



Experience the commitment®

Centralized Management of Code Quality Standards and Team Performance

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LOCAL EXPERTS. GLOBAL INSIGHTS.

CGI is a global end-to-end IT and business process services leader



Founded in 1976, CGI is the 5th largest independent IT and business process services firm in the world



73,000
professionals



78%
shareholders



400
locations



40
countries



9 / 10
client satisfaction
score



5,000
end-to-end
services clients



\$10.8B
annual
revenue



\$21.5B
backlog

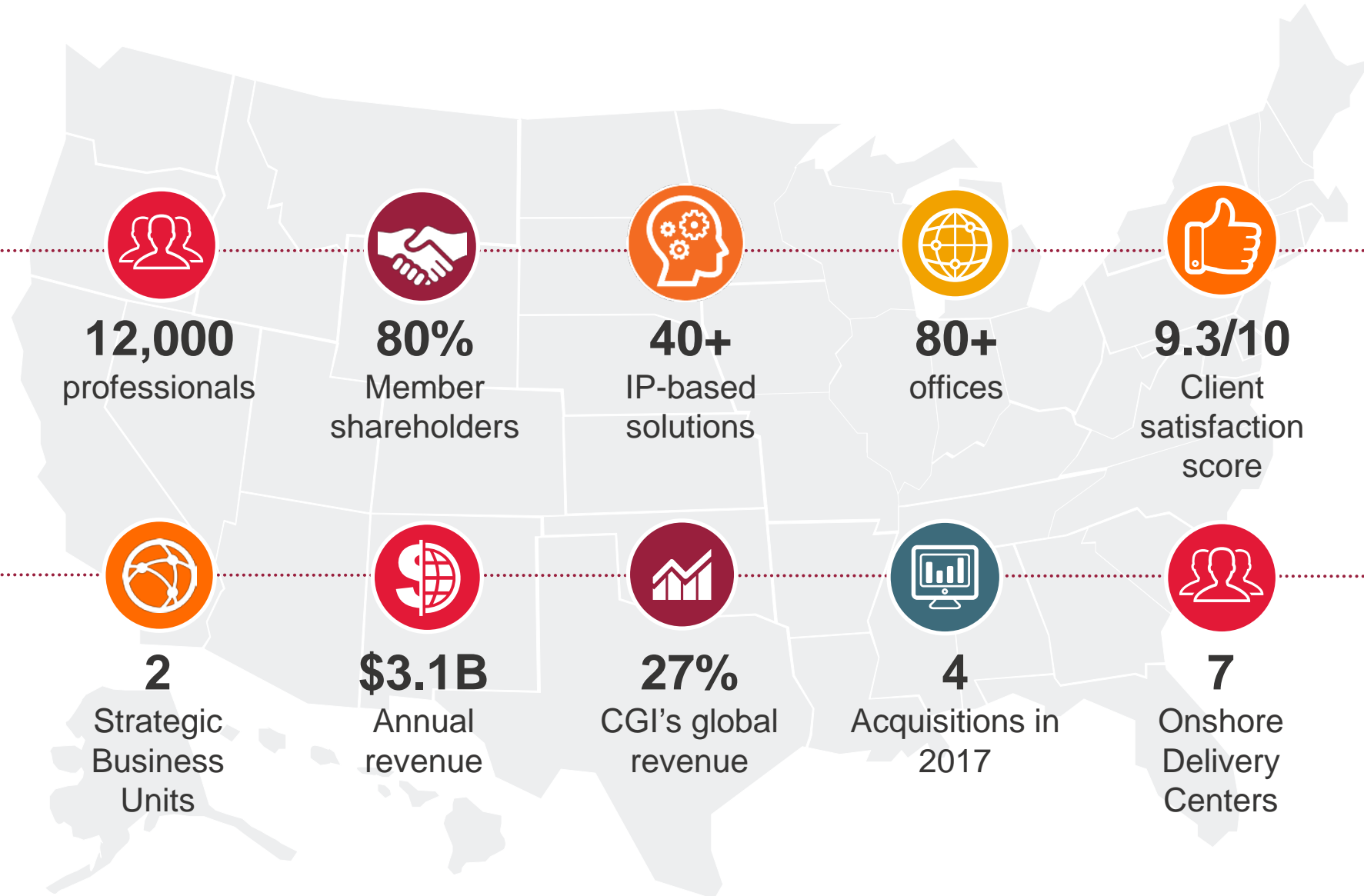


\$17B
market cap

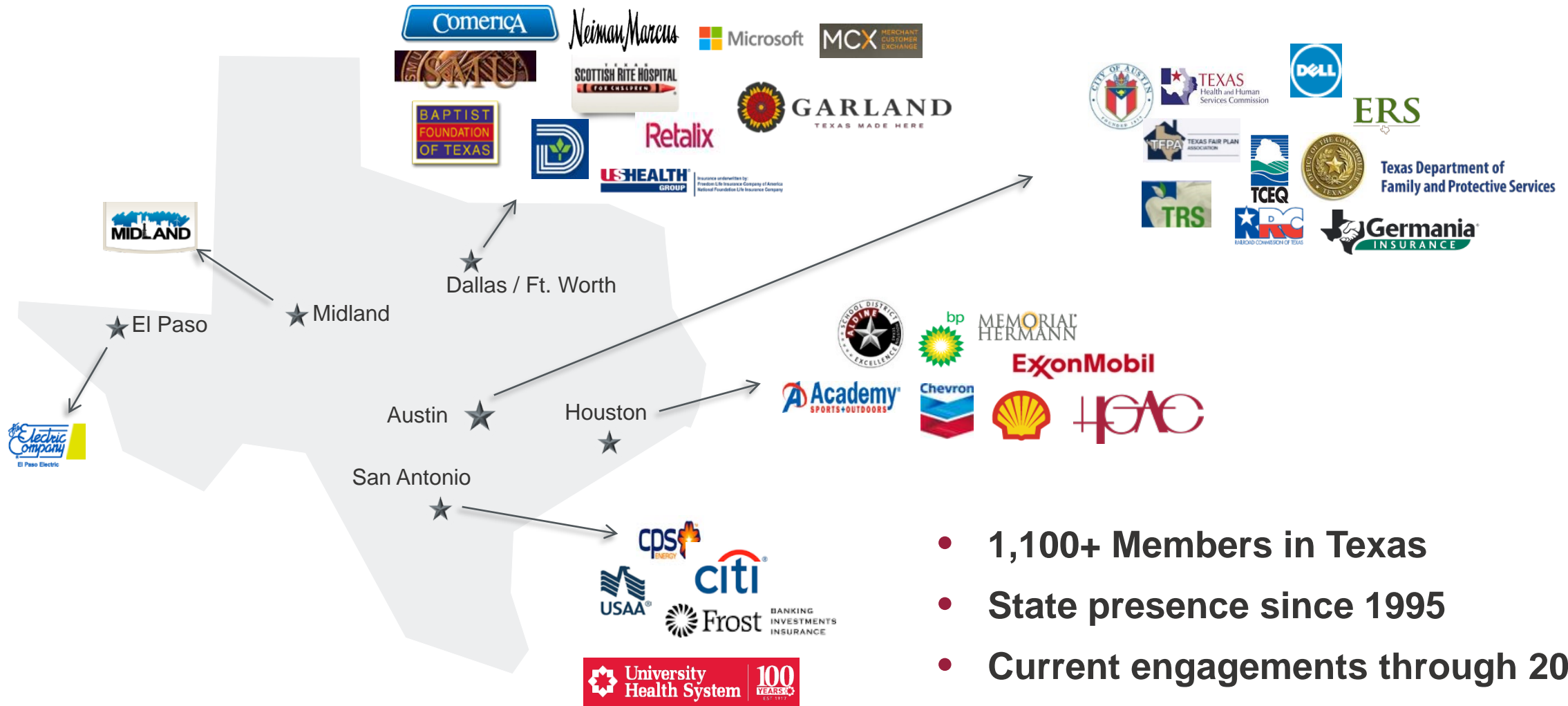


150+
IP solutions

CGI U.S. Highlights



CGI State of Texas – Selected Clients



- 1,100+ Members in Texas
- State presence since 1995
- Current engagements through 2027

A large acquisition in 2012 facilitated a revamp of our approach to application services as we more than doubled our size & global footprint



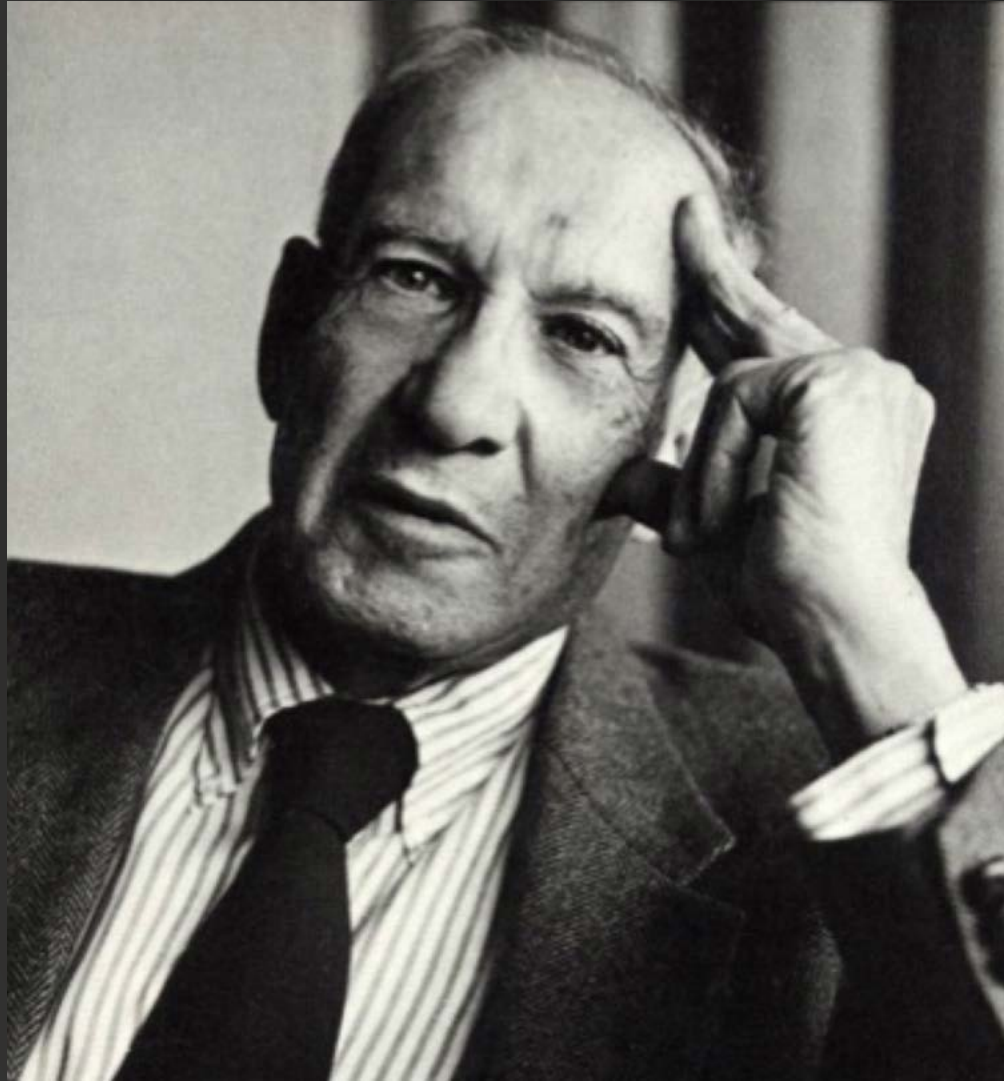
- 31,000 Members
- \$4.2 billion in revenue
- 125 offices in 20 countries
- 94% North America



