Problem With 64-bit Systems

Given:
- virtual address space $= 64\,bits$
- page size $= 4\,KB = 2^{12}\,B$

? How much space would a simple single-level page table take?

if Each page table entry takes $4\,Bytes$

then The whole page table (2^{64-12} entries) will take

$$2^{64-12} \times 4\,B = 2^{54}\,B = 16\,PB \quad (peta \Rightarrow tera \Rightarrow giga)!$$

And this is for ONE process!

Multi-level?

if $10\,bits$ for each level

then $\frac{64-12}{10} = 5$ levels are required

5 memory accress for each address translation!