Snowpipe Streaming High-Performance Architecture Data Sources MTA Real-time Transit Data Pipeline Processing Layer Storage & Analytics Monitoring Infrastructure **Snowpipe Streaming Application** Real-time Data **Snowflake** Streamed Data **Data Sources** • Iceberg Tables • TRANSCOM_TSPANNICEBERG_EXTVOL Quality Transformation • MTA Real-time APIs Data Error Validation & Enrichment Checks Handling GTFS-RT Feeds • Clustered Storage Multiple Endpoints **DEMO.DEMO.ICYMTA** Parallel Streaming Channels Batch Processing Metrics **Analytics & Optimization** Monitoring & Observability Prometheus Grafana Health Materialized Performance Auto Query Alertmanager Dashboards Clustering Optimization Metrics Checks Views Tuning Structured Logging **Infrastructure & Deployment** Docker Load Redis Auto Health Security Backup & Scaling Containers Balancer Cache Monitoring & Auth Recovery High Availability Performance Optimization **Performance Characteristics Technology Stack** • Throughput: 10,000+ records/minute • Python 3.11+ • Snowflake • Docker Latency: <30 seconds • Prometheus • Grafana • Redis Availability: 99.9%