- 41,000 Employees
- \$6.2 billion in revenue
- 200 offices in 43 countries
- 96% Europe



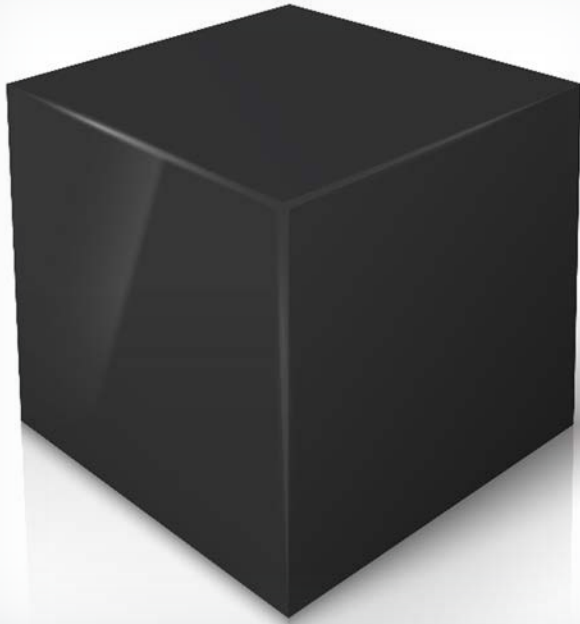
- **73,000 Members**
- **\$10.8 billion in revenue**
- **Presence in 40 countries**
- **Backlog: \$21.5B**
- **38% North America**
54% Europe



“What gets measured, gets managed and improved.”

Peter Drucker

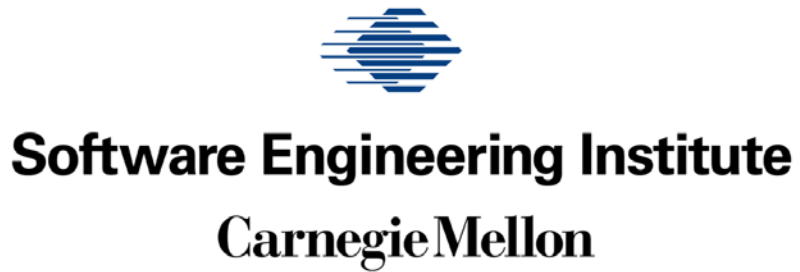
Turning the IT black box into a glass box...



