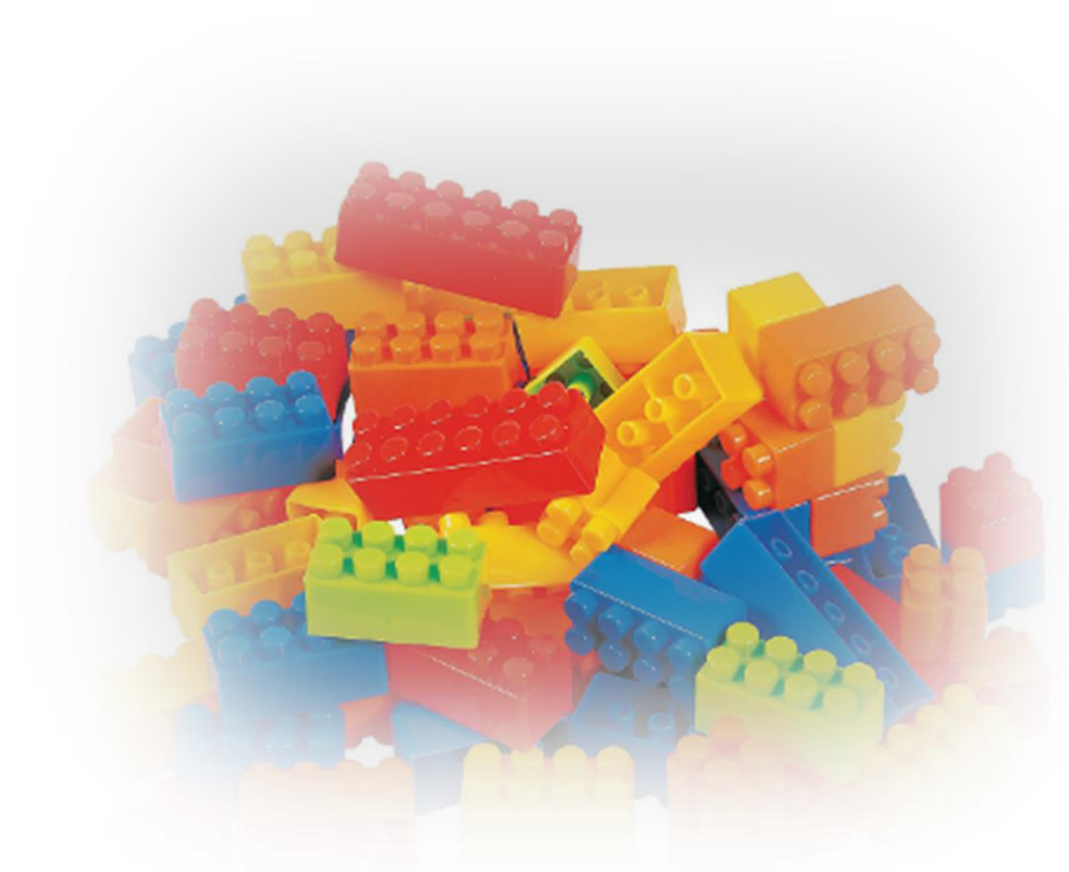


Challenges Integrating Legacy CICS Applications

Glenn Schneck

Principal Technical Architect -
GT Software

gschneck@gtsoftware.com



CICS Retains the System of Record



CICS Systems for Banks
(ATM, loans, account management)



CICS Systems for Insurance
(Claims & policy management)



CICS Systems for Manufacturing



CICS Systems for Finance

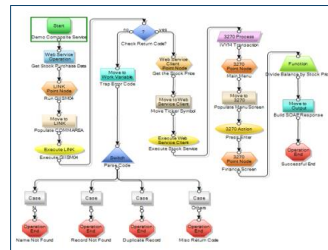
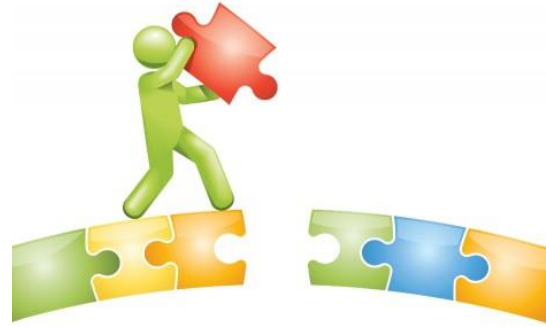
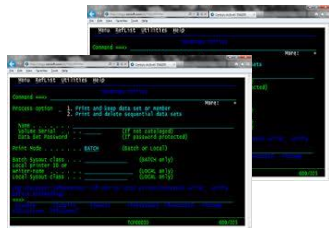


CICS Systems for Medical



CICS Systems for Transportation

Today's Challenge



Access untapped value in legacy systems and overcome perceived complexity to empowering your business.

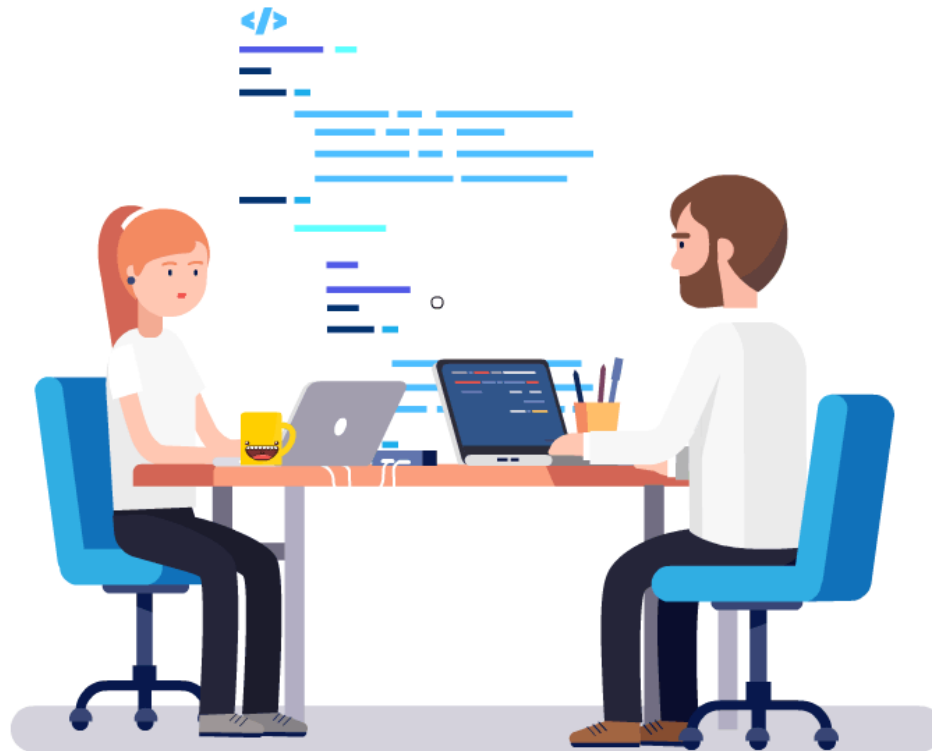
CICS API's : Complexities

API



API

Writing Code!!!!





