Session 15946: Technical Architecture To Bridge The Computing Generation Gap

Monday, August 4, 2014, 12:25 – 1:15 PM
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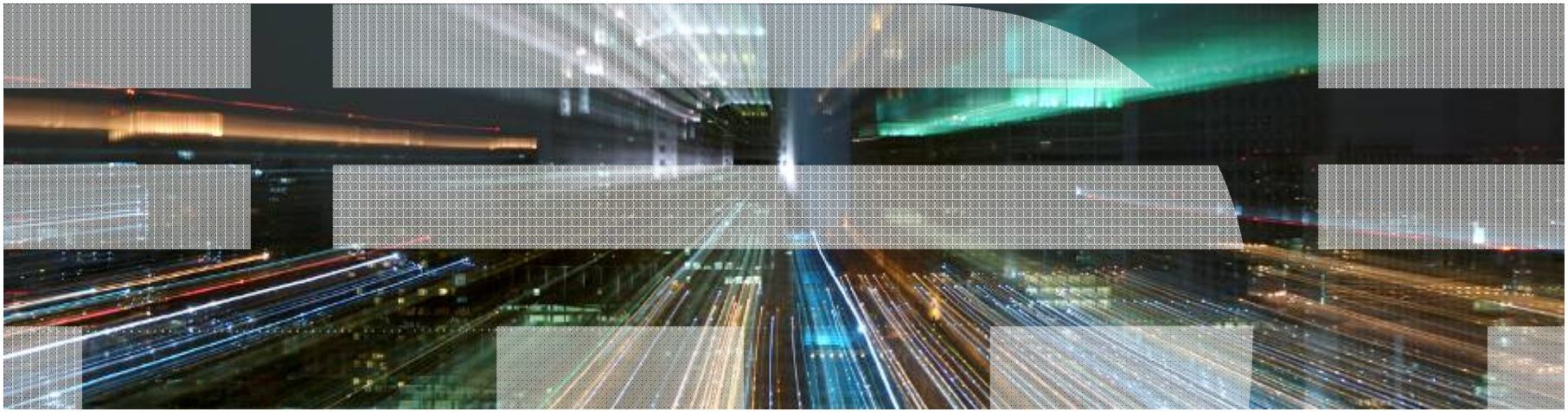
Rex Johnson
johnsore@us.ibm.com



