Honoring Ed Lassettre

To our Friend and Mentor

Dieter Gawlick Wallace limura

Ed's Many Talents

- A great friend
- A great colleague
- A great mentor
- A great architect/scientist
- A great engineer
- A great communicator
- A great influencer
- A great doer



Two Major Projects

- IMS/FP: IBM's Information Management System/Fast Path (1975-1978)
 - Pushing performance, scalability, availability, recoverability
 - Computers started to become the only carrier of critical information
 - Online processing became a must
- XRF: IBM's Extended Restart Facility (1982-1985)
 - Fault tolerance with full transparency to developer and user
 - Back to normal operation within 2 minutes
 - Minimal overhead in active system, less 5% in backup system

Ed's Contributions to IMS/FP

- Process management and OS services
 - Use and improve SRB (Schedule Request Block) technology
 - Extreme lightweight, optimized parallelism
 - 40 bytes/thread; just a piece of storage if not active
 - Fundamental for I/O architecture disks and terminals
 - Branch entry technology
 - AWE (Asynchronous Work Element) technology: bunching of data and message buffer processing, reducing application foot print and more
 - Avoid process switches
 - One process switch per TP1 a precursor of the TPC specifications
 - No process switches after write completion

Ed's Contributions to IMS/FP

- Message management the ATM challenge
 - Communication with ATMs was fully traceable and recoverable
 - Communication protocol was highly optimized, representing a mini workflow
 - The communication was robust enough to deal with ATM malfunction
- HW fast authorization switch
- System Behavior
 - System was build on computers delivering a few Mips it scaled with minor changes to modern multi Gips clusters
 - System delivered stable performance until close to 100% utilization, at high load the Mips rate went up and the path length went down mostly due to AWE technology
 - 1KTpS reached ~1985 using TP1 TP1 includes extreme hotspots and support robust message management

Other IMS/FP Achievements

- ACID First commit, group commit, fast comm
- MSDB Main Storage Database
- Hot spots optimistic escrow locking
- Fast conflict potential detection 15 instructions
- Ledger commit sequence = storage sequence; immutable
- Online Utilities Reorg, batch processing, redistribution and repair, duplication
- The team could build on the great work of Vern Watts and Ron Obermark

XRF – Extended Restart Facility

The problem

- System shutdown after failure took good deal of an hour
- System restart with 1000's files and 10000's of terminals could take hours
- Full functionality needed to be restored in less than 2 minutes banking, supervising process control
- Fully transparent to end-user (after all the ATM is dealing with real money)

The solution

- Prepare as much as necessary in a backup system
- Share as much as possible between active and backup system
- Do minimal cleanup after failure
- Activate back-up system; debug failed system

XRF

- I will not go into the details of the solution, it would take too much time and require too much detailed produced knowledge
 - Even the system has been developed 30+ years ago, the principles are still valid
- Ed told me about a test with
 - 100+ k terminal
 - 10+ k files (databases, areas/partitions, duplicates)
 - x KpTs, I forgot the x
 - The system was in full operation less than 20 second after failure detection with full end-user (and programmer) transparency

Ed's Contribution to XRF

- Deep understanding enabled Ed to carry the discussion with the principal architects from:
 - Operating system
 - Storage/file system
 - Telecommunication system
 - IMS system
- Everyone said that it was against some principle NIH
- Everyone had to be convinced that there is a good solution and that it was beneficial to participate
- Management had to be convinced that it was worth while to invest in his effort and everything had to be pushed through

Ed's Contribution to XRF

Only Ed was able to do this, since Ed was

- A great architect/scientist
- A great engineer
- A great communicator
- A great influencer
- A great doer

With deep knowledge of all products

