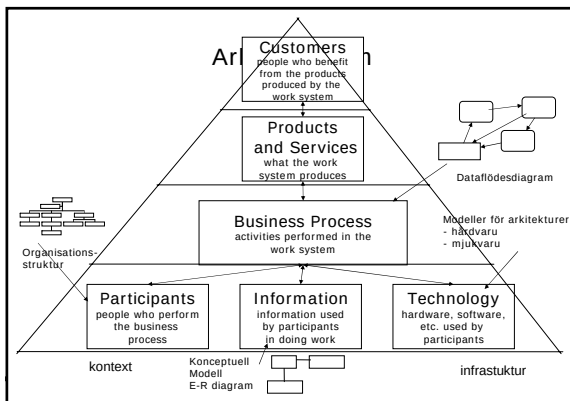
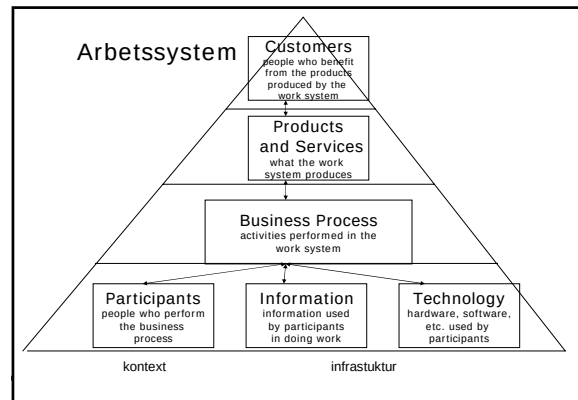


Systemarkitektur F7

Mjukvaruarkitekturer
Hårdvaruarkitekturer

Kapitel: 8, 9, 10



Agenda

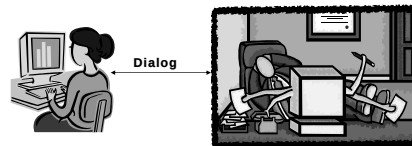
- Hårdvaruarkitekturer
 - Nätverkstopologier
 - Databehandling
- Mjukvaruarkitekturer
- Datorer
- Itea Lab

Arbetssituation



Hur vill du att din dator skall uppföra sig?

Arbetssituation



Hur vill du att din dator skall uppföra sig?

Beteende variabler för IT

- Funktionell kapacitet
 - Lagringskapacitet
 - processorkapacitet
 - Pris tex lagningskostnad
 - Driftsäkerhet
 - Villkor för bearbetningar
- Användbarhet
 - Kvaliteten på användargränssnittet
 - Enkelt att lära sig
 - flyttbar (portability)

Beteende variabler för IT, fort

- Kompatibel
 - Standarder
 - kodning, gränssnitt
- Underhåll
 - Moduler
 - Skälbarhet
 - flexibilitet

Beteendet påverkar

- Vilken typ av dator som arbetsuppgiften behöver
- Hur mjukvaruarkitekturen skall se ut
- Hur hårdvaruarkitekturen skall se ut

Datorer



Konrad's Zuse Z3 computer.
Germany, 1941



ENIAC
(Electronic Numerical
Integrator And Computer)
United States, 1946



Elektronisk datamaskin BESK

Erik Stemme, Gösta Neovius
Germund Dahlquist, Olle Karlqvist,
Göran Kjellberg och Arne Lindberger

Elektronisk datamaskin BESK

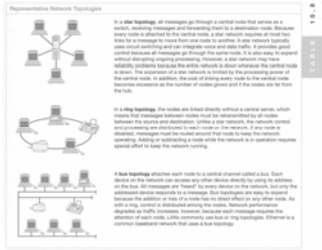
KTH lokaler på Drottninggatan 95A
1953

<http://www.treinfo.se/pers/oka/besk.htm>
Besk och dess föregångare Bark

Datortyper

- Superdatorer (mycket stora volymer, hög hastighet på beräkningar)
- Stordatorer (mainframes) (hela företag)
- Minidatorer (midrange computers) (avdelningar)
- Arbetsstationer (kraftfull PC)
- Persondatorer (dator för en användare)
- PDA (personal digital assistants) (handdatorer)

Computer Networks (topologier)

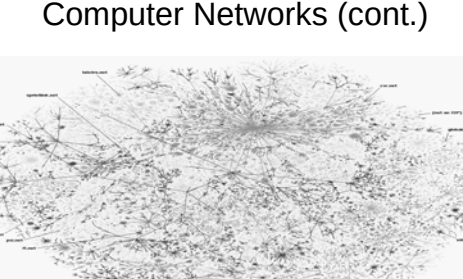


Kommunikationsnätverk

- Internet:
 - Publikt nät för kommunikationen mellan tex olika intressenter
- Intranet
 - Privat nätverk som använder sig av tex webmgränssnitt för kommunikationen mellan anställda, kunder etc
- Extranet
 - Privat nätverk som binder ihop ett företag med tex kunder och leverantörer
 - Virtuellt organisation

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Computer Networks (cont.)