Do You Have the Right Mainframe Integration Technologies?

- How old are your legacy backend applications?
- What technologies are they using?
- Is the application code structured or unstructured?
- How many coding 'standards' have been used over the past years?
- What third-party components are embedded in the code?
- Did your core applications first start out as commercial offerings?
- How complex is the code and data structure design?
- Do your support teams fully understand the application?

Do You Have the Right Mainframe Integration Technologies?

Near Real-time Integration

- Change data capture / replication
- Data extraction, exchange, and caching

Real-time Integration

- Message queuing (MQ)
- 3270 screen scraping / GUI frontends
- CICS Transaction Gateway (CTG)
- CICS Web Services (CWS)
- Java APIs with scripting / RPCs
- Process Automation
- ISV – 3rd Party Products

Integration Technology Stack... Legacy Infrastructure

- Enterprise Service Bus (ESB)
- Business Process Management (BPM)
- API Management
- Security & Governance
- Homegrown Components
- 3rd Party Tools

Understanding Your Legacy Applications & API Requirements

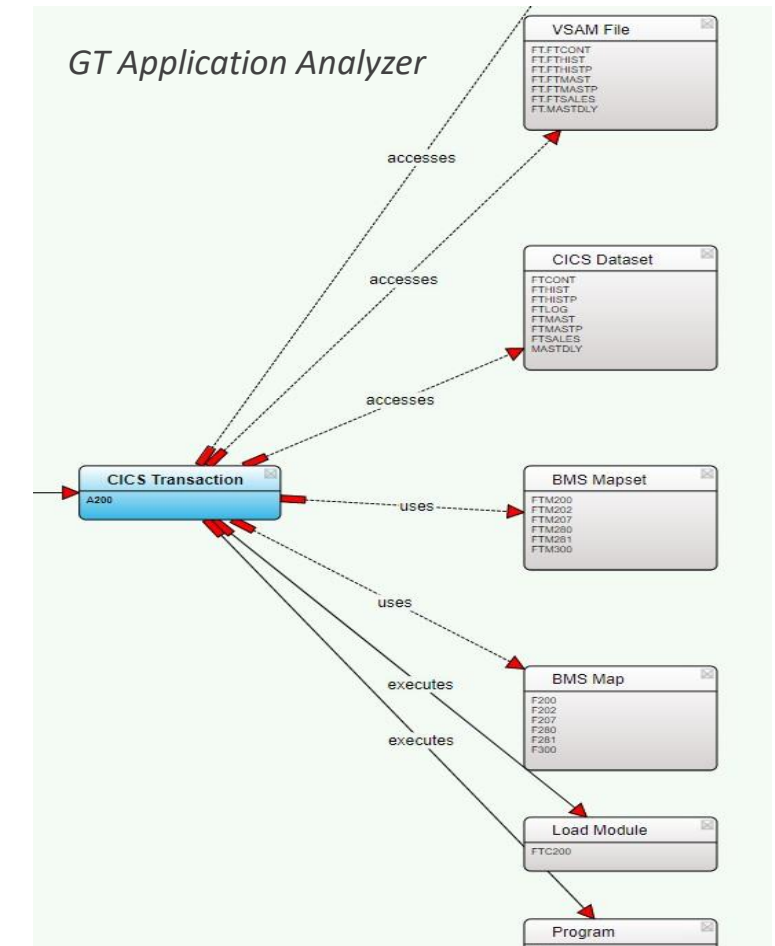
- Most mainframe online applications were designed to interact with 3270 terminals (end-user dialog).
- Integration technologies should be transparent to the backend systems.
- **Changing** legacy code to work better as an API introduces more complexity and code to manage.
- Fine grain APIs (microservices) may be easier to build, but put more work onto the consumer.
- More intelligent the API, less effort for the API consumer processing logic.
- Legacy mainframe apps are like a box of chocolates, it is hard to see what is inside.



Legacy Application Complexities

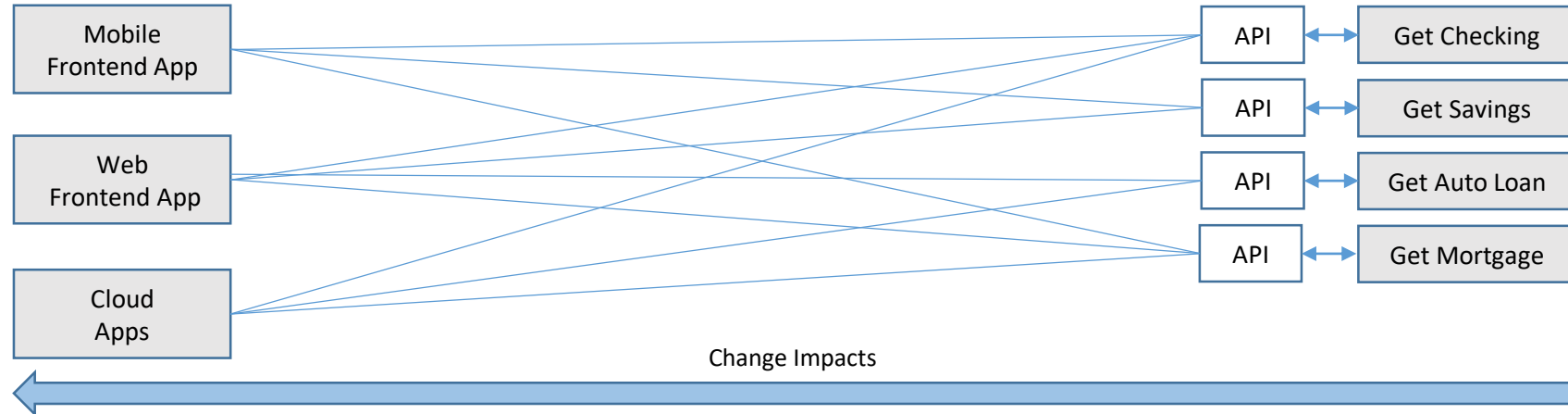


- XCTL/ multiple program calls
- Multiple input and output messages
- Variable length, multi-part messages, different layouts
- Complex structures (REDEFINES & ODO)
- Null terminations, non-standard code
- Screen macros
- Conversational dialogs
- External and other 3270 applications
- Complex Conversational Transactions



