Contents

Why You Should Read This Book *by Tom Ramey* i
About the Authors v
Introduction *by Surekha Parekh* xv

DB2 12 for z/OS: Technical Overview and Highlights
by John Campbell and Gareth Jones 1
Introduction 1
Why You Should Read This Paper 1
Highlights 1
Application Enablement 2
DBA Function 2
OLTP Performance 2
Query Performance 2
Quick Hits 3
Performance for Traditional Workloads 3
In-memory Computing 3
INSERT Performance 6
Access Path/Access Plan Stability 10
More Granular Global Commit LSN and Read LSN 15
Avoid Scheduling Unnecessary Prefetch 15
Miscellaneous Performance Enhancements for Traditional Workloads 15
System Scaling Enhancements 16
DB2/DASD Synergy 17
High-level Performance Expectations 17
Instrumentation Enhancements 18
Performance Enablers of Modern Applications 19
Performance Focus: Enabling New Applications 19
High-level Performance Focus 20
Query Performance Focus 21
Application Enablement 25
DB2 for z/OS—Adapting to Modern Application Development Paradigms 25
RAS—Reliability, Availability, Scalability 33
Lifting Partition Limits 33

Online Schema 35
Security and General Enhancements 37
Utilities 38
Data Sharing Improvements 42
Migration and Prerequisites 44
Migration Prerequisites: Hardware and Operating System 44
Migration and the Catalog 44
Online Migration Improvements 45
Questions & Answers 45

DB2 12 for z/OS: What's the Latest from the Optimizer for Improved Query Performance?
by Terry Purcell 53
Introduction 53
Why Read Further? 54
What Is the Performance Focus in DB2 12 for z/OS? 54
Performance Expectations 55
UNION ALL and Outer Join Performance 59
Reorder Outer Join Tables to Avoid Materializations 60
Push Predicates Inside UNION ALL Legs or Outer Join Query Blocks 60
Trim Unnecessary Columns and Tables 64
Push Down of ORDER BY and FETCH FIRST 67
Summary of Targeted UNION ALL and Outer Join Performance Enhancements 70
Runtime Optimizations 71
Runtime Adaptive Index 71
Internal Runtime and Complex Expression Optimization 74
Sort, Workfile, and Sparse Index Improvements 75
Partial Sort-Avoidance for FETCH FIRST 75
Extensions to Sort Avoidance for OLAP Functions 76
Sort Space Reductions and In-memory Exploitation 77
Sparse Index Improvements 78
Predicate Optimizations 79
Sort for Stage 2 Join Expressions 79
User-Defined Table Function Predicate Optimizations 80
VARBINARY Indexability Improvements 80
Row Permission Indexability for Correlated Subqueries 81

Optimizer Cost Model Enhancements 82
Extending NPGTHRSH to Default Statistics 82
List Prefetch and Hybrid Join Cost Improvements 83
Improved Filter Factor for CURRENT DATE/TIMESTAMP Predicates 84
Improved Resolution of Filter Factors at Bind/Prepare Utilizing Index Probing 84
Improved Bind/Prepare Performance with a Large Number of Indexes 85
RUNSTATS and Optimizer-generated Statistics Profiles 86
Static and Dynamic Plan Stability 88
Static Plan Stability Usability Improvements 89
Dynamic Plan Stability 89
Summary 90

Build a DB2 12 for z/OS Mobile Application Using IBM MobileFirst
by Jane Man and Clement Leung 91
Abstract 91
Introduction 91
Installation and Configuration 92
Installation 92
Configure JNDI for DB2 for z/OS 94
Introducing Scenario 1: Retrieve a string from a string ID from the SYSIBM.SYSXMLSTRINGS table using regular SQL statements 95
Client-Side Development 95
Server-Side Development 97
Create an SQL Adapter 98
Deploy and Test an Adapter 100
Use the Result from the Server Side 102
Create New Environments 102
Build and Deploy 102
Test Using MobileFirst Console 103
Run Android Emulator (Optional) 106
Introducing Scenario 2: Execute RUNSTATS for a particular database and table space by calling a stored procedure 106
Summary 107
Acknowledgments 108
Resources 108

IBM DB2 Analytics Accelerator: A Revolution in Performance
by Namik Hrle, Ruiping Li, and Wolfgang Hengstler 109
Executive Overview 109
Introduction 110
The Changing Role of Analytics 110
Challenges with the Traditional Approach to Analytics 111
Business Usage Scenarios for Improved Insight 111
Rapid Acceleration of Business-Critical Queries 113
Derive Business Insight from z/OS Transaction Systems 114
Reduce IT Sprawl for Analytics Initiatives 115
DB2 Analytics Accelerator Key Design and Operational Features 116
DB2 Analytics Accelerator Query Process and Features 118
DB2 Analytics Accelerator Content Maintenance 119
DB2 Analytics Accelerator Table Definition and Deployment 119
High Performance Storage Saver 120
Connectivity Options and Workload Balance 120
Disaster Recovery 121
DB2 Integration 122
Query Acceleration Criteria 123
Query Acceleration Control Knobs 123
EXPLAIN Function 123
Accelerator Modeling 124
Accelerator-related Instrumentation 125
Accelerator-only Tables 126
In-database Transformation in the Accelerator 127
In-database Analytics in the Accelerator 129
DB2 Analytics Accelerator Administrative Stored Procedures 130
DB2 Analytics Accelerator DB2 Command 131
Performance Considerations 132
PureData System for Analytics, powered by Netezza 132
The PureData System for Analytics S-Blade, powered by IBM Netezza technology 134
Applying Data Stream Processing to DB2 Queries 134
Improved Disk Failover 135
Drive Redistribution for S-Blade Failures 135
Comparison of PureData System for Analytics Appliance Models 136

Summary 136
For More Information 137
Acknowledgments 137

Making Data Simple and Accessible: The Role of Technology in Delivering Analytic Results 139
Overview 139
A Technology Revolution on z Systems 139
Understanding User Roles and Data 140
Use Cases 141
Avoid Data Movement 141
Integrate Multiple Data Types 142
Run Analytics on Operational Data 143
Summary 143
For More Information 144
Notes 144