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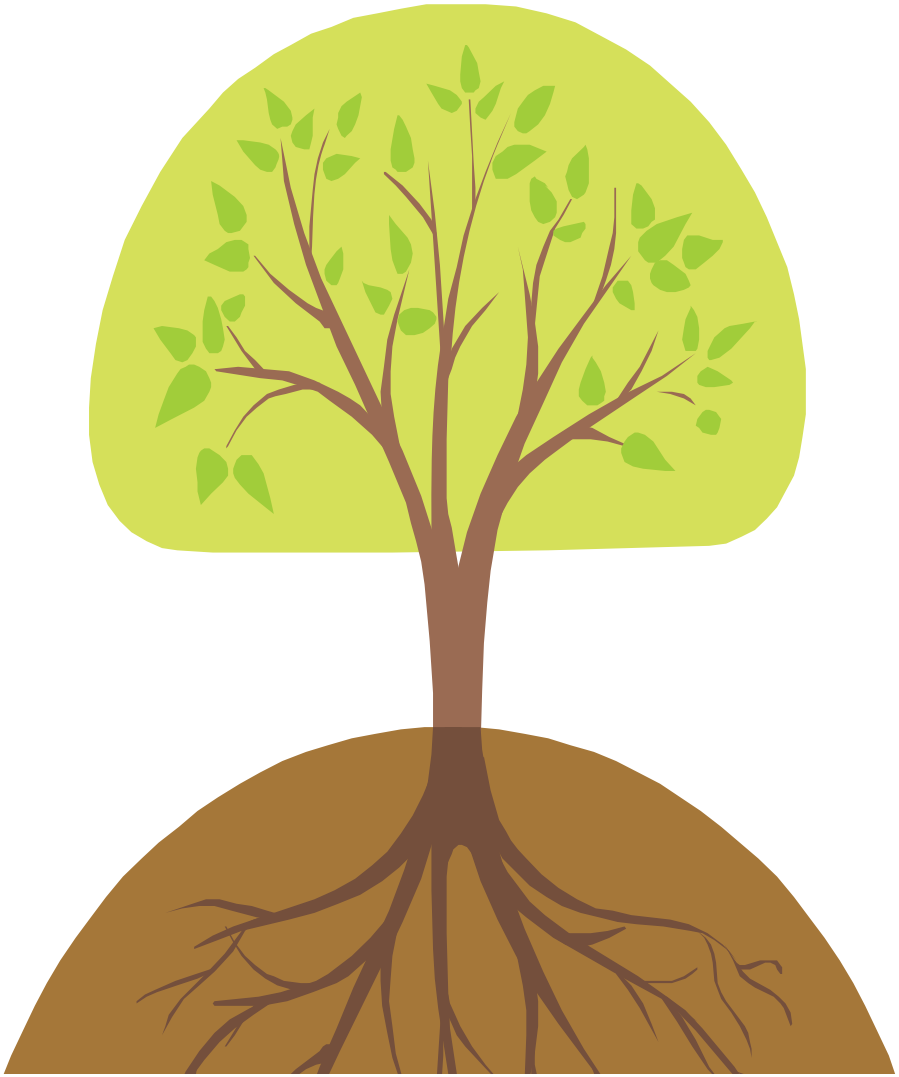
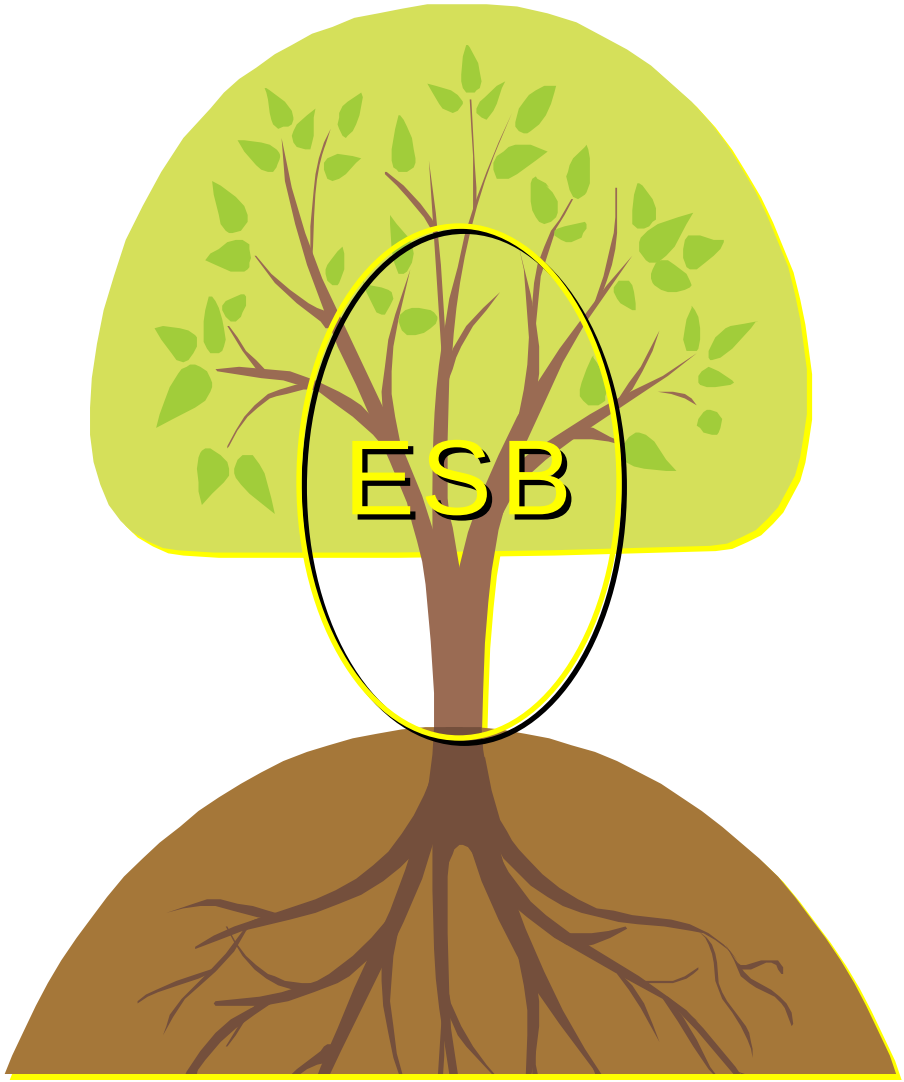
A Successful Pattern From Nature

- A compute network can be depicted as a tree with components: leaves, branches and trunk, and root system.
- Each component encompasses specialized functions to contribute efficiently and effectively to the overall well-being of the whole.
- We will review best-practice SOA design concepts using a tree metaphor to ease understanding of the underlying concepts.



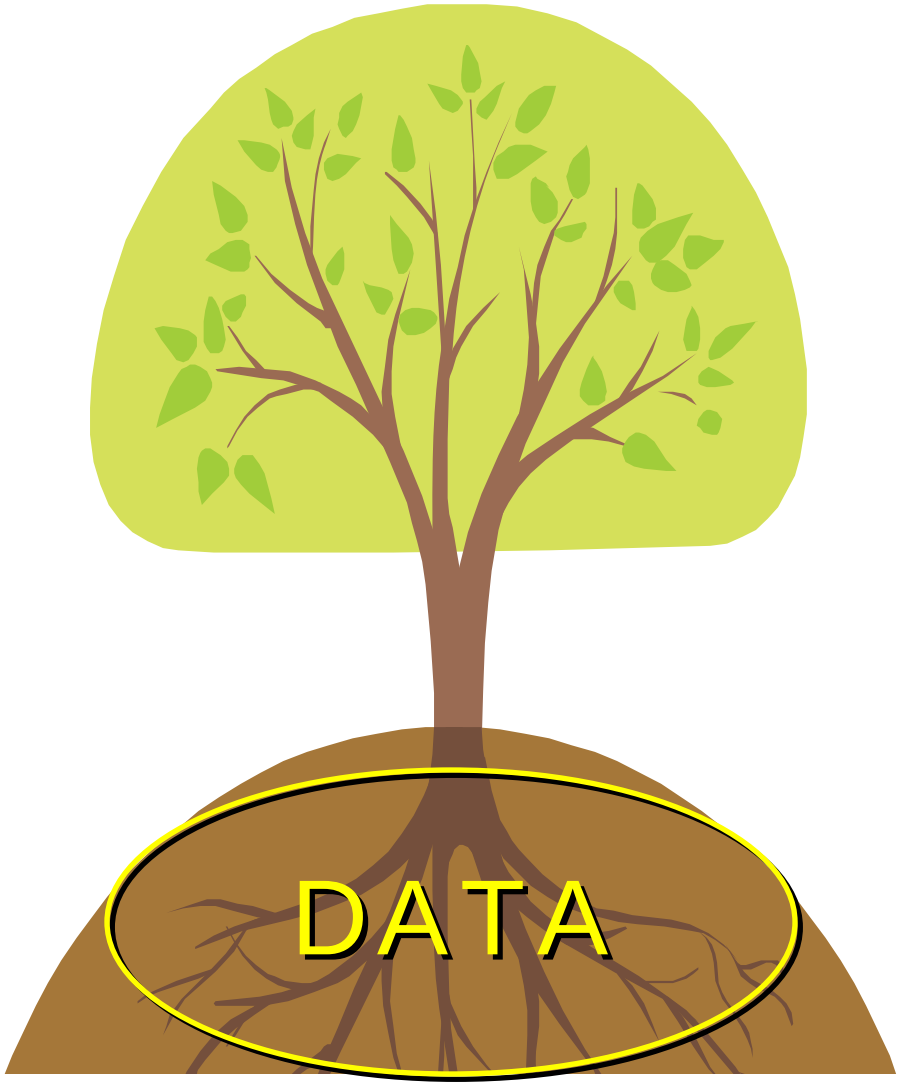
Enterprise Service Bus (ESB) aka Service-Enabled Cloud