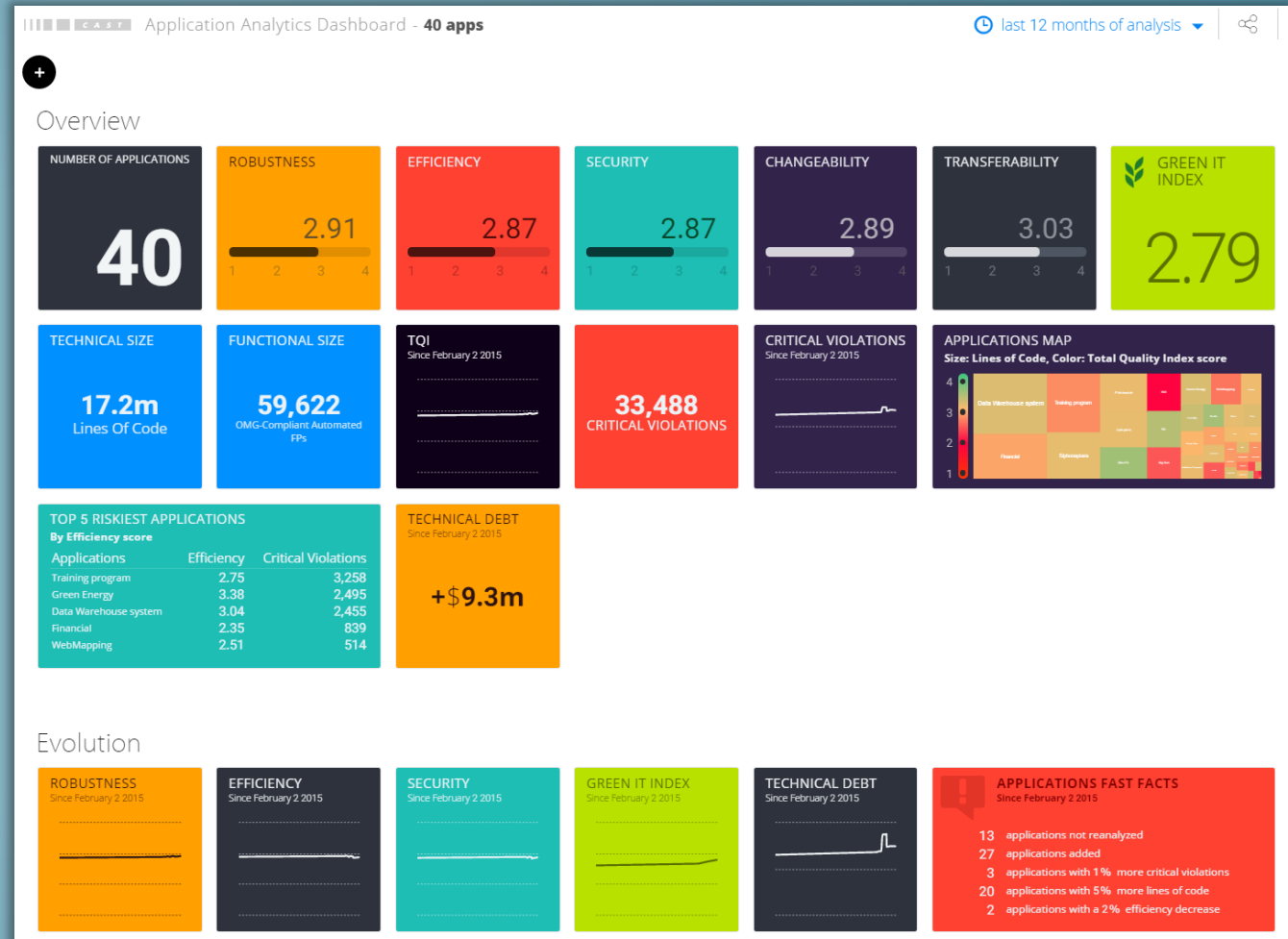
Our objectives

- **Utilize common quality and performance metrics** across the enterprise at the team level
- Use **objective data** driven by **industry standards**
- **Gain greater visibility** into quality being delivered by our teams
- **Drive team performance** for Agile, DevOps, Hybrid
- Reduce risk and better gauge the **size and complexity** of our development efforts
- **Build security into our coding** from the start

And do all of this in an efficient, centralized and automated fashion for the enterprise



CGI utilizes CISQ measurements with the CAST Application Intelligence Platform to bring transparency to quality, security, performance & cost



CAST Health Factors Map to CISQ Measures



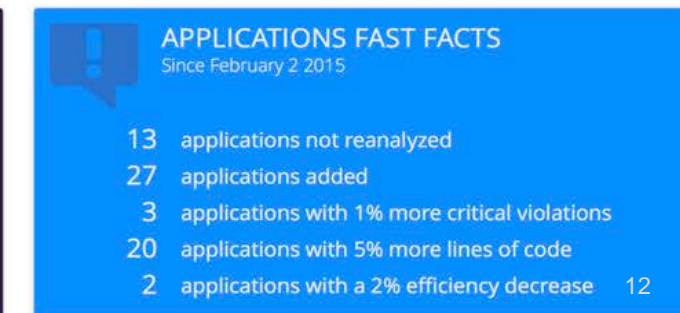
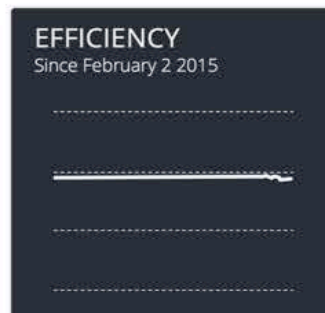
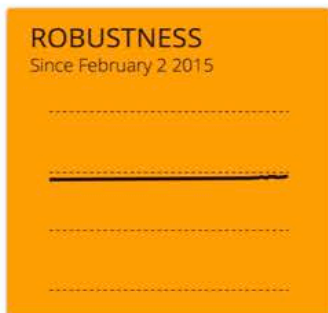


TOP 5 RISKIEST APPLICATIONS
By Security score

Applications	Security	Critical Violations
Quantlib	2.93	1,843
Green Energy	3.15	1,506
Shopizer	2.37	1,391
WebMapping	2.83	1,151
ECommerce	2.73	1,121



Evolution





Filter by

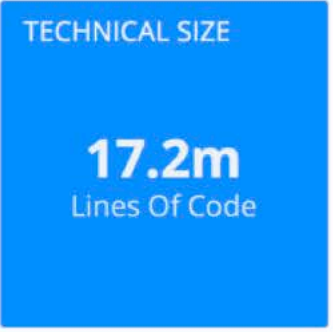
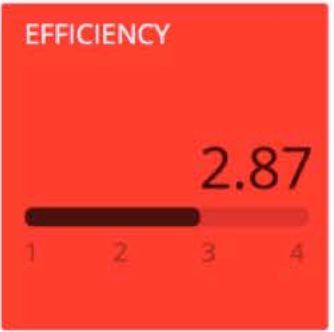


- China
- France
- India
- Morocco
- UK
- US
- ▼ **Methodology**
 - Agile
 - Mix
 - No Method
 - Waterfall
- ▼ **Release Frequency**
 - 1 Per Year
 - 1 To 3 Per Year
 - 4 To 12 Per Year
 - More Than 12
- ▼ **Sourcing**
 - Integrator 1
 - Integrator 2
 - Integrator 3
 - Internal Team

40 Matching Applications

- [Architecture Component](#)
- [Arizona](#)
- [BIO](#)
- [Big Ben](#)
- [Billing platforms](#)
- [CHOCOLATE](#)
- [Cars](#)
- [Cash Equity](#)
- [Data Warehouse system](#)
- [Dream Team](#)
- [DriveTo](#)
- [ECommerce](#)
- [Employee Portal](#)
- [Financial](#)
- [Financial Accounting](#)
- [Firmware](#)