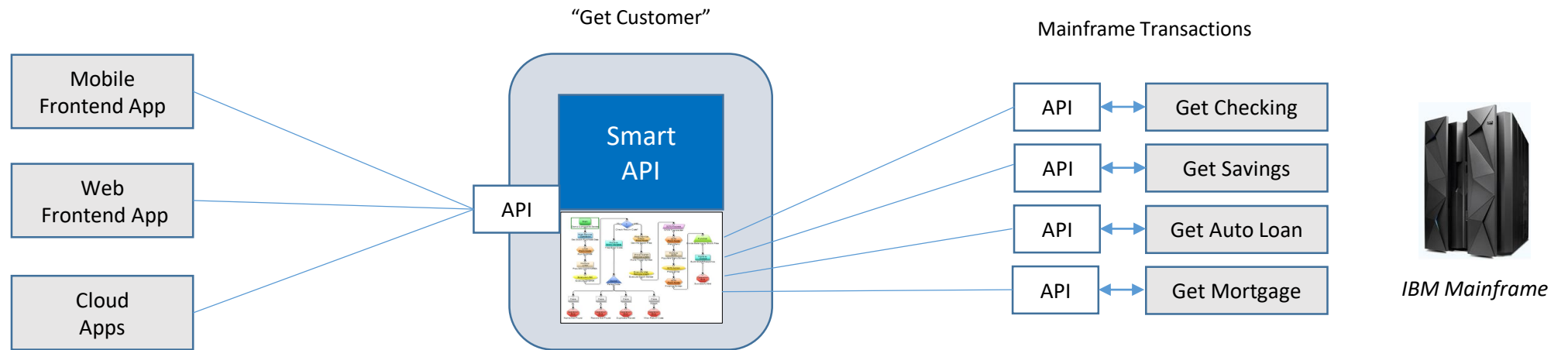
TRAP OF CODING AGAINST LOW-LEVEL MAINFRAME APIs

Business Apps

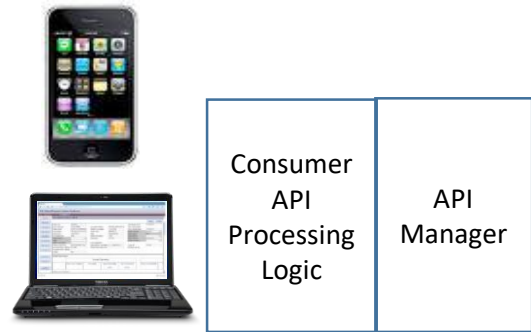


IBM Mainframe

Business Apps

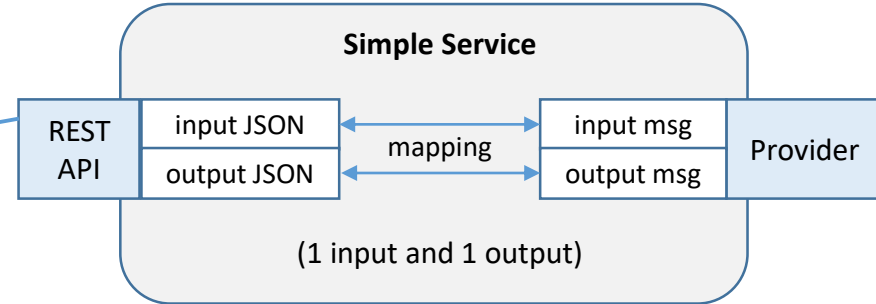


Legacy Environments & Integration Requirements



API requests and replies focused a single transaction (microservice)... GetChecking, GetSavings, GetCarLoan

Transaction Message API



- Web
- Mobile
- COTS
- ESB
- Cloud
- BI Tools
- Blockchain
- AI
- RPA
- Other

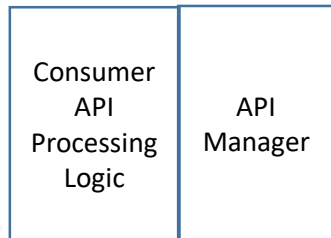
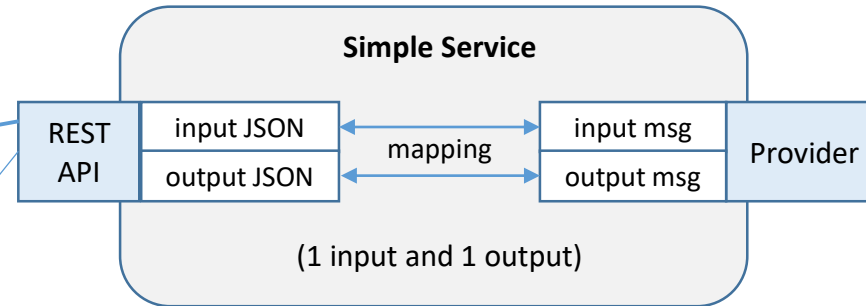
Legacy Environments & Integration Requirements



- CICS Program
- IMS Program
- MQ
- Batch
- DB2 (SQL)
- IMS DB (SQL)

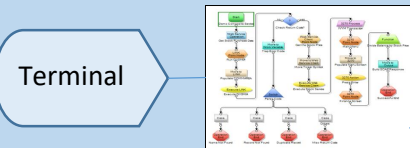
Transaction Message API

API requests and replies focused a single transaction (microservice)... GetChecking, GetSavings, GetCarLoan