- The trunk and branch system are like an ESB.
- Both are two-way systems.
- Both are asynchronous with dedicated channels to and from the root system.
- Both collect data (nutrients) that are sent to the roots for storage, and request data (nutrients used for growth and maintenance)
- Problems and restrictions in the ESB impair performance just as damage to a tree's trunk inhibits growth.
- Just like a tree's bark, we must provide security and integrity for the ESB



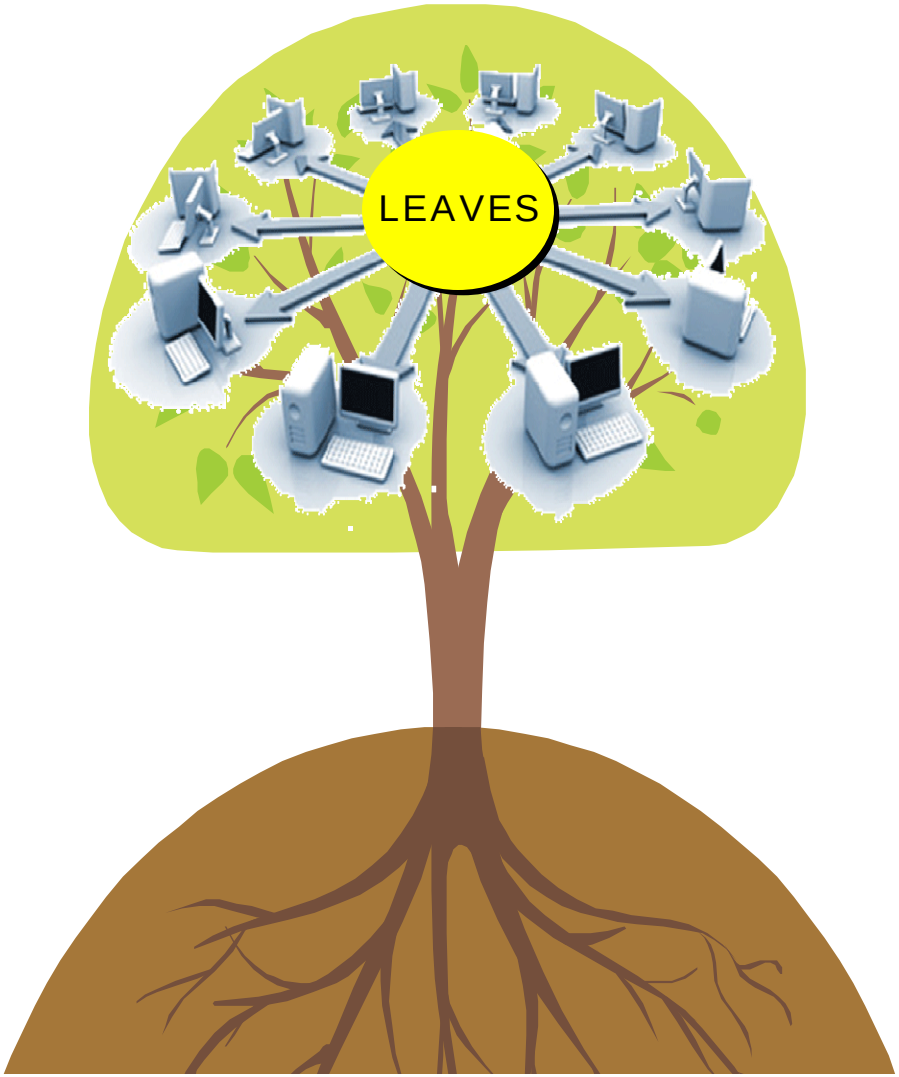
Systems / Files of Record Data Storage

- Just like our tree, data is stored optimally in a secure location. It is not exposed to the elements or herbivores (hackers).
- The root system has multiple branches for nutrient storage; likewise, our data may be stored optimally in different locations and may need to be aggregated before satisfying a request and sent on the ESB (our trunk).
- Even if the ESB is cut, it is possible for the tree to regrow from the root system (nature's disaster recovery).



