Index

A
AddDeviceAsync() method, 136
Agile approach, 34
Alarm Notification Cloud Service, 97
API console, 60
API management
   Administrator Dashboard, 55
dev breakup, 55
Developer Portal, 55–56
gateway services, 55
policy injection, 62
proxies, 56
subscriptions
   API console, 60
   API products, 59
   portal authentication, 58
   profile page, 59
   Try It button, 61
API proxies, 56–58
App Services, 63–64
Automation
   ASP.NET Web API
   Autodocumentation, 101
   Azure Preview portal, 71
   Azure resource groups, 72–73
   BioMax Event Simulator Console, 106
   ConfigM Management Console, 103
   connection strings, 79
   Create-EventHub.psm1 module, 77
   Create-ServiceBus.ps1 script, 77
data deployment testing, 99
definition, 67
deployment, 68
DevOps, 67
Import-Module command, 76
management, 68
microservice architecture, 67
oversight and quality assurance, 67
PowerShell (see Azure PowerShell)
PowerShell cmdlets, 76
product lifecycle, 68
provisioning, 67, 71
Redis Cache blade, 81
Redis Cache Settings blade, 80
RefM Public API test, 102
SBUpdate console application, 77
software building and automated
testing, 67
software development lifecycle, 67
source code control, 67
SQL database connection strings, 106
Stream Analytics job, 105
tools and technologies, 68
Web App Blade, 105
Azure Explorer, 38
Azure Management Console, 71
Azure Management Studio, 38–39
Azure PowerShell
   accounts and subscriptions, 69
   Microsoft Web Platform Installer, 69
   PowerShell console, 70
   PowerShell ISE, 70
Azure resources
   Azure Cloud Service
      Package Files, 92
   Azure cmdlets, 75
   Azure Website Package Files, 92
   CmdletBinding, 75
   Create-ResourceGroup.Ps1 script, 75
deployment scripts, 91
   JSON file, 94
   MSBuild, 92
   New-AzureResourceGroup, 94
Azure resources (cont.)
  ResourceGroup Script Execution, 76
  Set-WebsiteConfiguration function, 95
Azure Storage
  account creation, 35
  account managing key, 36
  add references, 37
  architecture, 35
  Azure Explorer, 38
  Azure Management Studio, 38–39
  Blob, 34, 38
  files, 35
  NuGet package installation, 37
  queues, 35
  tables, 34
  Visual Studio, 38

Biomedical Reference Implementation. See also Home Biomedical Reference Implementation
  deployment, 86
  NuGet packages, 86–88
Biometrics
  Azure environment, 85
  Azure Preview Portal, 98
  Cloud Service container, 84
  connection string information, 96
  data visualization website, 84
  Event Hubs, 84
  Notification Hubs, 84
  Set-AzureDeployment cmdlet, 97
  SQL Database, 84
  staging and production support, 97
  Stream Analytics, 85
  Stream Analytics jobs, 84
  UpdateCSCFG, 97
  verification, 103

Cloud Services, 63–64
ConfigM
  administrator console, 130–131
  API, 113
  ApiUrl property, 129
  architecture, 112
  ConfigMController class, 126
  ConfigPublicService NuGet package, 124
  Connection strings, 125
  data model, 122
  DevKey property, 130
  interfaces, 122–123
  Public API routesConfigMController class, 126, 128
  SDK class, 128–129
  services, 123–124
  Store Assembly (see Store Assembly)
  Wire Assembly (see Wire Assembly)
  Continuous Delivery Software, 67

Data access layer (DAL), 28
Data services layer (DSL), 24
Device management, 141
DevOps, 67
DocumentDb
  bounded-staleness, 41
  client SDK, 45
  definition, 43
  DocDb class, 45
  Entity class, 46
  eventual, 41
  granular consistency levels, 41
  internal structure, 42
  JSON documents, 43
  Keys, 43
  NuGet package installation, 45
  provision, 42
  query, 44
  reference collection database, 47
  session, 41
  strong, 41

Event Hubs, 84

Geographically Redundant Storage (GRS), 35

Home Biomedical Reference Implementation
  Azure, 111
  BioMax device, 109
business capability, 110
ConfigM
administrator console, 130–131
API, 113
ApiUrl property, 129
architecture, 112
ConfigMController class, 126
ConfigPublicService NuGet
package, 124
Connection strings, 125
data model, 122
DevKey property, 130
interfaces, 122–123
Public API
routesConfigMController
class, 126, 128
SDK class, 128–129
services, 123–124
Store Assembly (see Store Assembly)
Wire Assembly (see Wire Assembly)
microservice
capabilities, 83–84, 110, 112
new product, 109
provisioning process, 78
technical capability, 111
Home Biomedical Git Repository, 73–75

I
Infrastructure as a Service (IaaS), 4
Initialize() method, 174
Internet of Things (IoT) services
analytics and data visualization, 134
custom development, 134
IoT Hub Connection String
Blade, 136
IoT Hub Creation Blade, 135
IoT Hub RegistryManager, 136
device management, 133
real-time data visualization, 161
real-time notifications, 153
reference implementation
device management, 141
Home Biomedical Microservice
Architecture, 141
telemetry ingestion, 143
scripted scenarios, 134
IoT Suite Dashboard, 139
IoT Suite Landing Page, 139
resource group, 140
status and notifications, 134
telemetry ingestion, 133
telemetry transformation, 147
transformation and storage, 133

J, K
JavaScript Object Notation (JSON), 11

L
Locally Redundant Storage (LRS), 35
Logical architecture, 25
API gateway layer, 26
automation, 30
DAL, 28
models, 25
protocol layer, 27
SDK layer, 26
service layer, 27
store, 30

M
Microservices
approach, 73
architecture, 24
Continuous Delivery, 24
data services layer, 24
layered architecture, 22
logical. Logical architecture
Service Bus Queue, 24
SQL Database, 24
automated, 12
autonomous and isolated, 10
benefits of
evolutionary, 13
flexible, 14
high velocity, 14
one team, owned by, 15
open, 14
reusable and composable, 14
versionable and replaceable, 15
ConfigM provisioning, 81–83
configurable, 12
definition, 9
deployment, 100
DeviceM, 81
discoverability, 19
elastic, resilient, and responsive, 11
Microservices (cont.)