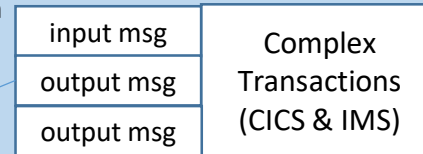


Legacy Applications

Business Process Workflow



- Data manipulation (math, string)
- Flow control (if, then)



- Message switching / program calls
- Multiple input and output messages
- Variable length, multi-part messages
- Complex structures (REDEFINES & ODO)
- Null terminations, non-standard code

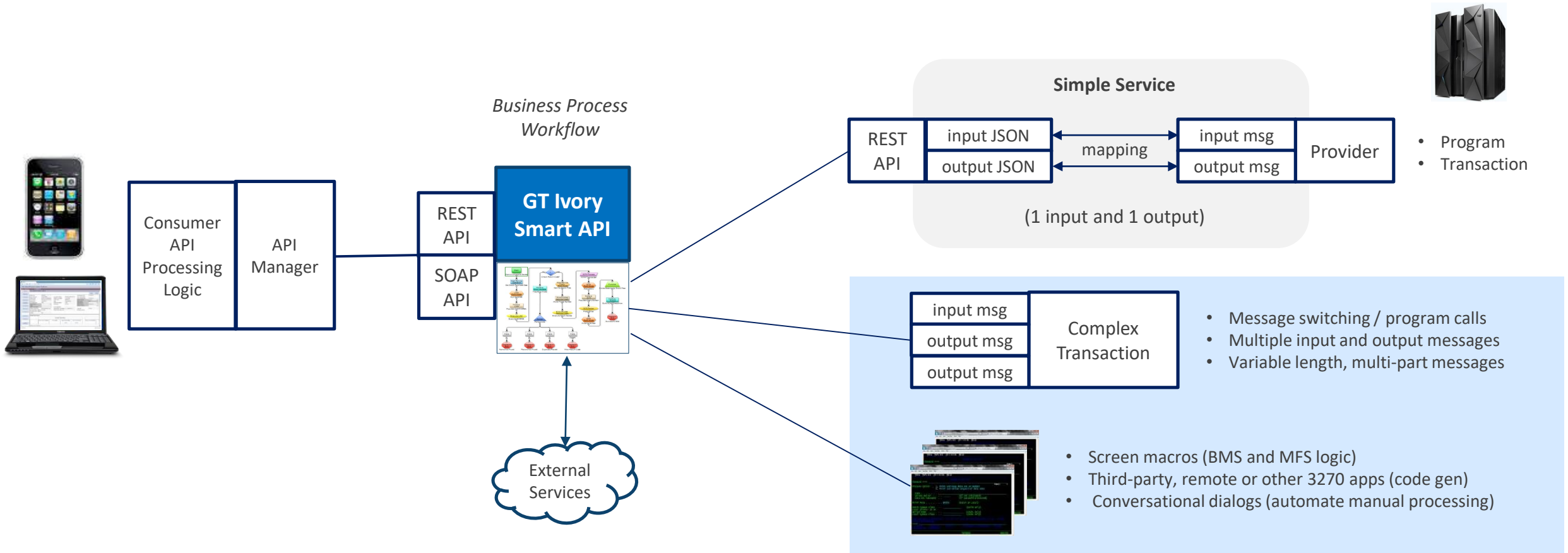
- Multiple transactions (logical sequence)



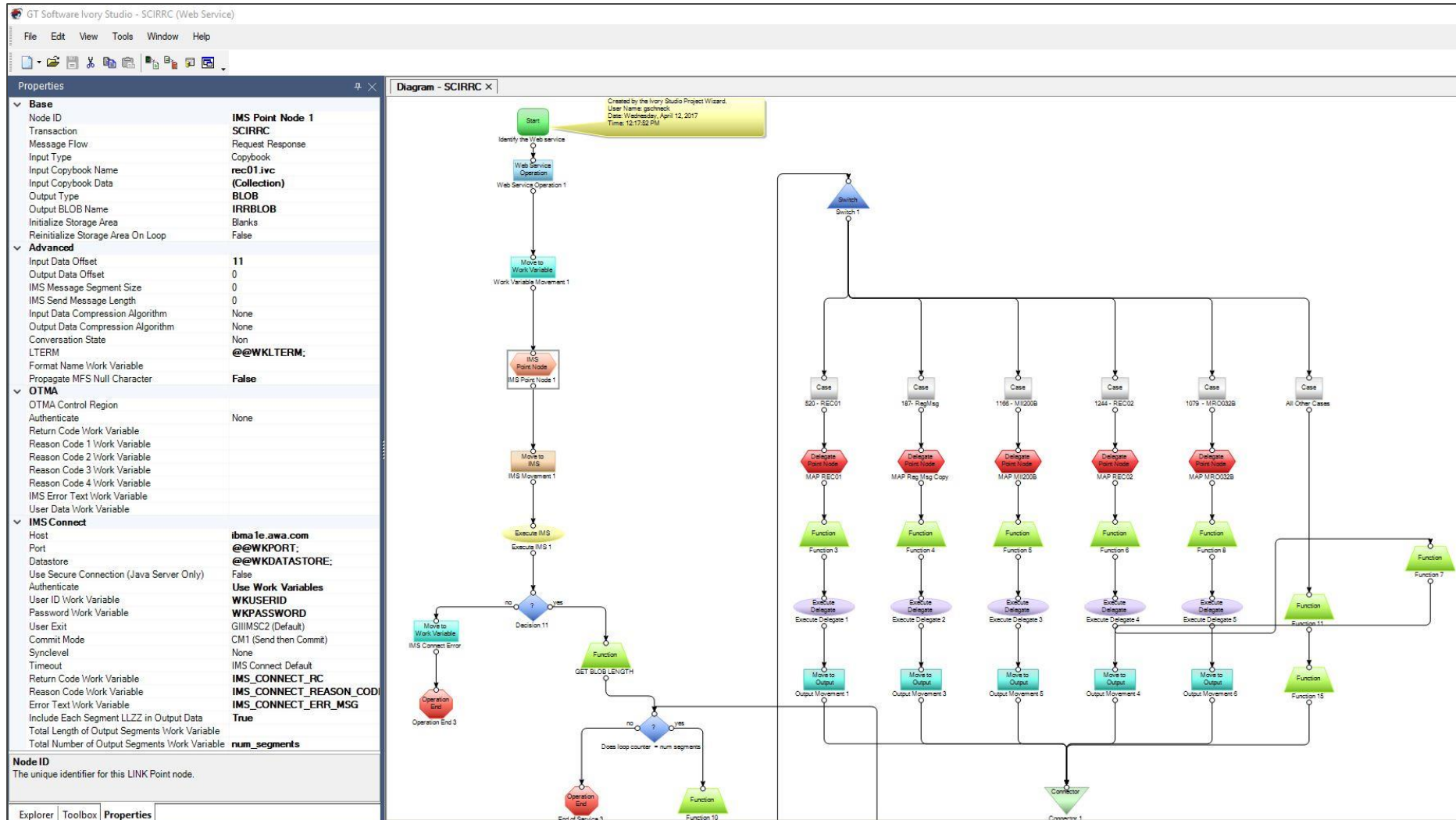
- Screen macros (BMS and MFS logic)
- Third-party, remote or other 3270 apps (TN3270, IDMS, NATURAL, other)
- Conversational dialogs