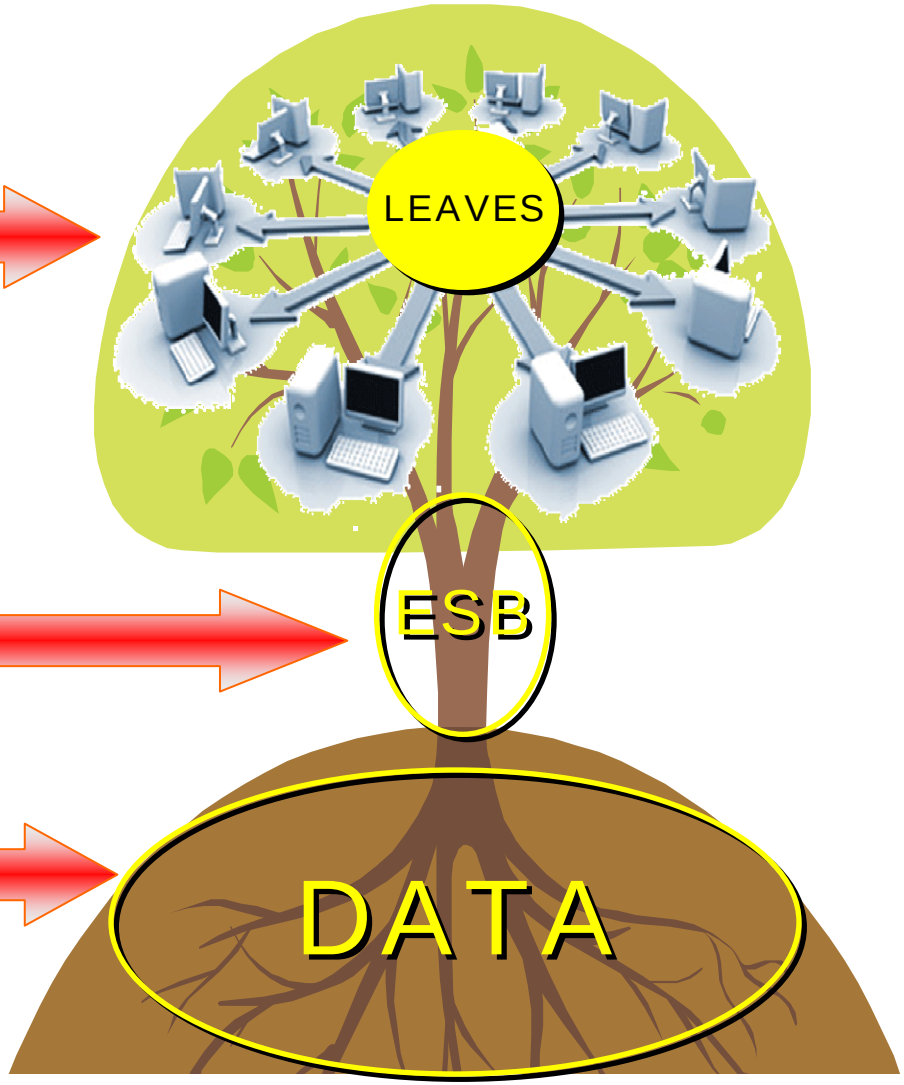
ESB Service Entry Points aka Systems Of Engagement

- Like the leaves of our tree, the ESB service entry point is our interface to the outside world.
- Entry Points collect requests (CO_2 for the tree), transform the request for transport (photsynthesis), and return valuable responses (O_2 in the tree's case).
- Similar to a leaf, nothing gets to the ESB with out processing in a transportable, storable format.
- The leaf interacts intimately with the external environment, just like our rich applications.
- The leaf bundles new nutrients to send down to the roots, and extracts resources needed for interaction, asynchronously, in parallel; we strive for the same treatment of data in the ESB.



The “Full Monty” Of The New Paradigm

- Systems of Engagement
- The Cloud (Public, Private, or Hybrid)
- Systems / Files of Record



What Is Old Is New Again

- “That which has been is that which will be, And that which has been done is that which will be done. So there is nothing new under the sun. Is there anything of which one can say, ‘Look! This is something new’? It was here already, long ago; it was here before our time.” Solomon 970–931 BC
- These concepts are indigenous to compute configurations that preceded them
- Terminology has changed, but the concepts haven’t
- Therefore, regardless of your age or experience level, you are competent and qualified to engage in productive analysis, diagnosis, and design of current “modern” systems!