Overview



APPLICATIONS MAP
Size: Lines of Code, Color: Total Quality Index score

TOP 5 RISKIEST APPLICATIONS
By Security score



RISK MODEL

35
CRITICAL VIOLATIONS

APPLICATION COMPONENTS

2 MODULES **357.9k** LINES OF CODE

RISK INTRODUCED FOR TOTAL QUALITY INDEX

+ 35 ADDED CRITICAL VIOLATIONS **0** REMOVED CRITICAL VIOLATIONS

WEAKNESSES FOR ROBUSTNESS

- Program ... ices - Error and Exception Handling
- Secure Coding - Time and State
- Archite ... ture - Multi-Layers and Data Access
- Program ... ing Practices - Unexpected Behavior

TOP RISKIEST TRANSACTIONS FOR ROBUSTNESS

No transactions available

TOP RULES INCREASING VIOLATIONS FOR TOTAL QUALITY INDEX

- Pages should use error handling page **+ 8**
- Close the outermost stream ASAP **+ 6**
- Avoid using Fields (non stat ... er Classes) **+ 4**
- Avoid Fields in Servlet Clas ... nal static **+ 3**
- Avoid cyclical calls and inh ... n packages **+ 3**
- Avoid copying needless the v ... bles (PHP) **+ 3**
- Avoid declaring Public Insta ... Variables **+ 2**
- Avoid empty catch blocks (PHP) **+ 2**
- Avoid instantiations inside loops **+ 1**

TOP RISKIEST COMPONENTS FOR SECURITY

parse _condition _createTree _expression

__d pluginSplit queryAssociation

_constructVirtualFields _mergeAssociation



Programmin ... d Exception Handling > Pages shou ... error handling page > [C:\CASTMS ... -INF\pages\demo.jsp]

All Technologies All Modules



- [C:\CASTMS80_CU ... \main\webapp\WEB-INF\jsp\lexl.svg]
- [C:\CASTMS80_CU ... main\webapp\WEB-INF\pages\demo.jsp]
- [C:\CASTMS80_CU ... ain\webapp\WEB-INF\pages\error.jsp]
- [C:\CASTMS80_CU ... eb\src\main\webapp\WEB-INF\web.xml]
- [C:\CASTMS80_CU ... s-export-web\WEB-INF\jsp\lexl.svg]
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- [C:\CASTMS80_CU ... export-web\WEB-INF\pages\error.jsp]
- [C:\CASTMS80_CU ... hcharts-export-web\WEB-INF\web.xml]

Computing details

8 Total checks

Source code

No violation bookmarks or details are available on this violation, object source code will be displayed instead when applicable. Code added and violation added since the last snapshot analysis

Pages should use error handling page

VIEW FILE

c:\castms80_custom_bd\deploy\php_demo\pack1\app\webroot\js\lib\highstock\exporting-server\java\highcharts-export\highcharts-export-web\src\main\webapp\web-inf\pages\demo.jsp

```

1 <%@ taglib uri="http://java.sun.com/jsp/jstl/core" prefix="c"%>
2 <%@ taglib prefix="spring" uri="http://www.springframework.org/tags"%>
3 <%@ page language="java" contentType="text/html; charset=UTF-8"
4     pageEncoding="UTF-8"%>
5
6 <!DOCTYPE html>
7 <html>
8 <head>
9 <meta http-equiv="content-type" content="text/html; charset=UTF-8">
10 <title>Highcharts export server</title>
11 <link rel="stylesheet" type="text/css" href="resources/css/demo.css" />

```

+ Show More

CGI's Approach for Centralized Management of Code Quality Standards and Team Performance

Global Center of Excellence

- - Fully staffed and operational
- - Includes CAST and Sonar
- - US, Europe SMEs
- - Global delivery support

Global Implementation

- 8 Strategic Business Units
- 60 Business Units
- >300 projects to date
- 2,000 projects by 2020

Delivery Methodologies

- Waterfall
- Agile
- DevOps
- Hybrid / bimodal IT

Road Map

- CGI IP
- Client applications
- New business
- M&A

CGI Software Quality and Performance Center of Excellence



Objectives	Description	Key facts
Program Oversight	Provide oversight at the executive level on quality, security, productivity and technical debt to drive risk and cost reduction	300+ applications analyzed
Improve software and team performance	Reduce complexity and cost of application portfolios by measuring software and team performance at each Agile sprint	350+ projects in the program
Enable software quality capabilities	Equip application services resources with advanced insight into their software applications leveraging deep analytics and common metrics	220+ million lines of code assessed
Educate and Train on software quality	Provide training on software improvement through multiple channels	Global team supporting CGI and our customers

Creating the IT “Glass Box” using CISQ quality, performance and security measures with CAST through our COE

Macro Visibility

- Health checks at the management level
- Objective measurements for quality and quantity
- Insights to drive better estimates
- Reduction of project margin leakage
- Improved investment analysis and monitoring



Micro Visibility

- Violations and technical debt
- Corrective actions
- Transactions and their risk
- Visual call flows
- Team output measurements
- Security vulnerabilities