CICS API's : Composite or Business API

Understanding Legacy Integration Requirements



Online Transaction with Multiple Variable-length Output Messages



Error Conditions



- Ability to interrogate
- Ability to change logic flow of API based on error
- Ability to customize error message

CICS API's : 3270 Transactions

3270 BMS

- Field Justification – Blank inserted? Zero filled?
- Initial Character – Constant of default data
- XMIT – Data specified in Hex
- Length - Maximum length of the field
- Occurs – Number of entries for the field to be generated
- PICIN – Picture to be applied to field
- Validin –
 - Mustfill – Field must be filled completely
 - Mustenter – Data must exist but does not have to be completely filled
 - Trigger – Field is a trigger
 - Userexit – Field is to be processed by BMS Global User Exits
- Potential for multiple screens can be returned

3270 Non-BMS

- Fields referenced by position
- Potential for multiple screens to be returned
- Unknown issues with screen fields (same issues as BMS)

Logged in: tcdemof@mapinc.com ... this information is as of 3/13/2014 11:14:30 AM (please call 800-427-5342 or 562-463-5090 if you have any questions.)

LOGOFF

TRANSPORTATION & COMMUNICATIONS INTL UNION

Your Information (Member)

Member Name: ERIC SOARES
 Address: 1234 CASTLE AVE
 City/State/Zip: DRAGON CITY, CA 99999
 SSN: xxx-xx-1234
 Date of Birth: 12-29-1969 Age: 44

Your Dependents

Name: DEVIN SOARES
 Relation: Child - Male
 Date of Birth: 09-06-1994 Age: 19
 as of Date: 2011-12
 Enroll Status: Enrolled (Term Date: 2020-10)
 Name: CHRISTINA BENNETT
 Relation: Child - Female
 Date of Birth: 10-08-1990 Age: 23
 as of Date: 2011-12
 Enroll Status: Enrolled (Term Date: 2016-11)

Eligibility

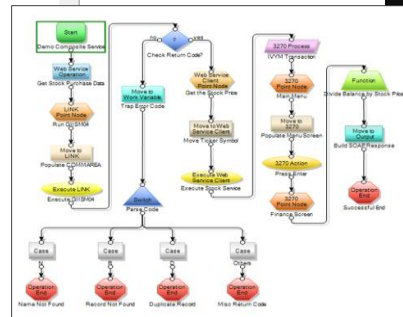
as of Date	Termination Date	Type	Plan Data
04-01-2013		Medical	PPO Indemnity FAMILY
		Prescription	No Coverage
		Dental	PPO Indemnity FAMILY
		Vision	Vision Service FAMILY
		Life	PrudentialLife FAMILY

Claims

Claimant	Claim#	Bill#	Check#	Status	Service Date	Paid Date	Provider Name	Total Charges	Deductible	COB	Paid Amount	Patient Liability
Self	3	7	98986	Paid	09-16-13	10-29-13	STEVEN TENENB	1540.00	0	0	1230.71	309.29
Self	3	8	100512	Paid	08-23-13	02-18-14	LABORATORY CO	111.75	0	0	39.25	9.81
Self	9	1	98200	Paid	07-22-13	08-26-13	DAVID ROSENF	290.00	0	0	232.00	58.00
Self	3	5	98199	Paid	07-08-13	08-26-13	STEVEN TENENB	125.00	0	0	100.00	25.00
Self	3	6	98555	Paid	06-25-13	09-17-13	LABORATORY CO	262.75	0	0	116.02	28.99
Self	8	1	96946	Paid	04-02-13	05-21-13	JOHN D MATRIS	500.00	50.00	0	346.80	153.20
Self	7	3		Denied	03-30-13	07-29-13	PRESCRIPTION	75.49	0	0	0	75.49
Self	2	5	99189	Paid	03-05-12	11-11-13	MICHAEL S LEE	52.56	0	0	52.56	0
Self	99	901		Received	01-27-14	----	----	145.00	0	0	0	0

Claims are only for the member and any dependent under 18 years old. Please call 800-427-5342 or 562-463-5090 during business hours for information on other claims.

The records shown are based on information held in the Fund's Data Processing System as of this date. The information is believed to be correct, however, the Fund reserves the right to correct the information and to adjust the records if any errors are discovered.