Enterprise Service Bus – Previous Generation

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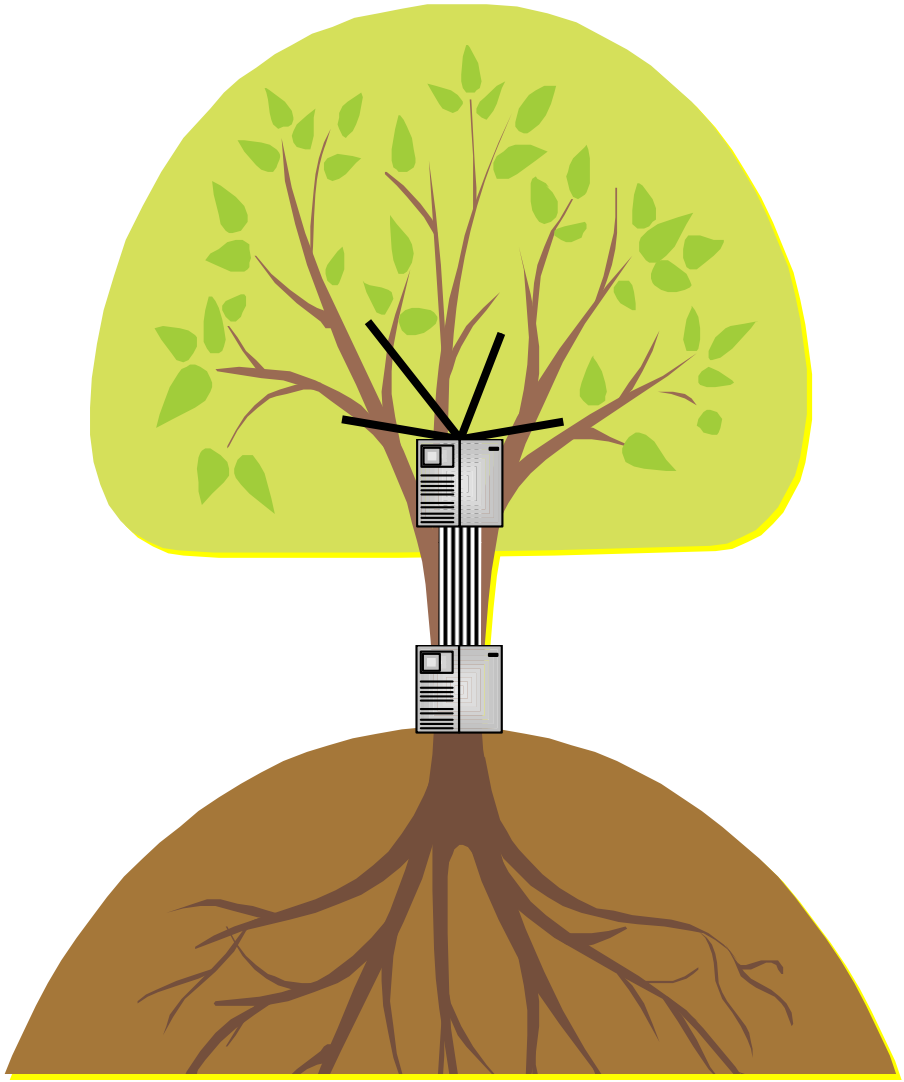

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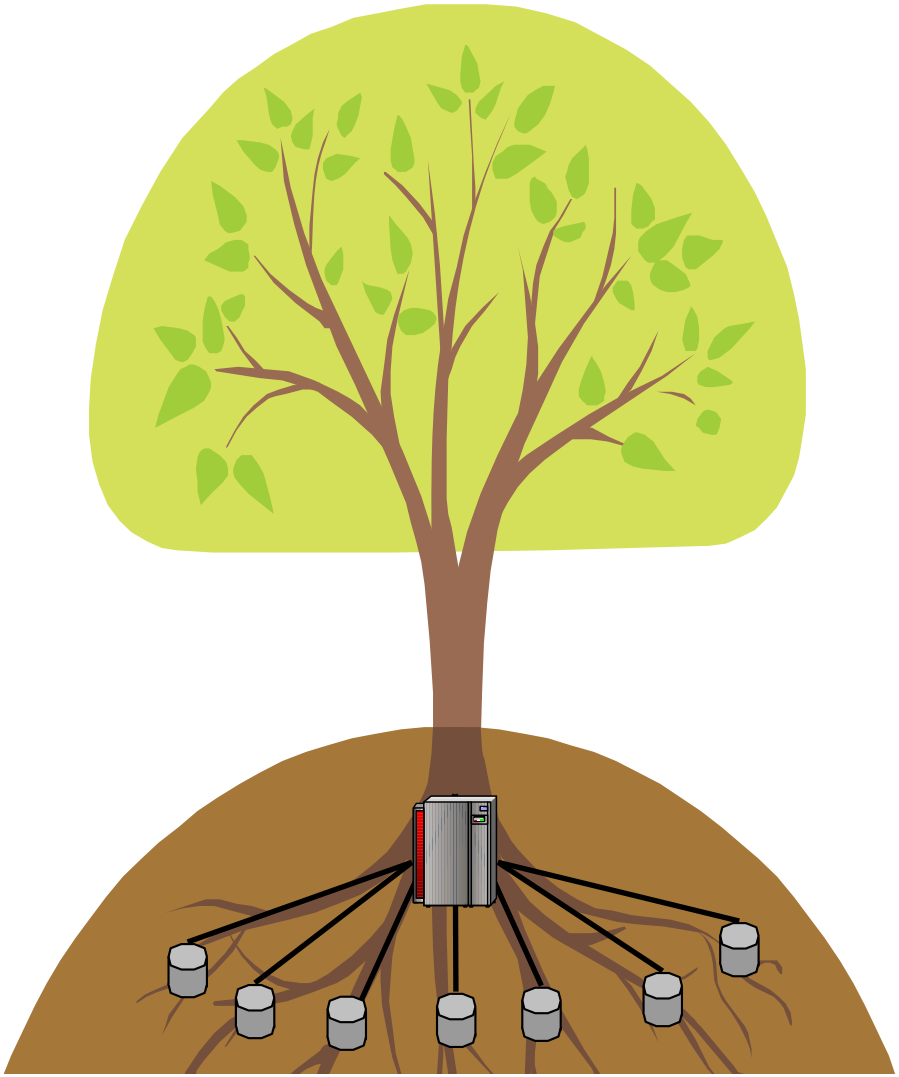