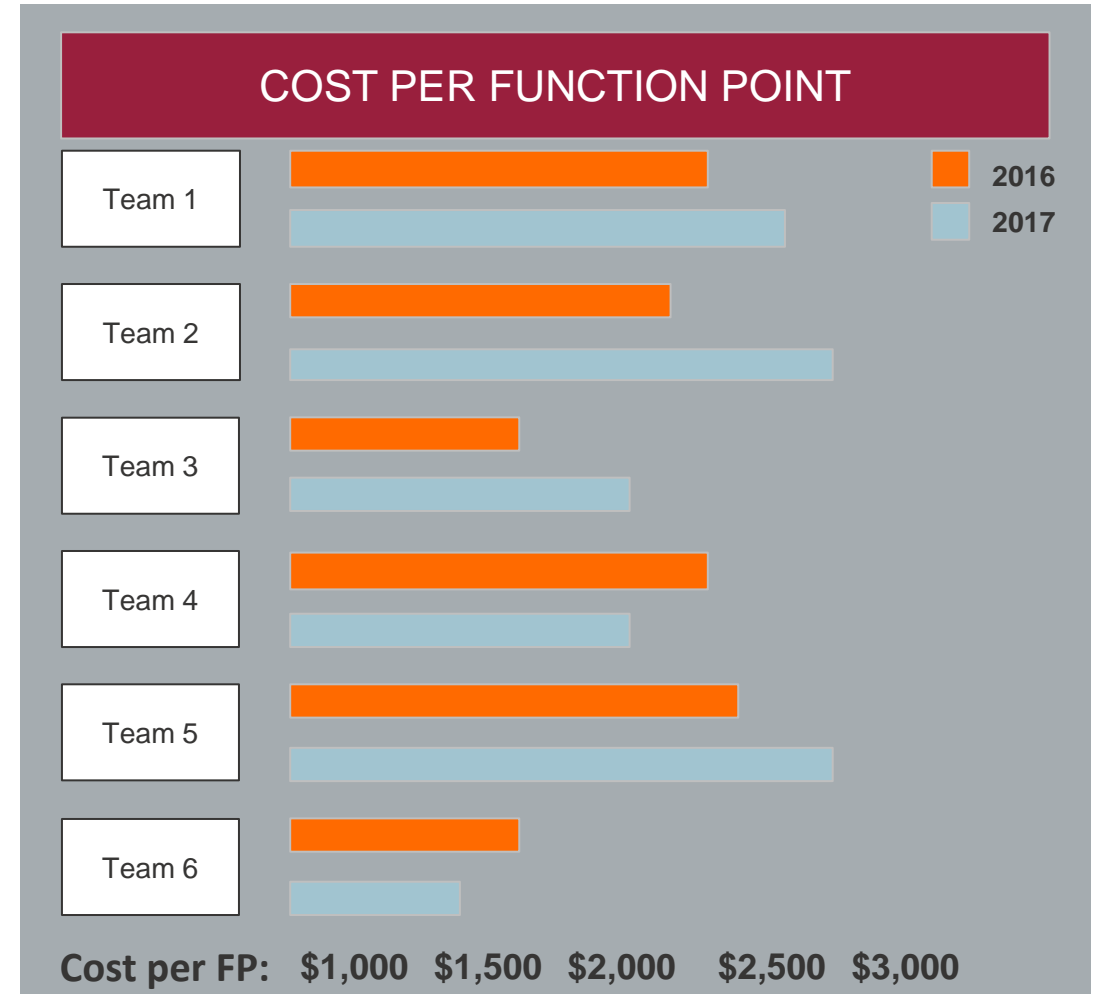
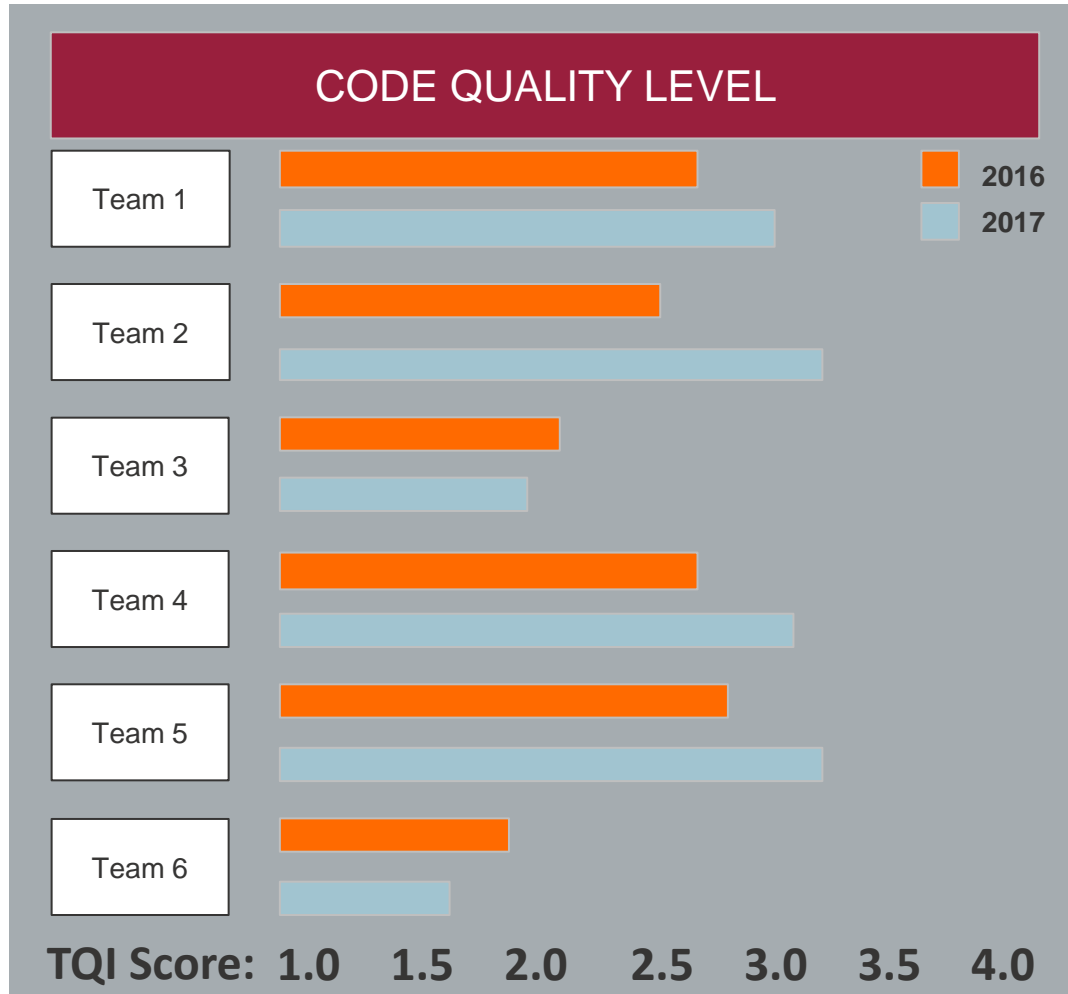