Participant Profile

01/24/13 BPCO
17:26:56 CPRFL

OPERATING ENGINEERS LOCAL 501

Name..First: ALFONSO SSN/ID.....
Last.: ABAYAN Employee ID:

Health & Welfare Eligibility

01/24/13 BPCO
17:28:23 CHOEN

BirthDate...: OPERATING ENGINEERS LOCAL 501 EffDts: Med: D 2004/03
Den: D 2004/05
Pre: D 2004/05
Vis: D 2004/05
Lif: 0000/00

Name..First: ALFONSO SSN: 264 49 9362
Last.: ABAYAN ID.: 264499362

Dependents

01/24/13 BPCO
17:29:16 CDERS

Name..First: ALFONSO SSN...: 264 49 9362 ClmPol: OE501
Last.: ABAYAN ID....: 264499362

1 CONNIE SSN Rel Sex BirthDate Age Effectv Termntd En REN
20019362 SP F 08/13/1960 52 E

Claims Search by Service Date

01/24/13 AIG
17:33:15 CIMS

DisplayLineNo	Service	Clm Bill	From	Thru	Provider	TotChrgs	Issue	Paid	ICD9	KeyDt
1	004 007	121412	121412	ST JOSEPH	HER7	62.00	000000	24.67	789.03	011813
2	004 008	121412	121412	ST JOSEPH	HER7	126.00	000000	66.21	789.03	011813
3	006 002	120512	120512	ST JOSEPH	HER4	89.00	011813	46.06	455.5	011413
4	006 003	120512	120512	ST JOSEPH	HER4	416.00	011813	396.00	455.5	011513
5	004 004	112712	112712	ST JOSEPH	HER7	100.00	010413	71.65	789.00	010313
6	004 005	112712	112712	ST JOSEPH	HER7	10.00	010413	.00	789.00	010313
7	004 006	112712	112712	ST JOSEPH	HER7	60.00	011113	10.26	789.00	010713

DisplayLineNo: More claims to show! F10=History

Nose # Find A/C
Advanced Search

AIRCRAFT
200

EQUIPMENT
B757 **ETOPS**

MAINT. PROGRAM
US

REGISTRATION
N200UU

ENGINE
RB211-535

NAA LOGBOOK
YES

More ▾

Aircraft Routing

<p>FLIGHT 0886 CUN → CLT</p> <p>DEP GATE: C10 DEP: 15:19 16 NOV GMT-5 ARR: 18:23 16 NOV GMT-5 ARR GATE: D2</p> <p>13m</p>	<p>DLY</p> <p>FLIGHT 0835 CLT → SJU</p> <p>DEP GATE: D2 DEP: 10:15 17 NOV GMT-5 ARR: 14:56 17 NOV GMT-4 ARR GATE: D12</p> <p>GND: 15h 52m</p>	<p>FLIGHT 0836 SJU → CLT</p> <p>DEP GATE: D12 DEP: 15:50 17 NOV GMT-4 ARR: 18:42 17 NOV GMT-5 ARR GATE: D7</p> <p>GND: 0h 54m</p>	<p>FLIGHT 1798 CLT → PHL</p> <p>DEP GATE: D7 DEP: 20:05 17 NOV GMT-5 ARR: 21:38 17 NOV GMT-5 ARR GATE: A20</p> <p>GND: 1h 23m</p>	<p>FLIGHT 1798 PHL → CLT</p> <p>DEP GATE: A20 DEP: 09:50 18 NOV GMT-5 ARR: 11:15 18 NOV GMT-5 ARR GATE: D7</p> <p>GND: 12h 12m</p>
---	--	---	---	--

ORIGIN	GATE	DEST	GATE	FLT	STD	ETD	OUT	OFF	STA	ETA	ON	IN	GND
CLT	D2	SJU	D12	0835	09:55	10:15	-	-	14:31	14:56	-	-	15h 52m

Discrepancies

MIC # Find / Create MIC# Refresh Legend ▾ Create MIC # ▾ Print MIC Sheet

57 MIC Items 22 MONS 33 SADs 2 SILs

MIC #	ATA	TTG	DEF CODE	STA	LAST UPDT	DISCREPANCY TITLE
3139798	5310		MON	CLT	15Nov15	FUSELAGE SKIN DENT FRAME STA 760 ON STRINGER 25L
1943953	7220		MON	PHL	21Oct15	# 1 ENG. INLET HAS DEBONDED ACOUSTIC PANEL AT 0330 POSITION AFT L...
6801187	5330		MON	BFM	25Aug15	(REF. LP#6800753) CREATE MONITOR FOR EXT FUSELAGE SKIN DOUBLER R...
5031125	5740		MON	CLT	22Aug15	ACCOMPLISHED TYPICAL REPAIR 57-40-05A. HOWEVER THIS TYPICAL REPA...
7294833	5330		SAD	BWI	21Aug15	DENT FOUND AFT OF RADOME AND FOWARD OF NOSE GEAR DOOR
6801175	5330		MON	BFM	21Aug15	REF SAD LP#7294833, FUSELAGE STATION 207.37 BETWEEN 527L AND 528 L H...
6801166	5330		MON	BFM	20Aug15	REF SAP LP#6800937 EXT FUSELAGE SKIN BETWEEN STA 560-580 & 5-27R /S...
6800943	5330		SAD	BFM	20Aug15	EXTERNAL FUSELAGE SKIN AFT OF R4 DOOR BETWEEN BS1681 AND BS1701 A...
6800937	5330		SAD	BFM	20Aug15	EXTERNAL FUSELAGE SKIN BET. BS 560 AND 580, 527R AND 28R HAS A D ENT
6053514	5330		SAD	MCN	20Aug15	DENT EXTERNAL FUSELAGE SKIN BS 1520 BETWEEN STRINGERS 3R & 4R
4844833	5310		MON	PHX	20Aug15	CREATE A MONITOR TO REPEAT HFEC INSPECTION EVERY 620 FC PER EA N...
0010936	5510		SAD	BOS	20Aug15	DMG #: 0007 ORIG MACH NBR: EA: OM7: 000000 DMG-LOC: LEN: 1.3" DEP...
6800997	5740		SAD	BFM	18Aug15	#6 L/E SLAT 47" FROM I/B END AND 4" FROM T/E WEDGE EXTERNAL HAS D...
6800995	5740		SAD	BFM	18Aug15	#6 L/E SLAT 7", 14" FROM I/B AND 6.5" FROM T/E WEDGE HAS 2EA DEN T.



