 16 - 24 bit **Common Uses**: Most professional audio equipment; Many hand-held microphones; Audio mixers; Beach Tiki; Some headsets, video cameras, and equipment controllers; Floor microphones; Some headphones; Other small audio devices		
Male			
Female			

speakON

Info	Male	Female
Function: Audio & Power - Analog **Audio**: 1 Channel **Power**: <1000 watts **Common Uses**: Large speakers; Amplifiers		

photo by D-Kuru - Own work, CC BY-SA 3.0 at, https://commons.wikimedia.org/w/index.php?curid=2598573

Today in security governance, risk, and compliance (GRC)

Or, what does any of that have to do with OSCAL?

Parallels

Challenges of failed startup, 1999

- Complex tech-stack from dozens of CE makers
- Documentation inconsistencies (structure, terms, details)
- SMEs required to translate requirements to customer environment
- Siloed information
- Manual mappings done by humans using spreadsheets

Challenges of security GRC, 2025

- Complex tech-stack from cloud providers, ISVs, etc.
- 150+ frameworks in traditional doc formats w/ inconsistent structure, terms, details
- SMEs required to translate requirements to customer environment
- Siloed information
- Manual mappings done by humans using spreadsheets

Compliance tooling

92% of big four auditors and 74% of non-big 4 auditors "Always" or "Often" using spreadsheets for Risk Assessment and Audit Planning

Almost 90% of leaders are interested in the integration of AI tools by providers of risk and compliance solutions. (Moody's Navigating the AI Landscape: Insights From Compliance And Risk Management Leaders)

38% of compliance leaders cite inefficient or manual compliance processes as their most significant worry. (NorthRow State of Compliance Trends Report 2024)

https://drata.com/blog/compliance-statistics

Current state (2025)

GRC approach

- Traditional doc formats for information exchange
- Siloed data in GRC tools
- Manual mappings done by humans in spreadsheets
- Evidence-gathering and analysis hand-done by SMEs

Builder approach

- Cloud, IoT, etc.
- Everything has an API
- Increasingly rapid SDLCs
- CI/CD automation
- AI-driven development

Compliance overhead

On average, 25% of business revenue is spent on compliance costs. 18% of businesses estimated that more than 50% of revenue is spent on compliance costs. (NorthRow State of Compliance Trends Report 2023)

74% of organizations state that compliance is a burden.

Time spent on compliance:

- 25% of organizations spend less than 1,000 hours/year.
- 35% spend 1,000 to 4,999 hours;
- 20% spend 5,000 to 9,999 hours;
- remaining 20% spend10,000+ hours/year.

https://drata.com/blog/compliance-statistics

Extending the analogy

Status quo

OSCAL

Get started with OSCAL

OSCAL is the de facto standard for security data interchange between enterprises and tools.

OSCAL use-cases at AWS

2022 – AWS achieves the first OSCAL format system security plan submission to FedRAMP

2024 – Implementing a compliance and reporting strategy for NIST SP 800-53 Rev. 5

OSCAL use-cases at AWS

2025

[Using OSCAL to express Canadian cybersecurity requirements as compliance-as-code]

[OSCAL Foundation Launched to Advance the Development and Adoption of Standards to Automate Security Assessments]

Sample objective (OKR) for your organization

Revolutionize internal security control management

1. Launch OSCAL-based, agentic-AI workflow for security control mapping and catalog management by Q2 2026
2. Integrate 3+ enterprise stakeholder groups outside of Compliance org by Q3 2026
3. Achieve 85% accuracy - verified by formal methods - in automated, fine-grained, control mapping by Q4 2026
4. Eliminate internal control framework in favor of auto-generated [NIST 800-53 profile | ISO 27001 | …]
5. Reduce cost of control catalog maintenance and framework mapping by at least 50% compared to current methods by Q1 2027

Vision: fully-integrated, end-to-end compliance automation – based on OSCAL – with human intervention only where high-judgement is needed

Request for input

AWS wants to hear from you. Tell us what OSCAL services or features would be most valuable to your organization.

Schedule a conversation with me using this QR code:

Thank you!