Using Application Analytics to Drive Team Quality, Performance, Security and Cost

Delivery Team (or Vendor)	Total Quality Index	Robustness	Performance	Security	Transferability	Changeability
Team 1	2.59	3.16	2.34	3.01	1.99	2.44
Team 2	2.81	2.78	2.78	3.12	2.34	3.03
Team 3	2.39	1.67	1.54	2.98	1.76	2.99
Team 4	3.06	3.12	3.11	2.79	3.11	3.15
Team 5	2.83	2.56	2.88	3.03	2.56	3.03
Team 6	3.11	3.76	2.89	3.07	2.85	2.63

- Enforces focus on structural risk and Total Cost of Ownership
- Provides business a means to measure deliverables to assess both risk and cost of work (Quality Gates)
- Based on industry standard, objective measurements of quality and quantity for IT delivery

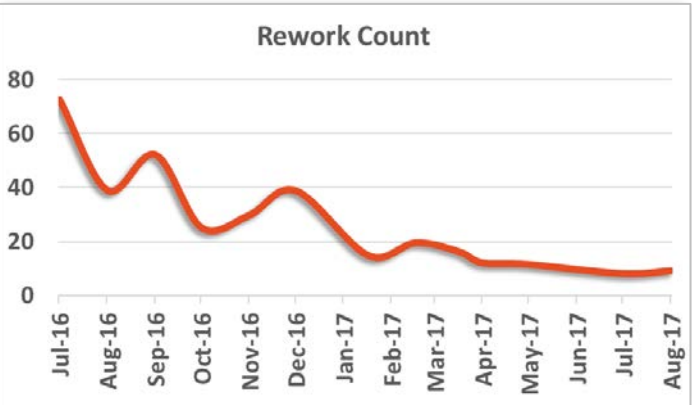
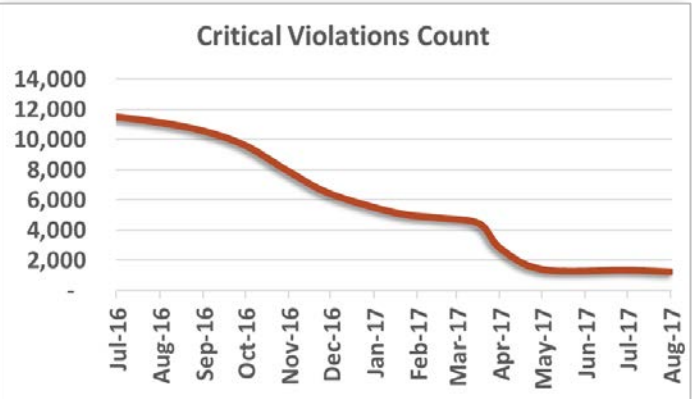
Team or Vendor Performance – Monitor Quality and Cost Over Time



With CISQ measures and CAST, we drive higher performance and quality leading to **lower IT costs and less downtime**

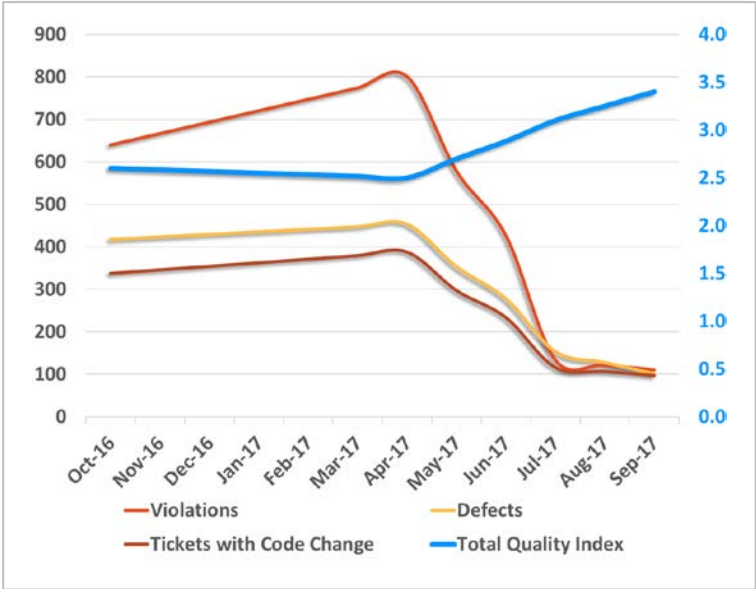
Banking Application

88% Reduction in Critical Violations
92% Reduction in Re-Work



Insurance Application

84% Reduction in Critical Violations
75% Reduction in Defects
30% Increase in Total Quality Index