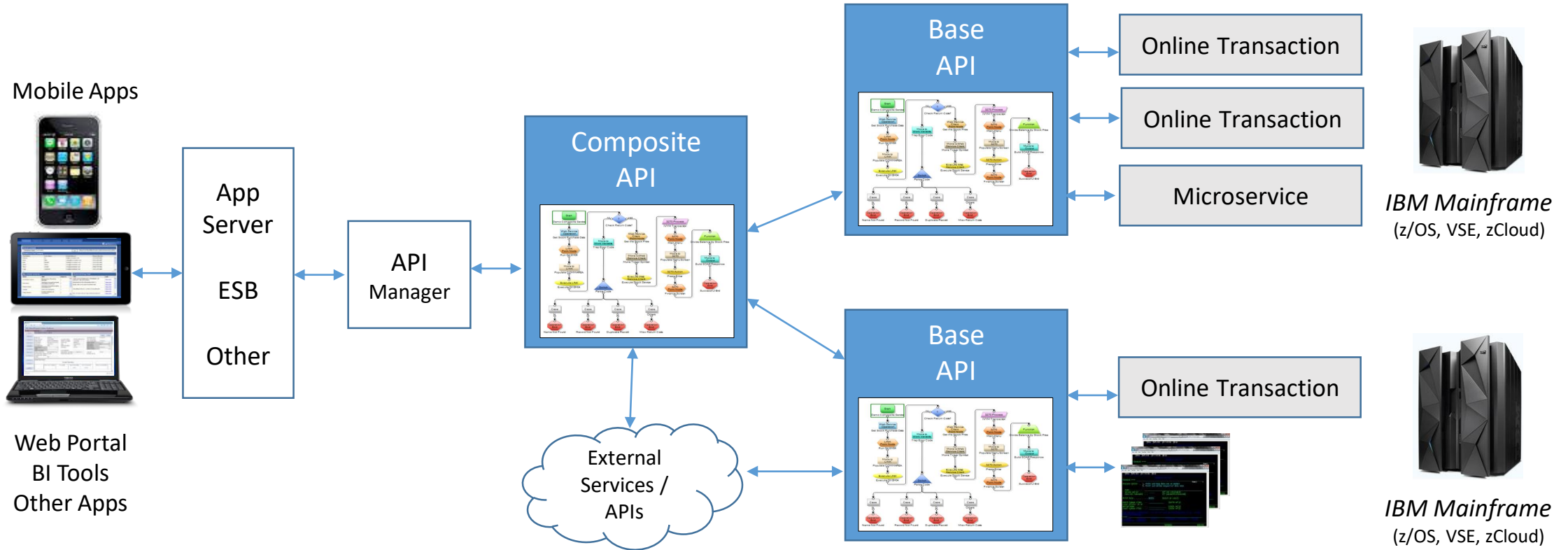
GT Ivory Smart API

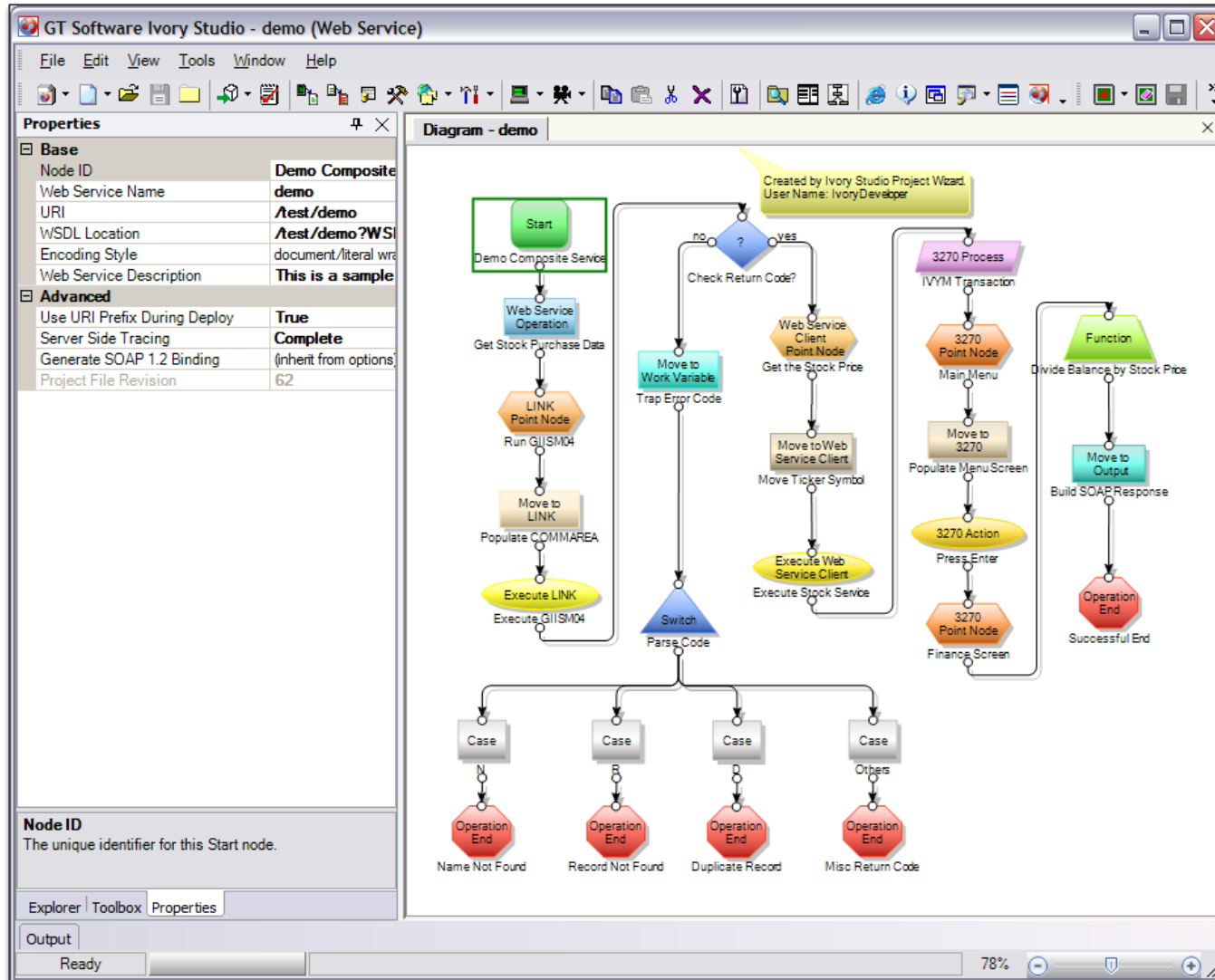
CICS API's : Design Methodology

Design Methodology



- Base Services (closely matched to individual Transactions when possible)
- Composite Services or Smart APIs (combined calling of multiple base services for business services)





