

Applications

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graph TD; Applications[Applications] <--> OS[Operating system (CvMiSi)]; OS <--> Hardware[Hardware];
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**Operating
system
(CvMiSi)**

Hardware

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Outline

- **main features of our basic assignment solution:**
 - hash table x paging table
 - memory optimalization
 - frame allocator
- **main features of our extended assignment solution:**
 - unlimited data structure for virtual memory blocks
 - implementation of the functions from the extended assignment (split, remap, ...)
 - new memory allocator - allocating strategies implementation and comparison

Hash table vs. Paging table

- hash table could be slightly faster
(if no conflicts)
- paging table is $O(1)$

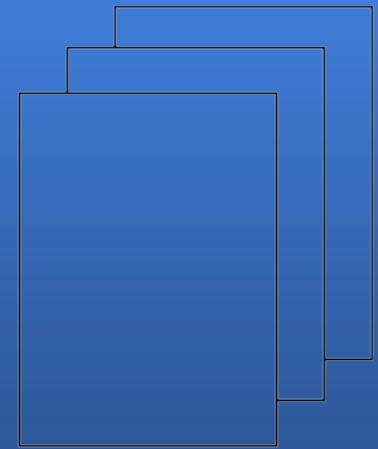
Our solution:

- classic 2-level paging
- no unexpected problems

Paging table

- tables are created when needed (`vma_alloc` call)
- adds some cases when **ENOMEM** is returned (later)

	physical address	flags
0		
1		
2		
⋮	⋮	⋮
1023		



1st level

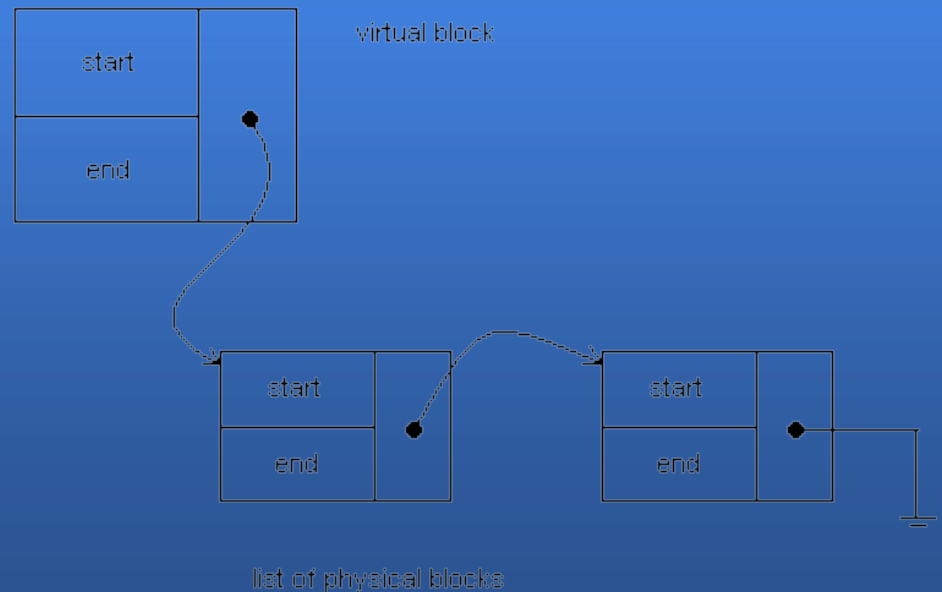
2nd level

The physical frame allocator

- **The free frames structure:**
 - linked list
 - stored directly in the free memory
 - header, footer
- **The allocated frames structure:**
 - sorted linked list
 - stored in the kernel heap (malloc, free)
 - frames for the kernel heap registered after the initialization

Data structure for virtual memory blocks

- sorted linked list of used blocks
- 1 virtual block - sorted list of assigned physical blocks



Functions from the extended assignment

- **vma_split** - **ENOMEM** if vma block cannot be allocated
- **vma_remap** - **ENOMEM** if new page table cannot be allocated

Memory allocator

- **Modified allocator from Kalisto**
- **Extended assignments**
 - **new Allocation strategies**
 - **List based strategies (* fit)**
 - **Allocation only thru free blocks**
 - **Strategy for (specific) small size alocation**
 - **Buddy system vs. RB-tree**
 - **Enormous vs. Classic overhead**
 - **Simple vs. Complicated delete**

Problems

- debugging
- (re)inventing things takes too much time

Conclusion

The diagram consists of three horizontal rounded rectangular boxes. The top box is green and contains the word 'Conclusion'. The middle box is blue and contains a list of factors: '+ experience teamwork' and '- time requirements'. The bottom box is red and contains the text 'Cvengroš, Mikuš, Šišaj', 'Operating System', and '10'. A blue arrow points from the top of the middle box to the bottom of the green box. A red arrow points from the bottom of the middle box to the top of the red box. A green arrow points from the right side of the green box to the right side of the blue box. A blue arrow points from the right side of the blue box to the right side of the red box.

+

experience

teamwork

-

time requirements