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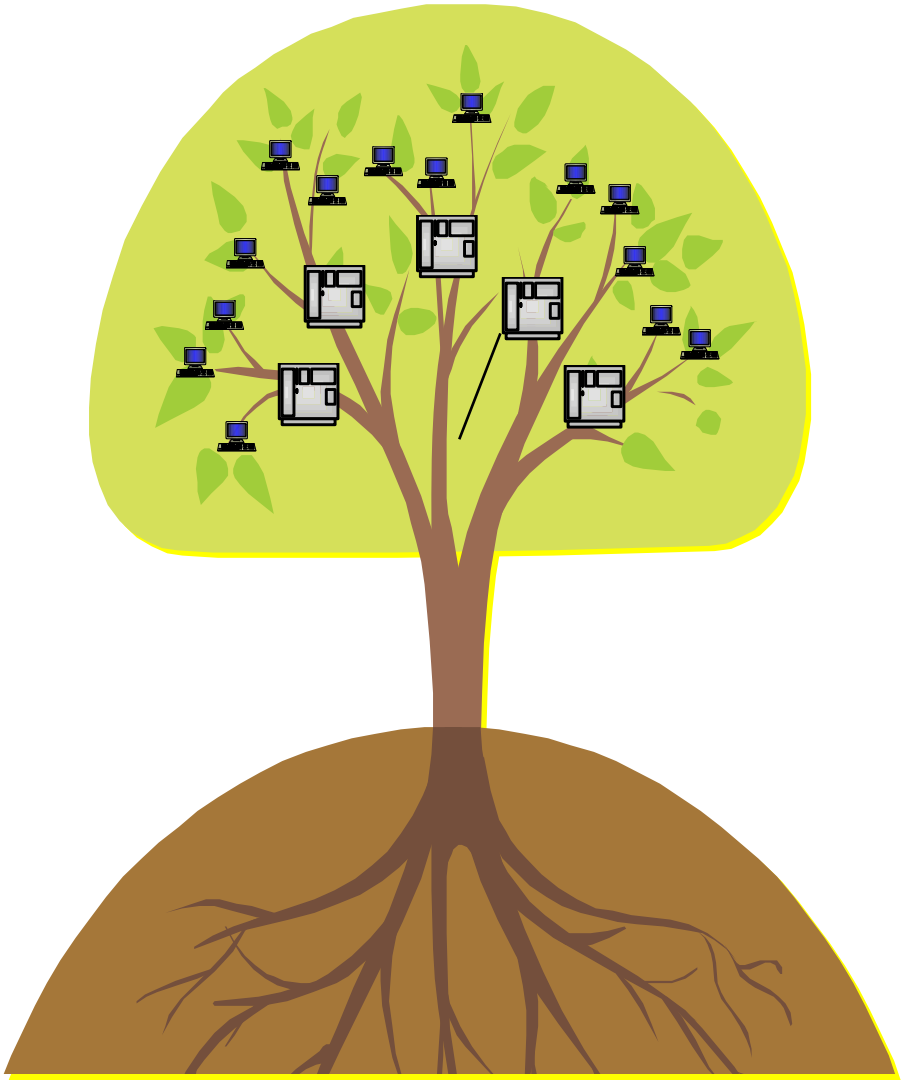