Home Biomedical Reference
implementation, 83–84
identification, 16
message-oriented and
programmable, 11
Microsoft Azure, 16
platform (see Microsoft Azure)
ProfileM, 81
RefM, 81–82
RefM Microservice Automation
Scripts, 82
(re)organization, 15–16
Service Fabric (see Service Fabric)
testing, 18
Microsoft Azure, 16
Agile approach, 34
analytics and IoT, 33
API management (see API management)
Azure Storage
account creation, 35
account managing key, 36
add references, 37
architecture, 35
Azure Explorer, 38
Azure Management Studio, 38–39
Blob, 34, 38
files, 35
NuGet package installation, 37
queues, 35
tables, 34
Visual Studio, 38
compute, 33
Containers, 62–64
data and storage, 33
developer services and
management, 34
DocumentDb
bounded-staleness, 41
client SDK, 45
definition, 43
DocDb class, 45
Entity class, 46
eventual, 41
granular consistency levels, 41
internal structure, 42
JSON documents, 43
Keys, 43
NuGet package installation, 45
provision, 42
query, 44
reference collection database, 47
session, 41
strong, 41
finished services, 33
hybrid integration, 34
identify and access management, 34
lean engineering, 34
management, 34
media and CDN, 34
Microservices, 16
networking, 34
NoSQL, 41
Redis Cache, 48
Service Bus
connection information, 51–52
endpoint, 51
event hubs, 50
namespace, 50
queues, 50, 52
relays, 50
ReST APIs/client SDK, 50
shared access policy
configuration, 51
topics, 50
SQL database, 39
web and mobile, 33
Microsoft Web Platform Installer, 69
Minimal-viable product (MVP), 110–111
Model-View-Controller (MVC), 21

N

Notification Hub, 153
NuGet packaging
build script, 90
ConfigM microservice, 89
Invoke-MsBuild.psm1, 88
Invoke-UpdateNuGet.psm1, 89
Manager Options, 88
microservice API, 87
Store assembly, 87
Wire and Store microservices, 89

O

OpenAsync() method, 155, 174
Open Web Interface for .NET (OWIN), 174
P, Q
Platform as a Service (PaaS), 4
ProcessEventsAsync() method, 155
Provisioning process, 78

R
Real-time data visualization, 161
Real-time notifications
   Biometrics Alarm Worker, 154
   Notification Hub, 153
testing, 161
Windows Store
   Application Package Manifest, 160
   Association Wizard, 159
   Client Secret, 158
   Messaging Package, 160
   Package SID, 158
   push notification, 157
Reliable Actor, 166, 171–173
Reliable Service, 166, 171–174, 181
Representational State Transfer (ReST), 11

S
SendEventAsync() method, 138
Separation of Concerns (SoC), 21–22, 25, 171
Service Bus
   connection information, 51–52
   endpoint, 51
   event hubs, 50
   namespace, 50
   queues, 50, 52
   relays, 50
   ReST APIs/client SDK, 50
   shared access policy configuration, 51
topics, 50
Service Fabric
   application model, 168
   cluster, 168
   components, 168
   partitioning, 169
   concepts, 165
definition, 165
   platform architecture, 166–167
   programming models
      Reliable Actor, 172
      Reliable Service, 171–172
   startups and ISVs, 165
   Stateless Web API-RefM
      developer preview, 172
      implementation, 177
      project templates, 173
Service Fabric Hosting
   Model, 174
   service testing
Software as a Service (SaaS)
   Agile and Scrum, 2
   cloud, 4
   Continuous Delivery, 2
   DevOps, 4
   lean engineering, 3
   microservices, 6
Store assembly
   Cache class, 118–119
   Dbase class, 119
   interfaces, 115
   optimized persistence, 115
   Persist class, 120–121
   Queue class, 117
Stream Analytics
   alarm queries, 150
   biometrics-blob, 150
   biometrics-store, 150
   bloodoxygen-alarms, 150
   creation, 148
   DDL, 149
   glucose-alarms, 150
   heartrate-alarms, 150
   input settings, 148
   output settings, 149
   query definition, 151
temperature-alarms, 150
   test output, 152
Structured Query Language (SQL), 43

T
Telemetry ingestion
   BioMaxSimulator, 144
   DeviceMessage class, 145
device simulator program, 146
event hub partition model, 143

U, V
User-defined functions (UDF), 42

187
INDEX

W, X, Y, Z
Windows Communication Foundation (WCF), 62
Windows Store
  Application Package Manifest, 160
  Association Wizard, 159
  Client Secret, 158
  Messaging Package, 160
  Package SID, 158
  push notification, 157
Wire Assembly
  ModelManager
class, 114
  Rest class, 114
  Wire NuGet package, 87