The diagram illustrates a highly interconnected network topology, likely representing the Internet or a large-scale corporate network. It features a dense web of nodes (represented by small circles or dots) and edges (represented by lines connecting the nodes). The network is characterized by a high degree of connectivity, with many nodes having multiple incoming and outgoing links. The overall structure is complex and non-hierarchical, suggesting a decentralized or peer-to-peer architecture. The nodes are distributed across the frame, with a higher density in the center, creating a radial or hub-and-spoke pattern in some areas. The edges vary in thickness, possibly indicating the strength or frequency of the connections. The overall impression is one of a vast, intricate, and highly resilient network.

Source: Computer Science of the World
Networks: A Global View, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2



Functions of IT

Function	Definition	Example of devices or technologies used to perform this function
Capture	Obtain a representation of information in a form permitting it to be transmitted or stored	Keyboard, bar code scanner, document scanner, optical character recognition, sound recorder, video camera, voice recognition software
Transmit	Move information from one place to another	Broadcast radio, broadcast television via regional transmitters, cable TV, satellite broadcasts, telephone networks, data transmission networks for moving business data, fiber optic cable, fax machine, electronic mail, voice mail, Internet

Six Functions of Information Technology		
Function	Definition	Example of devices or technologies used to perform this function
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Functions of IT

Store	Move information to a specific place for later retrieval	Paper, computer tape, floppy disk, hard disk, optical disk, CD-ROM, flash memory
Retrieve	Find the specific information that is currently needed	Paper, computer tape, floppy disk, hard disk, optical disk, CD-ROM, flash memory
Manipulate	Create new information from existing information through summarizing, sorting, rearranging, reformatting, or other types of calculations	Computer (plus software)
Display	Show information to a person	Laser printer, computer screen

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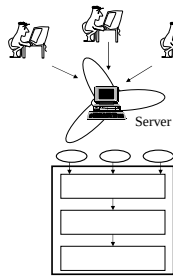
Arkitekturer

- Datorbehandling
 - Centraliserad
 - Klient/server
 - Distribuerad
 - Webbaserad
- Hårdvara
 - En dator
 - Två datorer
 - Tre datorer
 - Flera datorer
- Mjukvara
 - En-lager struktur
 - Två-lager struktur
 - Tre-lager struktur
 - N-lager struktur

– Obs en dator kan vara uppdelad som om den är flera

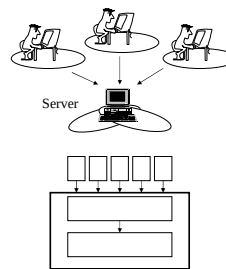
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One-tier (Centralized)



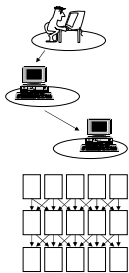
- The presentation layer, application logic and resource manager are built as a monolithic entity.
- Users/programs access the system through display terminals but what is displayed and how it appears is controlled by the server. (These are "dumb" terminals).
- This was the typical architecture of mainframes, offering several advantages:
 - no forced context switches in the control flow (everything happens within the system).
 - all is centralized, managing and controlling resources is easier.
 - the design can be highly optimized by blurring the separation between layers.

Two-tier (Client/server)



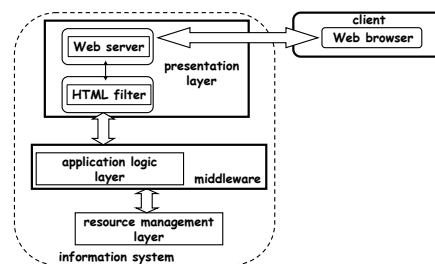
- As computers became more powerful, it was possible to move the presentation layer to the client. This has several advantages:
 - Clients are independent of each other: one could have several presentation layers depending on what each client wants to do.
 - One can take advantage of the computing power at the client machine to have more sophisticated presentation layers. This also saves computer resources at the server machine.
 - It introduces the concept of API (Application Program Interface). An interface to invoke the system from the outside. It also allows designers to think about federating the systems into a single system.
 - The resource manager only sees one client: the application logic. This greatly helps with performance since there are no client connections/sessions to maintain.

3-tier architecture (middleware)



- In a 3 tier system, the three layers are fully separated.
- The layers are also typically distributed taking advantage of the complete modularity of the design (in two tier systems, the server is typically centralized)
- A middleware based system is a 3 tier architecture. This is a bit oversimplified but conceptually correct since the underlying systems can be treated as black boxes. In fact, 3 tier makes only sense in the context of middleware systems (otherwise the client has the same problems as in a 2 tier system).

N-tier architecture (Web)

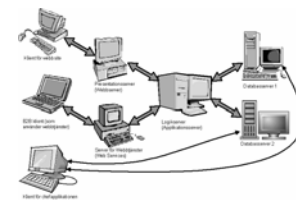


IS-Architektur

- Design → layer
- Implementation → tiers

GK:ITO ITea Lab

- Multi-tiered enterprise system



<http://itea.dsv.su.se/tutorial/>

GK:ITO ITea Lab

- Use ITea as a customer → Website
- Use ITea as a business customer → B2B
- Use ITea as a manager → Chef
- Explore the ITea architecture → Arkitektur
- Explore the ITea databases → Databaser
- Understand the system calls inside the different parts of the ITea system
- Look at the ITea documentation → Dokumentation
- Take the test! → Formulär

GK:ITO ITea Lab

Start : <http://itea.dsv.su.se/tutorial/>

Arbeta individuellt eller i grupper om två men
inlämningsuppgiften lämnas in individuellt