Capital Markets Application

30% Increase in Total Quality Index
50% Reduction in Defects
3.5% increase in engineering capacity

Area	Original Assessment (days)	Effort Savings %	Effort Savings (days)	Actuals
Estimate (1%)	124.6	10%	12.5	112.1
Impact Analysis (3%)	373.7	25%	93.4	280.3
Reviews (15% of CUT efforts)	653.9	20%	130.8	523.2
Coding standard related rework (15% of CUT)	280.3	15%	42.0	238.2
Memory issues related rework (1%)	124.6	32%	39.9	84.7
Scalability issues related to SQL (3%)	373.7	34%	127.1	246.6
Total	1,930.7	23%	445.6	1,485.1

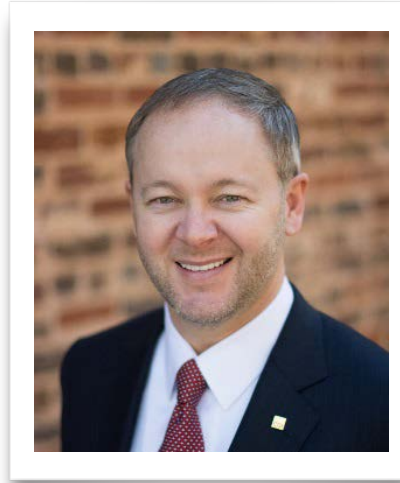


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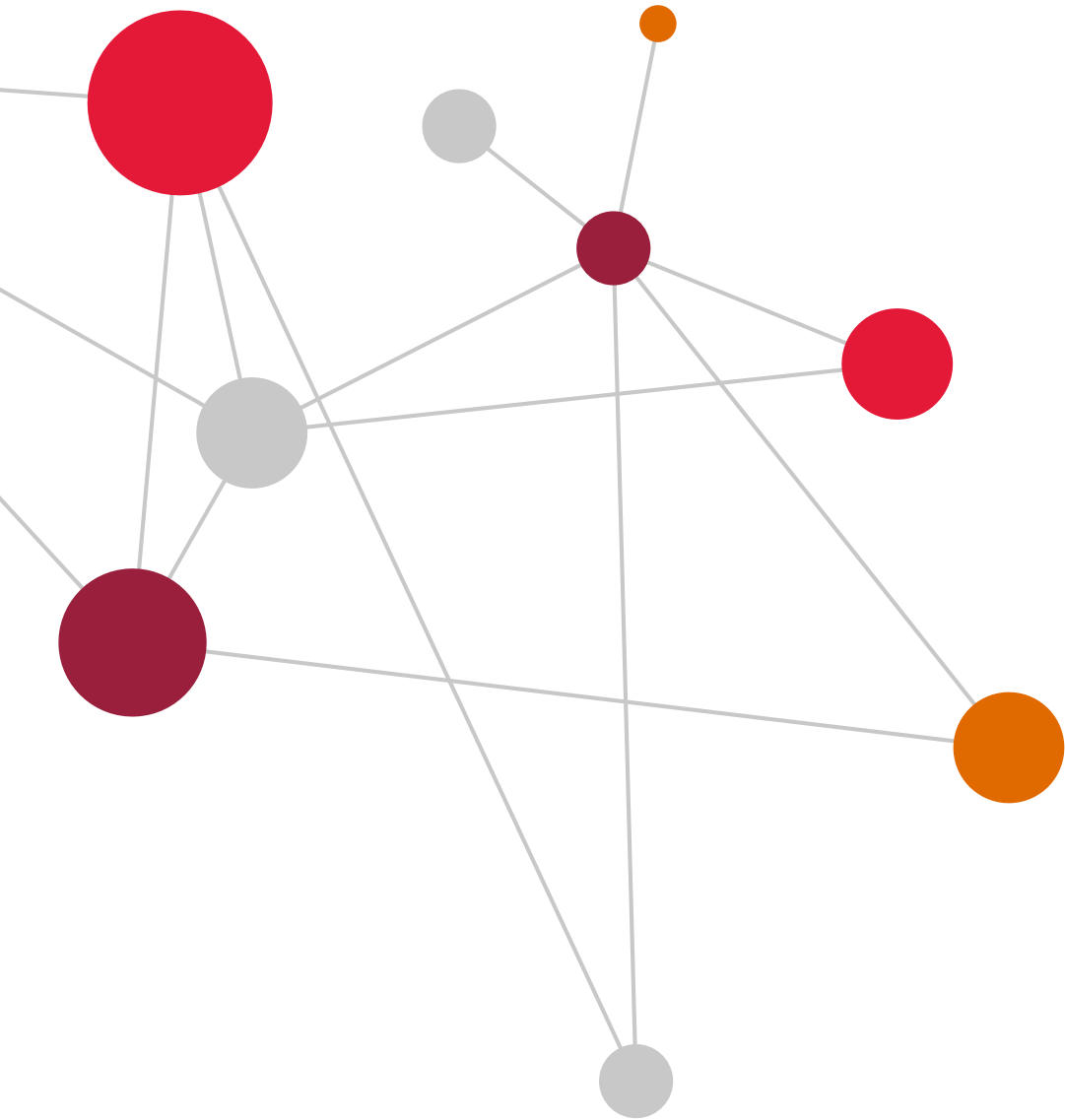


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Questions?