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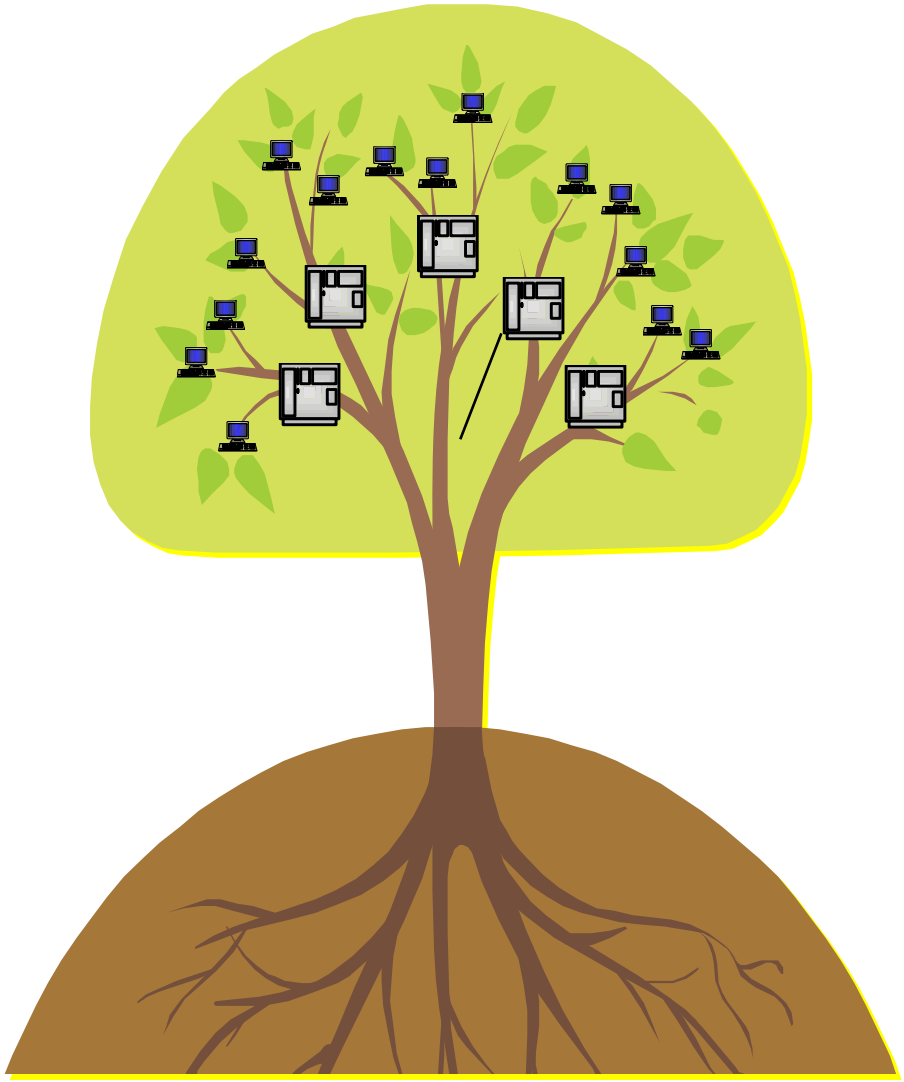
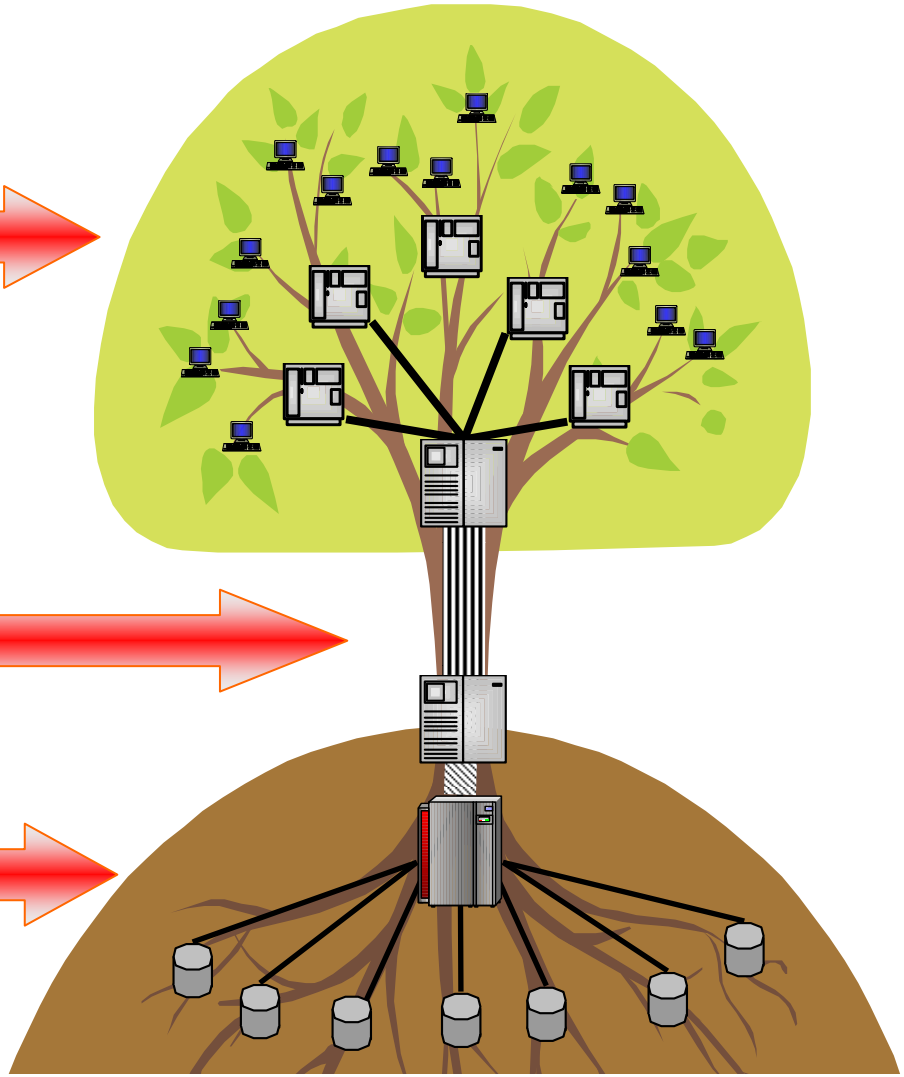


The Past

- Systems of Engagement
- The Cloud (Public, Private, or Hybrid)
- Systems / Files of Record