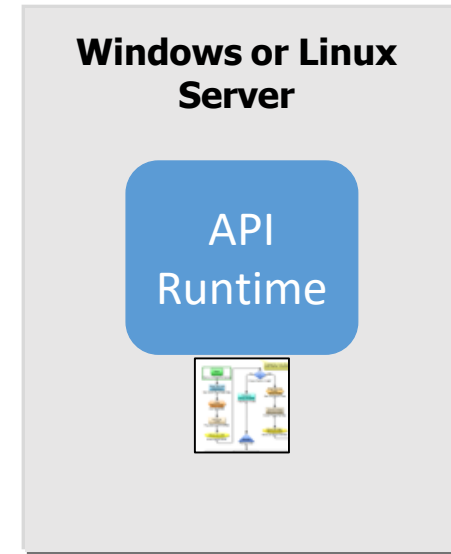
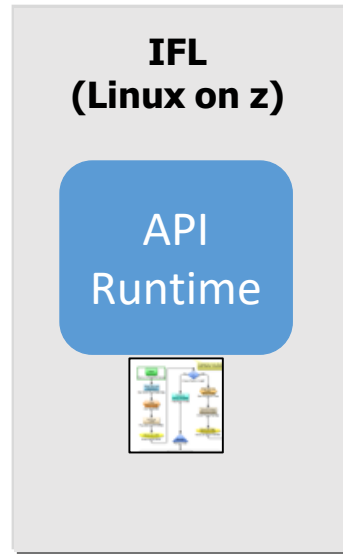
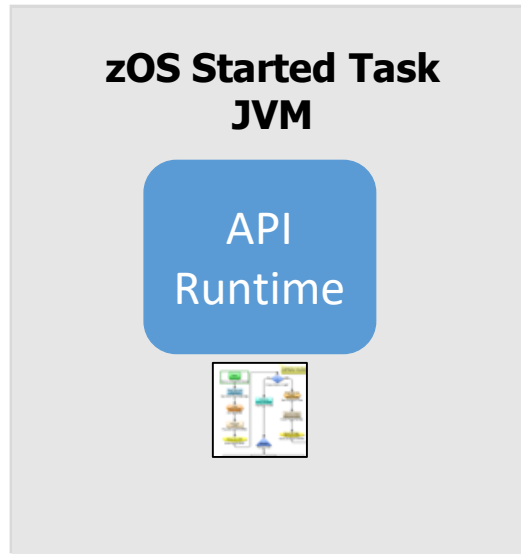
Intelligent Workflow Design

- Drag-and-drop... **NO CODING!**
- Multiple transactions
- Conditional Logic
- Error handling
- Arithmetic & string functions
- Data filtering
- Governance and security
- External web services and APIs
- Easy, fast, and agile development

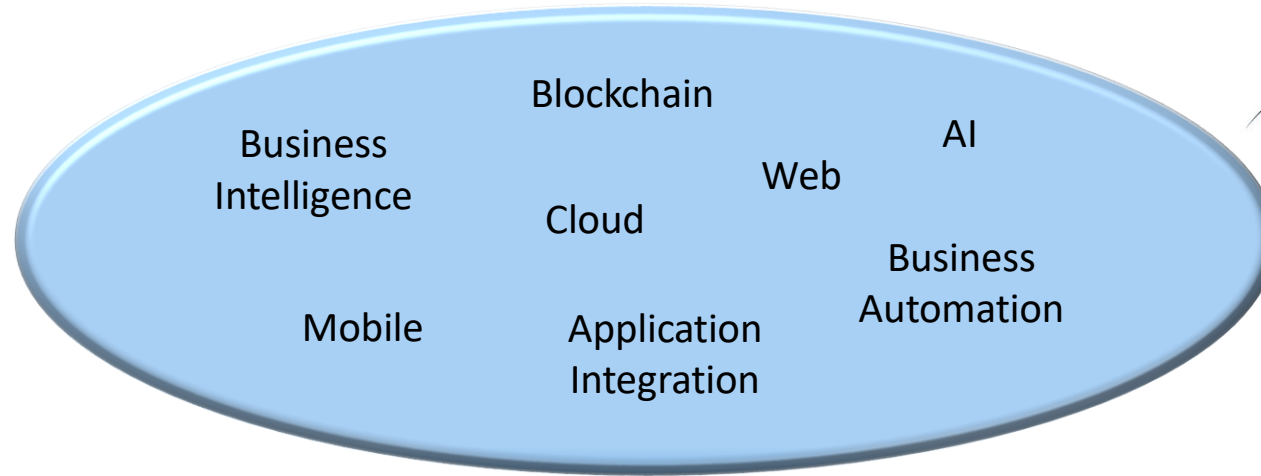
Mainframe API Runtime Alternatives



IBM Z
zCloud



IBM VSE
External 3270

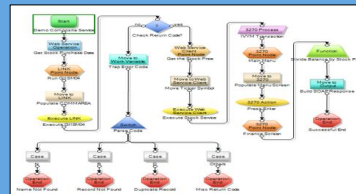


API Management

API Testing

ESB & RPA

Smart APIs



Workflow Orchestration

 **Zowe**

DB2 REST

z/OS Connect

IBM DVM



Mainframe Microservices and Integration Connectors

CICS Applications

IMS Applications

IDMS Applications

3270 Applications

Other Resources

Callable External Services

DEMO

Summary



There are many **hidden gotchas** in decades-old legacy mainframe applications that some integration technologies are not able to support.



No code or low-code integration tools will be easier to learn and faster to deliver APIs. The **“smarter” the API**, the less work there is for the consumer apps.



Transparent to the existing online applications and requires **no changes** to legacy code, with **on and off mainframe** runtime options for specific requirements.



Hybrid integration framework enabling mainframe applications to be both **providers and consumers of APIs** (bi-directional)



“Real time” mainframe integration is challenging particularly when you are dealing with decades-old legacy systems, avoid **integration tool “workarounds”**

GT Software Overview

GT Software is an industry leader in legacy systems **modernization** and **integration**.



PORSCHE



Trusted by over **2,500** organizations worldwide

No-code, drag-and-drop platform to **create legacy APIs in days** rather than weeks or months.



GT Software

Thank You

Email: gschneck@gtsoftware.com