The Present

- Systems of Engagement
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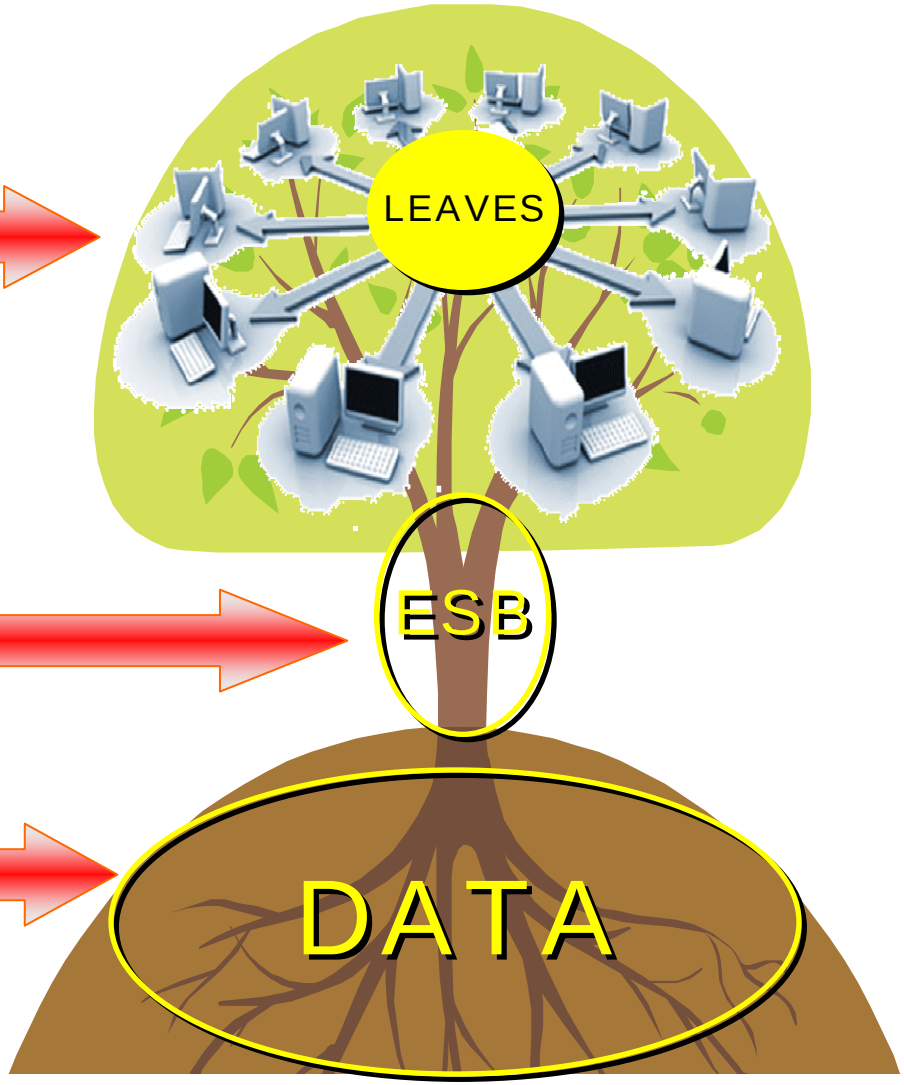

Best Design Practices Updated – Systems Of Engagement

- Keep end-device coordination and interaction as close to the target device as possible (THINK 3x74)
  - Permits rich client experience components to travel over the shortest possible network distance to maintain end-device responsiveness. (keystrokes)
  - Keeps rich client experience components from competing for bandwidth with higher priority data delivery services to improve end-to-end responsiveness and volume predictability. (session priority, operator interaction confined to 3x74)
  - Enables parallelism so that foreground end-device interactions can be overlapped with data requests in the background. Applications can engage in predictive data requests based on end-device behaviors. (3x74 multiple device buffers, data paging)
  - Creates options for data caching – static, dynamic, time-based, and predictive. (3x74 buffers, data paging)
  - Creates options for access monitoring and logging – time, location, application of service requestor, and quality of service. (3x74 error recovery, RTM)

Best Design Practices Updated – ESB / Cloud

- Keep network asynchronous (pseudo-conversational) and full duplex (THINK 37x5)
- Concentrate traffic where possible to provide maximum utilization of communications infrastructure investment without impacting service levels (37x5 transmission groups)
- Implement Quality Of Service techniques and technologies where possible to ensure expected, and or, committed service levels (37x5 session/transmission priorities)
- Provide for alternate routes for traffic to avoid failed components (37x5 NCP PATH statements) – *IP does a pretty good job of this*
- Tenaciously search for and eliminate latency. A common axiom for performance tuning is to look at I/O first – Network I/O is almost always the longest I/O component when data is in flight.
- Use encryption when and where needed, or to maintain compliance with regulations. Encryption takes resources that could be used elsewhere. Don't spread it all over like creamy peanut butter – there can be too much of a good thing. Make your security people cost-justify and pay for these resources. This brings them a closer understanding of the business and their value to it.

Best Design Practices Updated – Systems Of Record

- Tenaciously search for and eliminate latency. A common axiom for performance tuning is to look at I/O first – DASD and Database I/O is almost always the second longest I/O component when data is in flight.
  - Keep data as close to the application as possible. Provision the connections between data and application with bandwidth to handle processing PEAKS, not averages.
  - Group data into blocks so that every I/O is valuable. Avoid piling up latency with chatty applications
- Implement Quality Of Service techniques and technologies where possible to ensure expected, and or, committed service levels (Workload Manager)
- A server is a server is a server. Use the one that fits the workload and the non-functional requirements. In this economic environment, no business has capital to fund opinions, personal preferences, excess labor or capacity – use data and financial analysis
- USE diagnostic tools – monitors, dumps, and traces. IP Trace is as revealing today as GTFTrace ever was (or is), but the current generation of technicians underutilizes these tools
- Understand that High Availability, Disaster Recovery, and Business Continuity are three sets of non-functional requirements and not synonyms

My Ask Of You

- Use the slides if you found them valuable in conceptual understanding
- Engage with those less experienced than you (regardless of age) to help review their designs and visions. Help them not make the same mistakes we did. “Those who cannot remember the past are condemned to repeat it.” George Santayana
- You know more than you think; your experience is valuable, but only if you engage and offer it as a peer/colleague and not as an adversarial curmudgeon
- Engage as early in the design process as possible. Defects found early are the least costly to correct
- Use financials and measurements to support your observations, recommendations, and proposals; and while you are at it, use ALL expense components, hardware, software, labor, and facilities, not just those that conveniently support your theory or claims